



Consumers' hedonic and utilitarian attitudes toward sustainable products: Implications for the sustainability value–behavior gap and wood-based bioproducts

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ABSTRACT

The current research lacks insights into how consumers' utilitarian and hedonic attitudes may influence their sustainability value–behavior gap. We adopt the value–attitude–behavior (VAB) model to examine how utilitarian and hedonic attitudes toward products moderate the consumers' sustainability value–behavior relationship. We conduct three studies: the first tests the basic VAB model, the second examines differences between two time points, and the third compares three wood-based bioproducts: bioplastic bottle, T-shirt, and biofuels. The findings suggest that consumers with sustainable consumption values and hedonic attitudes toward sustainable products exhibit a reduced value–behavior gap and that this effect persists over time. This was most prominent in the case of the wood-based bioplastic bottle. Additionally, consumers with sustainable consumption values and utilitarian attitudes toward sustainable products tend to show a negative effect on the value–behavior gap, which is prominent with wood-based biofuels. These findings underscore the inherent nature of sustainability values and appeals as hedonic, hence the importance of aligning them with hedonic attitudes and related product attributes. Moreover, the importance of both hedonic and utilitarian attitudes is recognized in explaining the sustainability value–behavior gap, and the findings offer guidance for managers and policymakers promoting sustainable products while also highlighting the risks associated with greenwashing.

1. Introduction

With a growing number of consumers expressing sustainability values and an interest in sustainable consumption, new sustainable products are routinely entering the market. According to McKinsey and NielsenIQ (2023), 78% of Americans claim to prioritize a sustainable lifestyle, and between 2018 and 2022, products with environmental sustainability labeling grew at a faster rate than those without. These products are typically claimed to utilize clean energy, reduce pollution, and be recyclable, thereby minimizing their environmental impact (Severo et al., 2018). However, while some sustainable products successfully generate market demand, others fail to gain traction (Li et al., 2017). Sustainability marketing failures are often attributed to a sustainability value–behavior gap among consumers (Johnstone and Tan, 2015) or to companies' misleading or false claims about sustainability benefits, a practice known as “greenwashing” (Boncinelli et al., 2023). A

deeper understanding of the sustainability value–behavior gap and greenwashing is therefore crucial for enhancing the market success of sustainable products, including wood-based bioproducts (Rausch and Kopplin, 2021).

The sustainability value–behavior gap (also known as the sustainability intention–behavior gap) arises when consumers' sustainability values and related intentions do not align with their actual behaviors (Johnstone and Tan, 2015). Research has identified several factors influencing the sustainability value–behavior gap. These factors include the perceived value and legality of the product or service (Cheng et al., 2024), as well as its uniqueness, availability, and familiarity (Johnstone and Tan, 2015; Diddi et al., 2019). They further encompass potential lifestyle changes, personality traits and their impacts (Johnstone and Tan, 2015; Diddi et al., 2019), and consumers' altruism (Chang and Hung, 2023), along with knowledge of sustainability measures (Diddi et al., 2019; Lin and Shi, 2022) and social factors, including

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demographics (Johnstone and Tan, 2015; La Fuente et al., 2021; Yan et al., 2021; Chang and Hung, 2023; Cheng et al., 2024). The knowledge of sustainability measures and their impacts are also closely tied to the concept of “greenwashing,” in which companies exploit consumers' limited understanding by misrepresenting or even falsifying their actual environmental impact (Boncinelli et al., 2023).

Despite growing academic interest in the sustainability value–behavior gap, existing studies have entirely overlooked the role of utilitarian and hedonic aspects in shaping these phenomena. Following Voss et al. (2003), utilitarian attitudes toward products are defined as perceptions of products being effective, helpful, functional, necessary, and practical. Similarly, hedonic attitudes toward products are defined as perceptions of them being fun, exciting, delightful, thrilling, and enjoyable. According to the value–attitude–behavior (VAB) theory (Homer and Kahle, 1988), attitudes can have a significant effect, including in the context of the sustainability value–behavior gap, which motivates our consideration of utilitarian and hedonic attitudes in this study.

While literature on all these things exists independently, none addresses this specific overlap. As will be revealed below, results from the literature are mixed regarding whether sustainability appeals are more closely associated with utilitarian or hedonic attitudes and their related product perceptions (Luchs et al., 2010; Arruda-Filho and Brito, 2017; Luchs and Kumar, 2017; Bauer et al., 2013; Biswas and Roy, 2015; Tran and Paparoidamis, 2021; Weisstein et al., 2023; Yang et al., 2021). This appears to be largely due to different studies using different framings for sustainability, such as explicit guilt and general ethical appeals (Tran and Paparoidamis, 2021), or general and self-focused environmental benefits (Weisstein et al., 2023). However, there is no research examining sustainability as a simple claim (e.g., “this is a sustainable product”) and combining it with utilitarian and hedonic products and attitudes. This is the most common case, for example, when a sustainability certificate or eco-label conveys a similar simple message.

The objective of this study is to investigate how consumers' sustainable consumption values, along with their utilitarian and hedonic attitudes toward sustainable products, influence their sustainable behavior. To address this question, we adopt the value–attitude–behavior (VAB) model (Homer and Kahle, 1988) as our theoretical framework. Within this framework, we examine the moderating effects of consumers' utilitarian and hedonic attitudes toward sustainable products (Voss et al., 2003) on the relationship between sustainable consumption values (Haws et al., 2014) and behavior (measured as consumers' tendency to choose the environmentally friendly alternative even if it is more expensive; Schlegelmilch et al., 1996). We conduct a total of three studies. The first tests the VAB model itself, the second determines whether the hypothesized effects hold over time, and the third tests whether the model and hypotheses are valid for three distinct wood-based bioproducts: a water bottle made from a wood-based bioplastic, a T-shirt made from a wood-based fabric, and a wood-based biofuel. These products also represent a continuum from more hedonic, ecological packaging (Smith et al., 2023) at one end to more utilitarian products at the other end.

The findings, using a demographically representative sample from Northern and Western European panels consisting of Finnish and Dutch citizens, suggest that consumers with sustainable consumption values and hedonic attitudes toward sustainable products exhibit more positive sustainable consumption behavior, and that this effect persists over time. This is most apparent with the wood-based bioplastic water bottle, confirming previous research suggesting that ecological packaging is perceived as inherently hedonic (Smith et al., 2023). Additionally, sustainable consumption values and utilitarian attitudes toward sustainable products tend to have a negative effect on sustainable consumption behavior, which is most prominent in the case of more utilitarian products such as wood-based biofuel.

