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Aging and Sustainable Consumption: An Investigation of the Role of Time Perspective

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ABSTRACT

This research investigates how time perspective influences sustainable consumption among older consumers, a rapidly growing demographic. Across five studies, we find that older consumers are generally less likely than younger consumers to engage in sustainable consumption, largely because they adopt a shorter time perspective (Study 1). Message cues that prompt a long (vs. short or neutral) time perspective increase older consumers' likelihood of choosing environmentally friendly options (Studies 2a and 2b). We also show that the impact of age-related differences in time perspective on sustainable consumption is moderated by perceived youthfulness, an individual's tendency to feel younger than their actual (chronological) age. This moderation emerges both when older consumers chronically perceive themselves as younger than their actual age (Study 3) and when they are exposed to young (vs. old) social cues that situationally induce them to feel younger (Study 4). Together, the findings offer theoretical and practical insights for promoting sustainable behavior in an increasingly older consumer population.

1 | Introduction

Encouraging voluntary adoption of pro-environmental attitudes and behaviors is vital for advancing sustainability (Andrade and Vieites 2025; Tezer and Bodur 2020; White et al. 2019; White et al. 2025). However, sustainability-related attitudes and behaviors vary considerably across consumer segments. Notably, research indicates that older consumers tend to be less concerned about environmental issues (Cottrell 2003) and less inclined to engage in environmentally friendly behaviors, such as making lifestyle changes to address climate change (Semenza et al. 2008), reducing car use (Jansson et al. 2010), or minimizing food waste (Hwang et al. 2025). As a result, sustainable consumption is commonly associated with younger adults (Lee and Kim 2024).

These age-related differences present a critical challenge for sustainability efforts, especially in light of the global aging trend. By 2080, individuals aged 65 and older are projected to surpass those under 18 worldwide (United Nations 2024). In the United States, older adults already comprised 18% of the population in 2024, while, in Europe, they reached 20% (Population Pyramid 2024). This demographic shift underscores the pressing need to understand why older consumers are less inclined to engage in sustainable consumption and how such differences might be mitigated. Such efforts are particularly urgent given the limited research on older consumers and sustainability (Berg and Liljedal 2022).

The present research examines older consumers' pro-environmental attitudes and behaviors, focusing on the psychological factors that

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may reduce their engagement in sustainable consumption. While the link between age and sustainable consumption has been noted in prior work, the psychological processes underlying this relationship remain underexplored. Although several mechanisms have been proposed (see Web Appendix A), few have been tested empirically (e.g., Lee and Kim 2024). Drawing on socioemotional selectivity theory (e.g., Carstensen 1995, 2006; Carstensen et al. 1999), we advance limited future time perspective as a distinct and understudied mechanism that helps explain older consumers' reduced engagement in sustainable consumption. We posit that older consumers are more likely than younger consumers to adopt a shorter time perspective, leading them to prioritize immediate concerns over distant outcomes. This orientation may reduce motivation to engage in environmentally responsible behaviors, which are inherently aligned with a long-term outlook (Milfont et al. 2012; Van der Wal et al. 2018).

Previous research shows that time perspective is a malleable construct and can be shaped by situational factors (e.g., Mogilner et al. 2011, 2012; Williams and Drolet 2005), suggesting opportunities for interventions to promote sustainable consumption among older consumers. Accordingly, we propose two theory-consistent moderators. First, we examine whether situational cues that lengthen time perspective increase sustainable consumption among older consumers. Second, we examine whether a chronic or situationally induced tendency to feel younger than one's actual (chronological) age (i.e., perceived youthfulness) attenuates age-related differences in time perspective and, in turn, sustainable consumption.

This research makes three contributions. First, it elucidates why sustainable consumption tends to decline with age by identifying time perspective as a key explanatory mechanism. Second, it documents the role of perceived youthfulness as a novel individual-level moderator that influences older consumers' temporal outlook. Third, it demonstrates the malleability of age differences in sustainable consumption, showing that simple external factors can meaningfully increase sustainable choices in later life. Collectively, these contributions provide actionable insights for promoting sustainability among an increasingly older global population.

2 | Aging and Sustainable Consumption

Most existing research suggests a negative association between age and sustainable consumption: older consumers, on average, report less engagement with environmental issues and sustainable practices (e.g., Diamantopoulos et al. 2003; Jansson et al. 2010). For example, prior work shows age-related differences in environmental concern (Cottrell 2003), environmentally friendly food consumption (Nam 2020), and household food waste (Hwang et al. 2025). At the same time, a small set of studies reports a positive association between age and sustainability (Casalegno et al. 2022; Pinho and Gomes 2024); but this evidence is limited to younger adult samples, is correlational in nature, and leaves the underlying psychological mechanisms unexplored (see Table 1).

Why are older consumers generally less engaged in sustainable consumption? Recent research points to perceived fit with one's age identity as a potential explanation. Specifically, Lee and Kim (2024) show that *subjective* age (i.e., how old an individual feels) rather than *chronological* age better predicts sustainable consumption, such that consumers who feel younger are more likely to act sustainably because sustainability is often symbolically associated with youthfulness. The present work complements this identity-based account by proposing a valuation-based mechanism involving an intertemporal trade-off. This mechanism offers additional explanatory power for understanding the relationship between age and sustainable consumption.

First, we identify time perspective as a distinct psychological driver. Whereas the identity-based account suggests that consumers with an older subjective age avoid sustainability due to a symbolic mismatch with their self-identity, we propose that the limited time horizon associated with aging leads older consumers to undervalue the distant benefits of sustainable choices. We further show that situational factors that expand future time horizons can reduce such age-related differences, demonstrating that this valuation-based mechanism operates independently of, and complements, identity-fit accounts. Second, we provide a more nuanced understanding of the role of subjective age and, more particularly, perceived youthfulness, defined as an individual's tendency to feel younger than their chronological age (Amatulli et al. 2018; Gambicorti et al. 2026; Lee and Kim 2024). We show that this tendency, whether chronic or situationally induced, does not merely align consumers with a youthful identity but serves to expand their time horizon and rebalance the related intertemporal trade-off, thereby mitigating the age-related decline in sustainable consumption. Finally, unlike recent work that emphasizes subjective age broadly (Lee and Kim 2024), we focus specifically on older consumers, a demographically important segment whose consumption decisions carry growing societal consequences.

3 | Time Perspective in Older Consumers' Sustainable Consumption

To explain why older consumers may engage less in sustainable consumption, we identify a distinct valuation-based mechanism rooted in the perception of time. We propose that limited future time perspective plays a key role in older consumers' reduced engagement in sustainability. Socioemotional selectivity theory (e.g., Carstensen 1995, 2006; Carstensen et al. 1999) suggests that, as people age, they perceive their future as increasingly limited. This shift encourages a shorter-term orientation (reflecting a reduced future time perspective), where present or near future concerns take precedence over long-term considerations (Lang and Carstensen 2002; Mogilner et al. 2011, 2012). In contrast, younger consumers are more likely to prioritize distant future events (Fingerman and Perlmutter 1995).

Such differences in time perspective can affect consumption-related attitudes and behaviors. Older consumers may prioritize behaviors that offer more immediate rather than long-term benefits. For instance, older (vs. younger) individuals are more likely to opt for ordinary everyday experiences that provide immediate benefits and are closely tied to relationships with loved ones (Bhattacharjee and Mogilner 2014). Related research further shows that a shorter time perspective reduces motivation to tackle problems requiring immediate effort for a delayed payoff (Yeung et al. 2012).

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TABLE 1 | Literature on age and sustainable consumption.