While our results are consistent with much of the previous research, our novel use of the VAB model allows us to make several significant

theoretical contributions. First, adding to the literature assessing the factors behind the sustainability value–behavior gap (Johnstone and Tan, 2015; Diddi et al., 2019; La Fuente et al., 2021; Yan et al., 2021; Chang and Hung, 2023; Cheng et al., 2024), we assert that the gap is most likely to occur in the context of utilitarian products. In addition, our study contributes to the literature on greenwashing (e.g., Boncinelli et al., 2023), suggesting that products in hedonic categories are the most fertile ground for greenwashing. This is not only because consumers with sustainable consumption behavior (hereafter referred to as sustainable consumers) do not easily change their behaviors in this context, but also because hedonic contexts make them less analytical toward greenwashing. These findings highlight the importance of building consumer understanding and knowledge on through customer education (Holopainen et al., 2014; Panico et al., 2022; Maleknia and Hälälışan, 2025). Finally, our study extends previous research by suggesting that sustainability values and appeals are more closely associated with hedonic aspects (Luchs et al., 2010; Boer and Fischer, 2013; Tran and Paparoidamis, 2021; Larasatie et al., 2023; Smith et al., 2023; Luo et al., 2024), particularly in cases of simple sustainability framing and claims, and among consumers with strong sustainable consumption values. These contributions have implications for professionals working in sustainable and wood-based product marketing, as well as for policymakers.

We first introduce previous literature on the sustainability value–behavior gap, VAB model and review hedonic and utilitarian attitudes in sustainable consumption research with a particular focus on the forest sector. We then present our theoretical framework and hypotheses, followed by the methodology, data, and results for each of the three studies. In the discussion section, we summarize our findings, highlight the theoretical contributions and practical implications, and consider the study's limitations and directions for future research.

2. Literature review

As noted previously, the sustainability value–behavior gap describes a misalignment between consumers' stated values or intentions and actual behaviors (Johnstone and Tan, 2015). Factors contributing to the gap include perceived value, legality (Cheng et al., 2024), uniqueness, availability, familiarity (Johnstone and Tan, 2015; Diddi et al., 2019), lifestyle changes, and personality traits (Johnstone and Tan, 2015; Diddi et al., 2019), consumer altruism (Chang and Hung, 2023), and social and demographic factors (Johnstone and Tan, 2015; Yan et al., 2021; Chang and Hung, 2023; Cheng et al., 2024). These factors identified in general sustainable consumption research are similar to those identified in forest sector research (La Fuente et al., 2021). Further critical factors influencing the sustainability value–behavior gap are the knowledge and skills related to sustainability practices, along with the perceived effectiveness of these measures (i.e., perceived behavioral control; Diddi et al., 2019; Lin and Shi, 2022). These factors are closely linked to greenwashing, which occurs when consumers' knowledge is constrained by companies' misrepresentations or even false claims about actual environmental impacts (Boncinelli et al., 2023).

2.1. The VAB model and sustainable consumption

What seems to be completely missing from the current sustainability value–behavior gap research is the consideration of attitudes. According to the value–attitude–behavior (VAB) model (Homer and Kahle, 1988), a value–behavior relationship can be mediated or moderated by consumers' attitudes, depending on whether both values and attitudes are intrinsic or whether attitudes are more external—i.e., created by marketing messages and product imagery (Maio and Olson, 1994). While in the theory of planned behavior the value perspective is based on the expectancy-value model, focusing on beliefs about the benefits of adopting or using an object with certain characteristics (Ajzen, 2001), the VAB model treats value as reflecting an individual's personal values.

Voss et al. (2003) suggest, consumer attitudes have distinct hedonic and utilitarian components, with hedonic attitudes being more enacted and prevalent in hedonic product contexts, while utilitarian attitudes are more enacted and prevalent in utilitarian contexts. Furthermore, values are relatively stable (though not constant), whereas attitudes show more volatility over time, suggesting that time can affect this relationship and joint effect of values and attitudes on behavior (Eisenbraut, 2019). For example, the novelty of a product or service can enhance these relationships, especially if the product is also perceived as cool (Im et al., 2015).

Studies exploring the VAB model and sustainable consumption have found that pro-environment values positively affect attitudes, which further positively mediate behavior (e.g., Cheung and To, 2019; Habib et al., 2023; Jacobs et al., 2018; Kim and Hall, 2021; Kumar, 2021; Tewari et al., 2022; Upadhyay and Kamble, 2023; Saini et al., 2024; Kumar et al., 2025; Liu et al., 2025). However, certain product factors, such as perceived disease risks (e.g., concerns that using recycled water to irrigate wine grapes might introduce impurities), can weaken the impact of people's sustainable consumption values on their attitudes and purchasing decisions (Boer and Fischer, 2013).

More general literature on sustainable consumption values and attitudes suggests that economic and functional product attributes, as well as perceived health benefits, dominate consumers' product choices (Bauer et al., 2013; Biswas and Roy, 2015; Yang et al., 2021). These attributes relate to personal and egoistic perceptions in consumer decision-making (Srivastava and Maurya, 2023). In comparison, consumers often place less value on environmental or ethical issues (Beak et al., 2020; Potoglou et al., 2020; Raineau et al., 2023). In the context of wood-based bioproducts, price and quality are often valued over environmental product attributes like certificates (Holopainen et al., 2017; So and Laforteza, 2022; Zanchini et al., 2022).

Other attributes promoting sustainable products include social influence and networks (Cerqua et al., 2020). In addition, eco-labeling and certification enhance perceptions of healthiness (Sigurdsson et al., 2023; Katt and Meixner, 2020), environmental friendliness (Li et al., 2018; Sigurdsson et al., 2023), and social responsibility (Katt and Meixner, 2020), while also contributing to perceptions of modernity and high quality (Li et al., 2018; Katt and Meixner, 2020; Sigurdsson et al., 2023). According to Maleknia and Hälälışan (2025), trust-building is particularly important in the context of wood-based bioproducts and certification. Panico et al. (2022) highlight that knowledge and understanding of the value of certification have a stronger influence on behavior than general environmental values and attitudes per se. All this underscores the importance of educating consumers about the values underpinning certified forest products, which can also foster positive attitudes and behaviors toward them (Holopainen et al., 2014).

While the above literature highlights the positive effects of pro-environmental values and attitudes on behavior toward sustainable and wood-based bioproducts, it does not account for utilitarian and hedonic attitudes (Voss et al., 2003) as such. In the next section, we review the sustainable consumption literature that explicitly considers utilitarian and hedonic attitudes.

2.2. Utilitarian and hedonic attitudes and sustainable consumption

Luchs et al. (2010) suggest that consumers may have differing preferences between utilitarian and hedonic product categories, indicating that sustainability attributes are more valued in gentleness-related products than in strength-related products. According to Luchs and Kumar (2017), due to the dominance of utilitarian product attributes, consumers are also more likely to trade hedonic product attributes for sustainability rather than utilitarian ones, although consumers who demonstrate a preference for emotional product attributes are less likely to do so. Indeed, Arruda-Filho and Brito (2017) suggested that sustainability appeals are most closely linked to utilitarian perceptions, especially when combined with technology as a product category.