Paper	Method	IV, MED, MOD	DV	Key findings
Van Liere and Dunlap (1980)	Meta-analysis	IV: Age	Pro-environmental attitudes (environmental concern)	Age was negatively correlated with environmental concern.
Cottrell (2003)	Survey	IV: Age	Pro-environmental attitudes (environmental concern)	Age was negatively related to environmental concern.
Diamantopoulos et al. (2003)	Survey	IV: Age	Pro-environmental attitudes	Age was negatively correlated with pro-environmental attitudes.
Semenza et al. (2008)	Survey	IV: Age	Inclination to adopt lifestyle changes	Older consumers reported being less inclined to adopt lifestyle changes to address climate change.
Jansson et al. (2010)	Survey	IV: Age	Willingness to reduce car usage	Older consumers reported being less inclined to reduce car usage.
Urien and Kilbourne (2011)	Survey	IV: Generativity MOD: Self-enhancement	Intentions to engage in sustainable behavior	Generativity was positively associated with greater eco-friendly intentions and more environmentally sustainable consumption behaviors.
Guiot et al. (2019)	Survey	IV: Age	Attitudes toward recycling	Age was negatively related to attitudes toward recycling.
White et al. (2019)	Conceptual	(Not available)	(Not available)	Sociodemographic differences were examined as predictors of sustainable consumption, with older consumers being less likely to engage in sustainable consumption compared to younger consumers.
Nam (2020)	Survey	IV: Age	Frequency of buying eco-friendly food	Older (vs. middle-aged) adults reported being less likely to engage in environmentally friendly food consumption.
Berg and Liljedal (2022)	Conceptual	(Not available)	(Not available)	The authors called for additional research on older consumers' behavior and identified aging and sustainable consumption as a new field of research.
Casalegno et al. (2022)	Survey	IV: Age (i.e., Generations X, Y, and Z)	Intentions to engage in green purchase behavior	Sustainable consumption behaviors of Generations X, Y, and Z were examined. Age was positively associated with green purchase behavior, which was attributed to younger generations' lower ability to afford environmentally friendly products.
Lee and Kim (2024)	Experiment	IV: Subjective age MED: Perceived fit between consumers and sustainable options	Sustainable choice	This study focused on subjective age rather than chronological age. Subjective age (i.e., how old one feels) exerted a negative impact on sustainable consumption, an effect explained by an identity-fit mechanism. Consumers who felt older avoided sustainable options because these options were

(Continues)

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TABLE 1 | (Continued)

Paper	Method	IV, MED, MOD	DV	Key findings
		MOD: Association strength between sustainability and youth		symbolically viewed as youthful and perceived as a mismatch with their identity.
Ma and Xing (2024)	Experiment	IV: Contextual cue (generativity vs. self) MED: Self-expression inspiration, affiliation inspiration MOD: Typeface design (handwritten vs. machine-written)	Sustainable purchase intentions	Including generativity cues in consumption contexts increased older consumers' purchase intentions for sustainable options. Specifically, older consumers were more willing to choose sustainable options when they were asked to purchase for future generations rather than for themselves. However, the study did not compare older consumers' sustainable consumption with that of younger consumers.
Pinho and Gomes (2024)	Survey	IV: Generation (X, Y, and Z)	Pro-environmental attitudes and behaviors	Environmental concerns and pro-environmental behaviors were examined across Generations X, Y, and Z. Sustainable attitudes differed by generation: Generation X was the most sustainable followed by Generation Y, with Generation Z showing the lowest environmental concern. This study, however, did not include consumers older than 57.
Hwang et al. (2025)	Survey	IV: Age	Food waste generation	Age was positively related to food waste production, with older households being more likely to over-purchase fresh foods, prepare excessive amounts, and thus waste food.
Our work	Multi-method (survey and experimental studies)	IV: Age MED: Time perspective MOD: Perceived youthfulness	Pro-environmental attitudes, sustainable choice	Age is negatively related to engagement in sustainable consumption. Such age-related differences in sustainable consumption are driven by time perspective: older consumers adopt a shorter time perspective than younger consumers; thus, they are less inclined to engage in sustainable consumption. However, such age-related differences are mitigated when older consumers are situationally induced to expand their time horizon, as well as when they either chronically or situationally feel younger and, as such, align their time perspective (thus their engagement in sustainable consumption) with that of younger consumers.

Abbreviations: Age = Chronological age, DV = Dependent variable, IV = Independent variable, MED = Mediating variable, MOD = Moderating variable.

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This short-term focus poses a challenge for environmentally sustainable consumption, which inherently involves prioritizing long-term benefits over immediate ones (Huang et al. 2025; Milfont et al. 2012; White et al. 2019). Consistent with this logic, empirical evidence demonstrates that individuals with a longer time horizon show greater environmental concern (Arnocky et al. 2014) and are more likely to adopt pro-environmental behaviors, such as recycling (Lindsay and Strathman 1997) and purchasing environmentally friendly products (Reczek et al. 2018). Building on this evidence, we propose that older consumers adopt a shorter time perspective, which leads them to undervalue the delayed benefits of sustainable choices, resulting in lower engagement in sustainable consumption. Accordingly, we hypothesize:

H1. *Older consumers adopt a shorter time perspective and, consequently, exhibit lower engagement in environmentally sustainable consumption.*

4 | Key Moderators of Sustainable Consumption Among Older Consumers

We propose two theoretically relevant moderators of the relationship predicted in H1: (1) situational cues that lengthen time perspective and (2) perceived youthfulness, explored both as an individual difference and as a momentary mental state elicited by situational cues.