More recently, Tran and Paparoidamis (2021) demonstrated that framing utilitarian products with explicit guilt appeals and hedonic products with general ethical appeals was most effective for various product categories. Meanwhile, Weisstein et al. (2023) found that both utilitarian and hedonic product perceptions positively influence the perceived tastiness of organic food products and consumers' willingness to pay a premium when sustainability appeals align with a product category. They suggested that utilitarian food products should be framed using general environmental benefits, while hedonic food products should emphasize self-focused environmental attributes, including health benefits. In contrast, Smith et al. (2023) argued that while ecological packaging, the use of renewable energy sources, and social responsibility may not significantly enhance a product's utility, customers are still willing to pay a premium for these attributes, suggesting that sustainability is also associated with hedonic perceptions. An argument supported by Larasatie et al. (2023) in the context of sustainable forest products. In the same context, Luo et al. (2024) suggest that both utilitarian and hedonic attitudes have positive effects on preferences for wood-based recycled paper and bioplastics.

As the literature above suggests, the findings are unclear about whether sustainability concerns align more closely with utilitarian or hedonic attitudes and the associated product perceptions. This appears to be largely because different studies have used different framings for sustainability (e.g., explicit guilt and general ethical appeals [Tran and Paparoidamis, 2021]; general and self-focused environmental benefits [Weisstein et al., 2023]). However, studies in this context that use only a simple claim (e.g., "this is a sustainable product") and combine it with utilitarian and hedonic products and attitudes are completely missing. Nevertheless, such simple framings and claims about sustainability are what consumers encounter most often, for example through certificates and eco-labels. Moreover, studies considering utilitarian and hedonic attitudes in the contexts of the sustainability value-behavior gap as well as wood-based bioproducts are absent.

3. Model development

Addressing the above shortcomings, this study adopts the VAB model by considering the main effect of sustainable consumption values on consumers' behavior alongside the moderating influences of utilitarian and hedonic attitudes (Fig. 1). Following Maio and Olson (1994), in our case attitudes are external factors created by marketing messages and product imagery and are therefore treated as moderators in the model. This framework is used to address our research question: How do consumers' sustainable consumption values, along with their utilitarian and hedonic attitudes toward sustainable products, influence their sustainable behavior?

Following the literature on the VAB, to address generalizable values (Homer and Kahle, 1988), sustainable consumption values are taken to

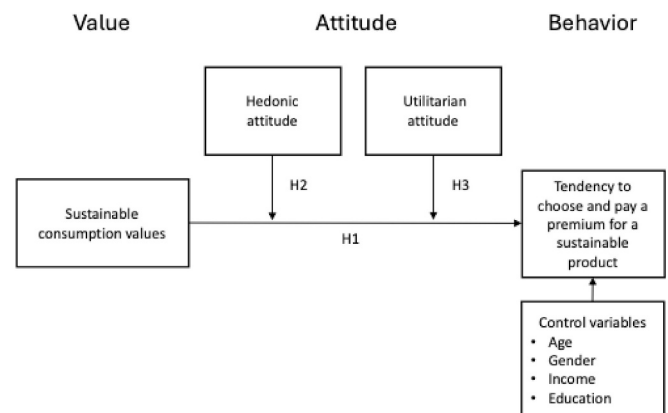


Fig. 1. Theoretical framework: The value-attitude-behavior model.

signify an individual's intrinsic values toward sustainable consumption (Haws et al., 2014). When examining consumer behavior, consumers' tendency to choose the environmentally friendly alternative even if it is more expensive is assessed (Schlegelmilch et al., 1996). Following Hulland and Houston (2021), measuring tendencies is a more conscious measure and thus a better predictor of behavior than measuring intentions alone. Moreover, this research focuses on premium pricing because sustainability initiatives often involve additional costs that producers aim to recover through higher market prices (Li et al., 2017). Utilitarian and hedonic attitudes toward sustainable products are measured using the scales introduced by Voss et al. (2003).

As the VAB model is case-specific (Boer and Fischer, 2013), the robustness and generalizability of the results were enhanced by conducting a total of three studies. These consider the basic VAB model, the effects of temporal differences (e.g., Eisentraut, 2019), and the influence of different types of products (e.g., Boer and Fischer, 2013; Im et al., 2015), including wood-based bioproducts such as a bioplastic bottle, a T-shirt, and biofuel.

3.1. Main effect of sustainable consumption values on sustainable behavior

The VAB model (Homer and Kahle, 1988; Maio and Olson, 1994), general sustainable consumption literature (e.g., Kumar et al., 2025; Liu et al., 2025), and literature on wood-based bioproducts (e.g., Sakagami and Sakaguchi, 2022; Maleknia and Hälälüşan, 2025) suggest that pro-environmental values positively affect sustainable behavior. Moreover, values are relatively stable (Eisentraut, 2019). Exceptions occur with novel products; if they lose their novelty and perceived value, this can negatively affect behavior (Im et al., 2015).

Socio-demographic factors also influence the relationship between sustainability values and behavior. For instance, higher education levels, higher income, and being female are associated with a stronger sustainability value–behavior relationship, while age tends to have a diminishing effect (Del Giudice et al., 2018). Additionally, various personality traits may moderate this relationship (Hoffmann et al., 2018; Hasni et al., 2024). Overall, a hypothesis governing all three studies was:

H1: Sustainable consumption values are positively associated with sustainable behavior.

3.2. Moderating effects of utilitarian and hedonic attitudes

Most sustainable consumption literature suggests that sustainability appeals framed as a simple claim are inherently perceived as hedonic (Luchs et al., 2010; Boer and Fischer, 2013; Tran and Paparoidamis, 2021; Larasatie et al., 2023; Smith et al., 2023), a finding further highlighted in the context of wood-based bioproducts (Luo et al., 2024). As suggested by Weisstein et al. (2023), alignment between sustainability claims and product attributes is critical to promoting sustainable behavior. This further suggests that simple sustainability claims, which are inherently hedonic, are better aligned with hedonic product contexts. However, from a VAB literature perspective, while the alignment of sustainability claims and product attributes primarily affects attitudes, personal values also matter (Homer and Kahle, 1988; Maio and Olson, 1994). More precisely, when personal sustainability values, assumed to be inherently hedonic, are aligned with hedonic attitudes toward sustainable products, they reinforce one another and promote sustainable behavior. This effect is further strengthened in hedonic product contexts, where such attitudes are more salient (Voss et al., 2003).

The simple hedonic claims and related hedonic attitudes are present in Studies 1 and 2, as well as with the product in Study 3a—a wood-based bioplastic water bottle—given that ecological packaging is perceived as inherently hedonic (Smith et al., 2023). The positive

alignment of these types of simple hedonic claims and related hedonic attitudes with inherently hedonic sustainability values is hypothesized to decrease the gap:

H2: The greater the hedonic attitude toward a sustainable product, the stronger the relationship between sustainable consumption values and sustainable behavior.

A large vein of general sustainable consumption literature (e.g., Kumar et al., 2025; Liu et al., 2025) and wood-based bioproducts research (Luo et al., 2024; Maleknia and Hälälüşan, 2025) suggests that utilitarian attitudes toward sustainable products have only positive effects on sustainable behavior. However, while sustainability appeals are inherently perceived as hedonic (Luchs et al., 2010; Boer and Fischer, 2013; Tran and Paparoidamis, 2021; Larasatie et al., 2023; Smith et al., 2023; Luo et al., 2024), a misalignment with utilitarian product attributes can reduce the effectiveness of communication (Weisstein et al., 2023). Moreover, from a VAB model perspective (Homer and Kahle, 1988; Maio and Olson, 1994), it is not only the misalignment between simple hedonic sustainability claims and utilitarian product attributes that matters. It is also the misalignment between inherently hedonic sustainability values and utilitarian attitudes toward sustainable products, which are more salient in utilitarian product contexts (Voss et al., 2003). We hypothesize that this mechanism increases the sustainability value–behavior gap, which is especially pronounced in utilitarian product categories such as wood-based biofuels (Study 3c).

H3: The greater the utilitarian attitude toward a sustainable product, the weaker the relationship between sustainable consumption values and sustainable behavior.

4. Data, methods, and results

4.1. Study 1: VAB model

Study 1 tests the hypothesized effects (H1–3) by assessing respondents' intrinsic values surrounding sustainable consumption, general attitudes toward sustainable products, and behavior.

4.1.1. Sample and procedures

Data were collected by an independent market research company from a total of 461 Finnish participants aged 18 years or older. The sample includes 52.7% male and 47.3% female respondents, with a mean age of 58.0 years (SD = 15.7). The most common income categories are €30,000 to €39,999 (21.5%), €20,000 to €29,999 (21.0%), €10,000 to €19,999 (16.7%), and €40,000 to €49,999 (14.1%). Regarding educational attainment, 27.5% of participants have completed high school, 22.0% hold a bachelor's degree, 21.7% have completed some college education, 16.9% hold a master's degree, 2.2% hold a PhD, and 9.3% have not completed high school. In terms of employment status, 45.8% are employed, 31.0% are retired, 9.3% are students, 7.2% are unemployed, 4.1% are self-employed, 1.3% are unable to work, and 1.3% are homemakers.

The questionnaire first asks the respondents for demographic information such as gender (a binary variable), age, income, and education (Høibø et al., 2015). Questions on sustainable consumption values are assessed using the validated green consumption values scale (Haws et al., 2014). Utilitarian and hedonic product attitudes are measured following Voss et al. (2003), and behavior with consumers' tendency to choose the environmentally friendly alternative even if it is more expensive following Schlegelmilch et al. (1996). All items are rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The complete questionnaire is available in Appendix A.

4.1.2. Validity and reliability

After conducting a confirmatory factor analysis, cross-loadings are identified and only one item from Schlegelmilch et al.'s (1996) scale is

selected: “I choose the sustainable alternative even if it is more expensive.” The subsequent confirmatory factor analysis (Appendix A) reveals that the data were adequately fitted ($\chi^2 = 330,286$ [df = 101], $p < 0.001$, CFI = 0.948, TLI = 938; RMSEA = 0.070) and that the latent constructs are free from validity concerns (Fornell and Larcker, 1981). The factor loadings of all models are statistically significant ($p < 0.001$) and exceed the recommended threshold of 0.6 (Awang, 2014). Furthermore, all the average variance extracted values are greater than 0.5 and their square roots exceed the cross-construct correlations (Table 1).

Common method variance is accounted for both before and during data collection using statistical techniques in the study design (Chang et al., 2010; Podsakoff et al., 2003). Before beginning, the participants are informed that their answers will remain private, that there is no right or wrong answer, and that the information provided should be as accurate as possible. According to Podsakoff et al. (2003), these strategies reduce respondents' fear of judgment and their tendency to change their responses to sound more compliant, agreeable, and socially acceptable. Next, the “marker variable” technique is used to help detect and control for potential common method variance. In marker variable analysis, the marker variable and the research variables should be theoretically unrelated (Aulakh and Gencturk, 2000). Here, Miller and Chiodo's (2008) “blue attitude” is employed as a marker including four items: “I prefer blue to other colors,” “I like the color blue,” “I like blue clothes,” and “I hope my next car is blue.” The low and non-significant correlations ($r = -0.08$ to 0.085) between the marker variable and research variables remains below the threshold ($r < 0.3$; Table 1), suggesting that common method variance is not a concern (Lindell and Whitney, 2001).

The analysis of non-response bias is based on Armstrong and Overton's (1977) methodology, and no discernible differences between early and late responders were observed upon comparing the first and final quartiles of respondents. Moreover, as recommended by Little et al. (2006), the interaction terms are orthogonalized in the regression analysis, which reduces the number of competing models by eliminating correlations and allows for efficient computational sampling without the use of Markov chains (Clyde et al., 1996). In regression, orthogonality helps separate effects for highly correlated independent variables, resulting in a more accurate prediction equation (Gaylor and Merrill, 1968).

4.1.3. Empirical findings

To test H1–3, a step-by-step regression analysis is performed in SPSS using three sequential models. Model 1 includes only control variables and reveals that gender ($\beta = -0.176$, $p \leq 0.001$) and income ($\beta = -0.166$, $p \leq 0.020$) are statistically significant. The R^2 value of this model is 0.035. Model 2 adds the central independent variable of sustainable consumption values, which increases R^2 to 0.470. The results support H1 ($\beta = 0.672$, $p \leq 0.001$), indicating a relationship between sustainable consumption values and behavior is highly significant and positive. In Model 3, where the interaction effects are also included, R^2 is 0.478 and the hedonic attitude demonstrates a notable positive moderating effect on behavior ($\beta = 0.139$, $p = 0.021$), which validates H2 (Table 2). Nevertheless, H3 is not supported, because utilitarian

Table 1

Discriminant validity.

Constructs	Composite reliability	Sustainable consumption value	Utilitarian attitude	Hedonic attitude
Sustainable consumption values	0.901	0.778		
Utilitarian attitude	0.844	0.576	0.723	
Hedonic attitude	0.850	0.543	0.651	0.730
Marker variable		0.085	0.025	−0.008

Table 2

Study 1 results.

Variables	Model 1		Model 2		Model 3	
Dependent variable	β	p	β	p	β	p
Tendency to choose and pay a premium for a sustainable product						
Independent variable						
Sustainable consumption values			0.672	<0.001	0.608	<0.001
Moderators						
Hedonic attitude					0.023	0.616
Utilitarian attitude					0.089	0.065
Interaction term						
Sustainable consumption values x Hedonic attitude					0.139	0.021
Sustainable consumption values x Utilitarian attitude					−0.092	0.128
Control variables						
Age	0.016	0.743	0.000	0.993	0.010	0.785
Gender	−0.176	<0.001	−0.061	0.087	−0.054	0.125
Income	0.116	0.020	0.131	<0.001	0.127	<0.001
Education	0.048	0.317	−0.016	0.659	−0.009	0.796
Reliability						
R^2	0.035		0.470		0.478	
ΔR^2 (vs Model 1)			0.435		0.433	
1)						
ΔR^2 (vs previous model)			0.435 (vs Model 1)		0.008 (vs Model 2)	

attitude has no significant moderating effect ($p = 0.128$) on behavior.

4.2. Study 2: robustness of the results across two different time points

Study 2 examines whether the findings from Study 1 remain consistent across two measurement points, with a two-year interval between them. To investigate this, we measure the independent variable (sustainable consumption values) and the moderating variables (utilitarian and hedonic product attitudes) at time point t_1 . The dependent variable, consumers' tendency to choose the environmentally friendly alternative even if it is more expensive, was measured using responses from the same participants two years later at time point t_2 .

4.2.1. Sample and procedure

The procedures of this study are the same as those of Study 1 presented above. The dataset comprises responses from 239 individuals, who complete the questionnaire at time t_1 and two years later at time t_2 . It uses the same measures as Study 1. This significant drop in responses can be considered normal in longitudinal studies (Awang, 2014).

The sample has a mean age of 53.4 years ($SD = 15.0$). The most common income categories are €20,000 to €29,999 (20.5%), €30,000 to €39,999 (20.1%), €10,000 to €19,999 (18.4%), and €40,000 to €49,999 (13.4%). Regarding educational attainment, 49.4% of participants have

completed some college education, 28.9% have completed high school, 9.2% hold a bachelor's degree, 6.3% have not completed high school, 5.9% hold a master's degree, and 0.4% hold a PhD. In terms of employment status, 42.7% are employed, 25.1% are retired, 10.5% are homemakers, 9.6% are unable to work, 4.6% are unemployed, 3.8% are self-employed, and 3.8% are students.

4.2.2. Validity and reliability

To validate the measures, Study 2 uses the procedures followed in Study 1. No concerns are found regarding measurement validity. Like Study 1, the test for common method variance indicates no common method bias and the interaction terms are orthogonalized (Little et al., 2006).

4.2.3. Empirical findings

The linear regression analysis of this study replicates that of Study 1. According to Model 1, income is statistically significant ($\beta = 0.187$, $p = 0.008$) and the R^2 value is 0.017, whereas in Model 2, sustainable consumption values have a significant positive effect ($\beta = 0.537$, $p \leq 0.001$) on behavior, supporting H1, with an R^2 of 0.299 for Model 2. In Model 3, hedonic attitudes have a significant positive moderating effect ($\beta = 0.208$, $p \leq 0.001$) supporting H2 and utilitarian attitudes have a significant negative moderating effect ($\beta = -0.215$, $p \leq 0.001$), supporting H3 (Table 3).

Table 3
Study 2 results.

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
Dependent variable						
Tendency to choose and pay a premium for a sustainable product						
Independent variable						
Sustainable consumption values			0.537	<0.001	0.502	<0.001
Moderators						
Hedonic attitude					0.173	0.018
Utilitarian attitude					-0.096	0.180
Interaction term						
Sustainable consumption values x Hedonic attitude					0.208	<0.001
Sustainable consumption values x Utilitarian attitude					-0.215	<0.001
Control variables						
Age	-0.077	0.250	-0.050	0.377	-0.033	0.550
Gender	-0.050	0.450	0.023	0.679	-0.009	0.875
Income	0.187	0.008	0.128	0.032	0.138	0.018
Education	-0.096	0.168	-0.105	0.075	-0.087	0.133
Reliability						
R^2	0.017		0.299	0.299	0.377	
ΔR^2 (vs Model 1)			0.282		0.360	
ΔR^2 (vs previous model)			0.282 (vs Model 1)		0.078 (vs Model 2)	

4.3. Study 3: robustness of the results across products

Study 3 tests H1–3 for three distinct wood-based bioproducts: a water bottle made from a wood-based bioplastic (Study 3a), a T-shirt made from a wood-based fabric (Study 3b), and a wood-based biofuel (Study 3c). From these, respondents were asked to select the one to which they felt most attracted. This question considers a sustainable product with a simple claim and without any additional framing.

4.3.1. Sample and procedure

The data sample was the same as that used in Study 1, comprising responses from 459 individuals who completed the questionnaire. The same measures for the independent and moderating variables are used as in Studies 1 and 2. The only exception is that the dependent variable represents a single-item measure (“If it were available, would you like to buy these products regardless of their price?”), asking respondents about their willingness to buy a water bottle made from a wood-based bioplastic (Study 3a), a T-shirt made from a wood-based fabric (Study 3b), and a wood-based biofuel (Study 3c), regardless of price, using a five-point Likert scale (1 = definitely would not buy, 5 = definitely would buy). Empty responses in this section explain the smaller sample size compared to Study 1. Rossiter (2011) argued that a single-item measure is sufficient when the construct is “double concrete,” meaning the attribute has a clear, specific meaning and the object being rated is easily understood by respondents. This is also supported by a meta-analysis by Ang and Eisend (2017) that found no difference in effect sizes between single- and multi-item measures for double-concrete variables, suggesting that using a single item is both more efficient and less burdensome for respondents. Based on these assertions, single items were chosen to measure sustainable behavior regarding wood-based bioproducts.

4.3.2. Validity and reliability

To validate the measures for Study 3, the procedures from Studies 1 and 2 are used. No concerns about measurement validity are found. The test for common method variance indicates no common method bias. As before, the interaction terms are orthogonalized. In addition, while the measurement of the dependent variable in Study 3 is slightly different from that in Studies 1 and 2, a CFA was conducted considering all measures together. The results show a single latent construct with high standardized factor loadings between 0.762 and 0.884, indicating that all the dependent variables across the three studies are measuring the same underlying construct, even though the item wordings slightly differ (Rajić et al., 2026; Kang, 2013).

4.3.3. Empirical findings of study 3a: water bottle made from a wood-based bioplastic

In Study 3a, the R^2 value of Model 1 is 0.005. Model 2, which also includes sustainable consumption values, has a higher R^2 of 0.112. The results support H1 ($\beta = 0.331$, $p \leq 0.001$). In Model 3, which incorporates the interaction effects, R^2 is 0.168. Additionally, the moderating effect of hedonic attitude has a significant positive value ($\beta = 0.100$, $p \leq 0.042$), validating H2. However, the moderating effect of a utilitarian attitude on behavior was found to be significantly negative ($\beta = -0.133$, $p = 0.007$) supporting H3 (Table 4).

4.3.4. Empirical findings of study 3b: T-shirt made from a wood-based fabric

Model 1 indicates the statistical significance of age ($\beta = -0.126$, $p = 0.009$), with an R^2 value of 0.020. For Model 2, R^2 rises to 0.095 after including the sustainable consumption values, indicating a significant and positive relationship between sustainable consumption values and behavior ($\beta = 0.279$, $p \leq 0.001$) and supporting H1. In Model 3, which also includes the interaction effects, R^2 is 0.169 and utilitarian attitudes have a significant negative moderating effect ($\beta = -0.135$, $p = 0.006$) on behavior supporting H3. In this model, no statistical significance for the

Table 4
Study 3a results.

Variables	Model 1		Model 2		Model 3	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Dependent variable						
Tendency to choose and pay a premium for a water bottle made from a wood-based bioplastic						
Independent variable						
Sustainable consumption values			0.331	<0.001	0.199	<0.001
Moderators						
Hedonic attitude					0.177	<0.001
Utilitarian attitude					0.120	0.019
Interaction term						
Sustainable consumption values x Hedonic attitude					0.100	0.042
Sustainable consumption values x Utilitarian attitude					−0.133	0.007
Control variables						
Age	−0.061	0.213	−0.060	0.192	−0.050	0.266
Gender	0.021	0.658	0.035	0.430	0.036	0.407
Income	0.057	0.243	0.045	0.377	0.048	0.286
Education	0.058	0.242	0.019	0.690	0.029	0.527
Reliability						
R ²	0.005		0.112		0.168	
ΔR^2 (vs Model 1)			0.117		0.163	
ΔR^2 (vs previous model)			0.117 (vs Model 1)		0.056 (vs Model 2)	

moderating effect of hedonic attitude is apparent, and thus, the findings do not support H2 (Table 5).

4.3.5. Empirical findings of study 3c: wood-based biofuel

In Study 3c, Model 1 indicates that age is statistically significant ($\beta = -0.148$, $p = 0.002$), with an R^2 value of 0.022. In Model 2, the factor of sustainable consumption values has a significant positive effect ($\beta = 0.315$, $p \leq 0.001$), which supports H1, and R^2 for Model 2 is 0.119. In Model 3, no significant moderating effect of hedonic attitude is found, nor is there support for H2. Furthermore, utilitarian attitudes have a significant negative effect ($\beta = -0.183$, $p \leq 0.001$), which suggests that H3 should be accepted. The R^2 for Model 3 is 0.170 (Table 6).

Overall, the results support H1 and H3. The only exception is Study 1, where there is no support for H3. H2 is supported in Studies 1 and 2, while Studies 3a–3c show some variation across different product categories. Figs. 2 and 3 illustrate the moderating effect of hedonic and utilitarian attitudes on the value–behavior relationship, respectively. The results of these studies and the visualized data indicate that a utilitarian attitude toward sustainable products weakens consumers' tendency to choose the environmentally friendly alternative if it is more expensive, whereas a hedonic attitude enhances this tendency. The negative interaction effect of the utilitarian attitude is strongest for the wood-based biofuel, while the positive effect of the hedonic attitude is strongest for the water bottle made from a wood-based bioplastic.

Table 5
Study 3b results.

Variables	Model 1		Model 2		Model 3	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
Dependent variable						
Tendency to choose and pay a premium for a T-shirt made from a wood-based fabric						
Independent variable						
Sustainable consumption values			0.279	<0.001	0.126	0.012
Moderators						
Hedonic attitude					0.228	<0.001
Utilitarian attitude					0.116	0.023
Interaction Term						
Sustainable consumption values x Hedonic attitude					0.068	0.169
Sustainable consumption values x Utilitarian attitude					−0.135	0.006
Control variables						
Age	−0.126	0.009	−0.126	0.007	−0.114	0.011
Gender	0.009	0.848	0.021	0.640	0.020	0.653
Income	0.037	0.451	0.026	0.579	0.029	0.522
Education	0.081	0.098	0.048	0.309	0.059	0.193
Reliability						
R ²	0.020		0.095		0.169	
ΔR^2 (vs Model 1)			0.075		0.149	
ΔR^2 (vs previous model)			0.075 (vs Model 1)		0.074 (vs Model 2)	

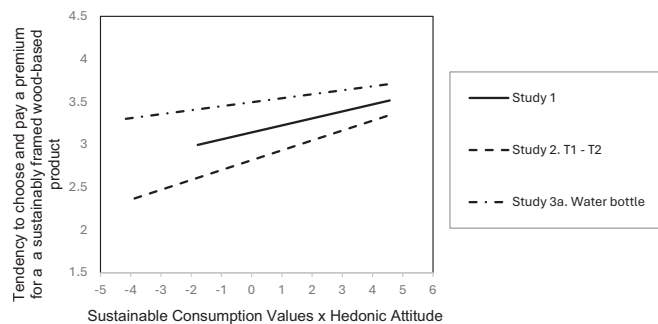
5. Discussion

The findings align with the VAB model and theory (Homer and Kahle, 1988; Maio and Olson, 1994), general sustainable consumption literature (Kumar et al., 2025; Liu et al., 2025), and literature on wood-based bioproducts (Sakagami and Sakaguchi, 2022; Maleknia and Hälälüşan, 2025), confirming that consumers' sustainability values can predict their sustainable behaviors, including their tendency to choose the environmentally friendly alternatives regardless of their price. The findings from Study 1 remain consistent over time in Study 2 and are also found to be robust across the different product categories in Study 3. This implies that consumers' sustainability values are consistent, confirming the stability of values suggested by Eisentraut (2019). On the other hand, the changes in attitudinal effects between the temporal studies (Study 1 and Study 2), as well as between product categories (Studies 3a–3c), align with the literature on attitudes and their more volatile nature over time (Eisentraut, 2019) and across product categories (Boer and Fischer, 2013; Im et al., 2015), while highlighting their importance in explaining the sustainability value–behavior gap formation.

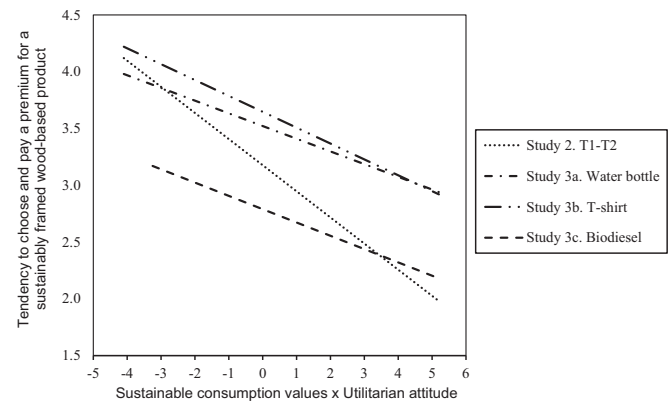
Regarding hedonic attitudes toward sustainable products, the general model (Study 1), temporal model (Study 2), and the case of the wood-based bioplastic water bottle (Study 3a) suggest that hedonic attitudes positively influence the relationship between sustainability

Table 6
Study 3c results.

Dependent variable	Model 1		Model 2		Model 3	
	B	p	β	p	β	p
Tendency to choose and pay a premium for wood-based biofuel						
Independent variable						
Sustainable consumption values			0.315	<0.001	0.237	<0.001
Moderators						
Hedonic attitude					0.208	<0.001
Utilitarian attitude					-0.032	0.524
Interaction term						
Sustainable consumption values x Hedonic attitude					0.051	0.298
Sustainable consumption values x Utilitarian attitude					-0.183	<0.001
Control variables						
Age	-0.148	0.002	-0.148	0.001	-0.128	0.004
Gender	-0.022	0.647	-0.008	0.861	-0.021	0.639
Income	0.005	0.912	-0.007	0.884	0.000	0.994
Education	0.067	0.171	0.030	0.522	0.033	0.465
Reliability						
R ²	0.022		0.119		0.170	
ΔR^2 (vs Model 1)			0.097		0.148	
ΔR^2 (vs previous model)			0.097 (vs Model 1)		0.051 (vs Model 2)	

**Fig. 2.** Interaction effect of sustainable consumption values and hedonic attitudes on tendency to choose and pay a premium for a sustainably framed wood-based product.

values and behaviors. These results suggest that when a product's inherently hedonic sustainability appeals are aligned with its hedonic product attributes, they further have a positive effect on hedonic attitudes toward sustainable products (Weisstein et al., 2023). Furthermore, these hedonic attitudes, when coupled with inherently hedonic sustainability values, strengthen the sustainability value-behavior relationship (Homer and Kahle, 1988; Maio and Olson, 1994). However, the

**Fig. 3.** Interaction effect of sustainable consumption values and utilitarian attitudes on tendency to choose and pay a premium for a sustainably framed wood-based product.

results are not significant for the wood-based T-shirt and biofuel, which may be due to their perception as more utilitarian products and thus lacking the hedonic sustainability characteristics necessary to influence attitudes and behavior.

Regarding utilitarian attitudes toward sustainable products, except for the general model (Study 1), all other models, including the temporal model (Study 2) and all product categories (Studies 3a to 3c), show a significant negative effect on the sustainability value-behavior relationship. This negative effect is particularly pronounced in the utilitarian product category, biofuel. According to Weisstein et al. (2023), a misalignment between inherently hedonic, simple sustainability claims and utilitarian product attributes can reduce the effectiveness of communication. Moreover, a VAB model perspective (Homer and Kahle, 1988; Maio and Olson, 1994) suggests that it is not only this misalignment that matters, but also the misalignment between inherently hedonic sustainability values and utilitarian attitudes toward sustainable products. This misalignment negatively affects the sustainability value-behavior relationship, an effect that is stronger in utilitarian contexts where utilitarian attitudes are more salient (Voss et al., 2003).

In terms of socio-demographic factors, the results indicate that consumers with higher incomes and stronger sustainable consumption values have tendency to choose the environmentally friendly alternative even if it is more expensive, aligning with existing research (Del Giudice et al., 2018; Sigurdsson et al., 2023). However, the significance of income in explaining this tendency varies across the product categories. Notably, for the biofuel, age has a significant negative effect on this tendency, underscoring the need to consider diverse product categories and demographics (Hoffmann et al., 2018; Hasni et al., 2024).

5.1. Theoretical contributions

The literature on the sustainability value-behavior gap suggests various factors that may influence customers' purchasing decisions (Johnstone and Tan, 2015; Diddi et al., 2019; La Fuente et al., 2021; Yan et al., 2021; Chang and Hung, 2023; Cheng et al., 2024). Our results add that hedonic or utilitarian attitudes and related product perceptions also play a role. For example, the sustainability value-behavior gap appears smaller in hedonic product categories, while in utilitarian products, especially when paired with utilitarian attitudes, the gap is wider. Following Weisstein et al. (2023), this can be explained by a misalignment between simple sustainability claims, which are inherently hedonic, and utilitarian product attributes. Following the VAB model (Homer and Kahle, 1988; Maio and Olson, 1994), we further suggest that this may also be due to the misalignment between inherently hedonic sustainability values and utilitarian attitudes toward sustainable products, which are especially salient in utilitarian product contexts (Voss et al., 2003). These mechanisms make sustainability marketing in

utilitarian product contexts particularly challenging, as a sustainability value–behavior gap is most likely to occur in this context.

The findings also inform greenwashing literature (e.g., [Boncinelli et al., 2023](#)). Consumers' sustainability values, combined with their hedonic attitudes toward sustainable products and the effects on their behavior remained largely constant over time. This suggests that products in hedonic product categories are fertile grounds for greenwashing. This is not only because sustainable consumers do not easily change their behaviors in this category, as suggested by the results, but also because consumers are less analytical toward greenwashing in this product category ([Voss et al., 2003](#)). This long lasting relationship is not observed for utilitarian products. These shifts in attitudinal effects across the temporal studies, as well as across product categories, are consistent with prior research highlighting the more volatile nature of attitudes ([Boer and Fischer, 2013](#); [Im et al., 2015](#); [Eisenraut, 2019](#)), while also underscoring their role in explaining the sustainability value–behavior gap. These findings also align with the previous literature, highlighting the importance of building consumer understanding and knowledge through customer education, which further affects their attitudes and behavior ([Holopainen et al., 2014](#); [Panico et al., 2022](#); [Maleknia and Hälälışan, 2025](#)).

The findings on the positive interaction effect of values and hedonic attitudes toward sustainable products in Studies 1–3 give strong support to the idea that sustainability values and appeals including simple claims are more closely associated with hedonic aspects ([Luchs et al., 2010](#); [Boer and Fischer, 2013](#); [Tran and Paparoidamis, 2021](#); [Larasatie et al., 2023](#); [Smith et al., 2023](#); [Luo et al., 2024](#)). [Weisstein et al. \(2023\)](#) suggested that marketing strategies for utilitarian food products should focus on general sustainability claims, whereas those for hedonic products should emphasize such self-focused attributes as health benefits. However, the authors did not account for different consumer segments. This paper argues that sustainable consumers, who inherently hold hedonic values toward sustainability, should be targeted with simple hedonic sustainability claims that appeal to their hedonic attitudes in order to reduce the sustainability value–behavior gap.

5.2. Managerial and policy implications

The results offer implications especially for professionals working in sustainable and wood-based product marketing, forest-based value chains, certification schemes and eco-labeling, but also for those working in public procurement and the regulation of sustainability claims in bio-based and forest-product markets.

5.2.1. Combine sustainability issues with hedonic product aspects

The existing literature offers mixed findings on whether sustainability issues should be framed as utilitarian or hedonic. The present paper's results suggest that consumers with strong sustainability values naturally associate sustainability issues with hedonic aspects. Therefore, emphasizing these connections in marketing (e.g., “recycling is fun”) is likely to increase engagement and drive favorable behavioral outcomes among sustainable consumers. For similar reasons, hedonic products paired with sustainability messaging present the most fertile ground for greenwashing, of which policymakers, regulators, and law enforcement should be aware.

5.2.2. The sustainability value–behavior gap is most likely to occur with utilitarian products

The findings suggest that combining utilitarian products and sustainability issues can lead to negative effects among sustainable consumers. However, among general consumers, both utilitarian and hedonic framings generally have positive effects on their behavior and willingness to pay a premium for a sustainable product ([Luchs and Kumar, 2017](#); [Weisstein et al., 2023](#)). According to the findings, marketing utilitarian products to sustainable consumers is particularly challenging, as the sustainability value–behavior gap is most likely to

occur in this context.

5.2.3. Misalignment widens value–behavior gap

The findings address misalignment as another contribution to the factors that widen the sustainability value–behavior gap among sustainable consumers. For example, when utilitarian products are combined with sustainability issues that are inherently perceived as hedonic—as in the case of the wood-based biofuel—this misalignment reduces communication effectiveness. Marketers must therefore ensure that marketing cues are properly aligned to maintain the intended impact and credibility and avoid suspicions of greenwashing.

5.2.4. Understanding the intrinsic values of a product is essential for effective marketing

Marketers must determine whether their products carry utilitarian or hedonic aspects and align sustainability messaging accordingly. While this alignment and communication are more straightforward for products in the hedonic product category, marketers must exercise diligence with utilitarian products by assessing the intrinsic values, features, benefits, and flaws of their products, ensuring that marketing cues and framing resonate with the target demographic. Similar market research and analysis are also important for policymakers to identify fertile grounds for greenwashing or introduce more effective incentives for sustainable products, particularly those that are genuinely environmentally beneficial but lack appropriate cues and framing.

5.3. Limitations and future research

The findings come with limitations that present opportunities for future research. For example, the effectiveness of targeting sustainable consumers with hedonic sustainability issues should be examined with different kinds of framings as well as across a wider range of product categories and consumer segments. Similarly, further research is needed on the most effective alignment of utilitarian aspects and sustainability issues, especially given the limited existing research on simultaneously integrating utilitarian and hedonic aspects in the context of sustainable consumption research. This is especially pertinent as existing research shows that different framings of sustainability issues in various product categories can have different effects ([Tran and Paparoidamis, 2021](#); [Weisstein et al., 2023](#)).

Future research should more comprehensively incorporate all the identified factors that contribute to the sustainability value–behavior gap to validate the proposed model ([Johnstone and Tan, 2015](#); [Diddi et al., 2019](#); [La Fuente et al., 2021](#); [Yan et al., 2021](#); [Chang and Hung, 2023](#); [Cheng et al., 2024](#)). In addition to exploring different product categories, this could include exploring consumer categories based on personality traits and cultural backgrounds, including egoistic and hedonic traits ([Jayawardhena, 2004](#); [Boer and Fischer, 2013](#); [Konuk and Otterbring, 2024](#)), collectivism and individualism ([Gregory et al., 2002](#); [Boer and Fischer, 2013](#); [Pătări et al., 2017](#); [Konuk and Otterbring, 2024](#)), and uncertainty avoidance ([Gregory et al., 2002](#); [Jayawardhena, 2004](#); [Boer and Fischer, 2013](#); [Pătări et al., 2017](#); [Hoffmann et al., 2018](#); [Halder et al., 2020](#); [Konuk and Otterbring, 2024](#)). This may provide deeper insights into varying sustainable consumption behaviors and patterns. The absence of controlling for all these factors might explain the relatively low explanatory power (R) in some of our models.

Given that our results are based on a single cross-sectional survey with a limited and not fully representative sample, and rely exclusively on self-reported Likert-scale measures of attitudes and behavioral tendencies, they are subject to common method variance and limitations associated with stated rather than observed behavior. Although several procedural and statistical remedies were applied to mitigate these concerns, the findings may still be affected by these limitations and should be interpreted with caution, particularly with regard to external validity and generalizability to actual consumer behavior. Therefore, as also

noted above, future research should employ more diverse samples and incorporate behavioral and/or experimental measures to strengthen validity and better capture the sustainability value–behavior relationship.

6. Conclusions

The findings suggest that targeting sustainable consumers with hedonic sustainability appeals affecting their hedonic attitudes toward sustainable products generally leads to lasting effectiveness. However, it can also create openings for greenwashing. Additionally, sustainability-oriented consumers with utilitarian attitudes toward sustainable products tend to show an increased sustainability value–behavior gap. This suggests that marketing utilitarian products to sustainable consumers is particularly challenging, as the gap is more likely to occur in this context.

Our results imply that it is not only the misalignment between simple, inherently hedonic sustainability claims and utilitarian product attributes, as suggested by Weisstein et al. (2023), but also the misalignment between inherently hedonic sustainability values and utilitarian attitudes toward sustainable products that contributes to the sustainability value–behavior gap. As utilitarian attitudes are more salient in utilitarian product contexts, the sustainability value–behavior gap is most likely to occur in these contexts. Moreover, the identified shifts in attitudinal effects across the temporal studies, as well as across product categories, underscore the importance of both hedonic and utilitarian attitudes in explaining the sustainability value–behavior gap. Therefore, considering attitudes in future research, as well as in

customer education contexts, is recommended for promoting sustainable consumer behavior.

CRediT authorship contribution statement

Jani Holopainen: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Jyri Hoffrén:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation. **Marianna Halinen:** Resources, Investigation, Conceptualization. **Tommi Laukkanen:** Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Data curation, Conceptualization.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Microsoft Copilot Pro to improve language and readability. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Survey items and factor loadings

Construct	Items	Factor Loading		
		Study 1	Study 2	Study 3
Sustainable consumption values	It is important to me that the products I use do not harm the environment	0.787	0.725	0.743
	I consider the potential environmental impact of my actions when making many of my decisions	0.843	0.829	0.836
	My purchase habits are affected by my concern for the environment	0.840	0.815	0.805
	I am concerned about wasting the resources of our planet	0.690	0.764	0.773
	I would describe myself as being environmentally responsible	0.701	0.793	0.799
Utilitarian sustainable product attitudes	I am willing to be inconvenienced to take actions that are more environmentally friendly	0.793	0.835	0.817
	Sustainable products are effective/ineffective (r)	0.577	0.791	0.815
	Sustainable products are helpful/unhelpful (r)	0.807	0.875	0.875
	Sustainable products are functional/not functional (r)	0.728	0.820	0.841
	Sustainable products are necessary/unnecessary (r)	0.781	0.800	0.789
	Sustainable products are practical/impractical (r)	0.700	0.771	0.784
Hedonic sustainable product attitudes	Sustainable products are fun/not fun	0.755	0.715	0.739
	Sustainable products are dull/exciting	0.714	0.849	0.852
	Sustainable products are delightful/not delightful	0.644	0.867	0.856
	Sustainable products are thrilling/not thrilling	0.787	0.870	0.854
	Sustainable products are enjoyable/unenjoyable	0.745	0.780	0.757

Note: r = reverse-coded item.

Data availability

Data will be made available on request.

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