We treat situational cues as external stimuli in the decision context that alter time perspectives through two different pathways. Direct cues explicitly prime an expanded or limited time horizon (e.g., message framing), whereas indirect cues, such as young or old social cues, affect perceived youthfulness, which in turn shapes time perspective.

4.1 | Situational Cues That Lengthen Time Perspective

Prior studies demonstrate that consumers' perceptions of time are malleable and responsive to situational influences (Arnocky et al. 2014; Mogilner et al. 2011, 2012; Williams and Drolet 2005). Accordingly, we posit that older consumers' typically shorter time perspective is not fixed but can be extended by contextual cues. Situational cues that encourage a longer time horizon can prompt older consumers to adopt attitudes and behaviors more similar to those of younger consumers (Fung et al. 1999; Williams and Drolet 2005). We therefore predict that inducing a long (rather than short or neutral) time perspective increases older consumers' engagement in sustainable consumption, highlighting the practical value of interventions that promote a long-term outlook. Formally:

H2. *Older consumers are more likely to engage in sustainable consumption when situationally induced to adopt a long, rather than short, time perspective.*

4.2 | The Role of Perceived Youthfulness

Many older consumers feel younger than their actual chronological age, a tendency captured by perceived youthfulness (Amatulli et al. 2018; Gambicorti et al. 2026). Unlike subjective age, which reflects how old individuals feel (e.g., Barak and Stern 1986; Lee and Kim 2024), perceived youthfulness refers to the discrepancy between chronological age and subjective age. This tendency is well-documented in aging research (e.g., Barak 1987; Peluso et al. 2021; Sherman et al. 2001) and has been shown to be influenced by factors such as health, education, income, and optimism (Barrett 2003; Kotter-Grühn et al. 2015; Stephan et al. 2015; Teuscher 2009).

Situational factors can also shape perceived youthfulness. Older consumers are more likely to feel younger than their chronological age in hedonic physical contexts (e.g., in a resort) (Guido et al. 2014), when negative aging stereotypes are salient (Barnhart and Peñaloza 2013; Weiss and Freund 2012; Weiss and Lang 2012), or when exposed to young rather than old social cues (Amatulli et al. 2018). Perceived youthfulness can lead older consumers to think and act more like their younger counterparts, increasing interest in entertainment (Wilkes 1992), fashion (Lin and Xia 2012), and modern designs (Amatulli et al. 2018).

Importantly, perceived youthfulness can also influence time perspective. Older consumers who feel younger perceive their future time horizon as more expansive, shifting their focus toward the distant future (Szmigin and Carrigan 2001; Weiss and Lang 2012). Accordingly, we propose that perceived youthfulness attenuates age-related differences in time perspective and sustainable consumption. Formally:

H3a. *Older consumers (vs. younger consumers) adopt a shorter time perspective and exhibit lower engagement in sustainable consumption; this effect is attenuated among consumers with higher perceived youthfulness.*

Because perceived youthfulness can be influenced situationally, we further predict a moderation effect driven by social cues, consistent with prior findings (Amatulli et al. 2018; Gambicorti et al. 2026). More particularly, we hypothesize that exposure to young (vs. old) social cues can enhance older consumers' perceived youthfulness, leading to a similar attenuation effect. Formally:

H3b. *Older consumers (vs. younger consumers) adopt a shorter time perspective and exhibit lower engagement in sustainable consumption; this effect is attenuated in the presence of young, rather than old, social cues.*

Figure 1 presents the conceptual framework. The proposed moderators are particularly important as they help rule out cohort effects as the sole explanation for age differences in sustainable consumption (Casalegno et al. 2022; Olli et al. 2001). According to the cohort effect explanation, older consumers' lower engagement in sustainable consumption may stem from formative experiences during a time when environmental sustainability was not a major societal concern (Olli et al. 2001). If this explanation were the sole operating mechanism, it would suggest that promoting sustainable consumption among older consumers is largely infeasible due to the immutable nature of their early-life experiences. By focusing on more malleable factors, our work highlights actionable pathways for promoting sustainability in later life.

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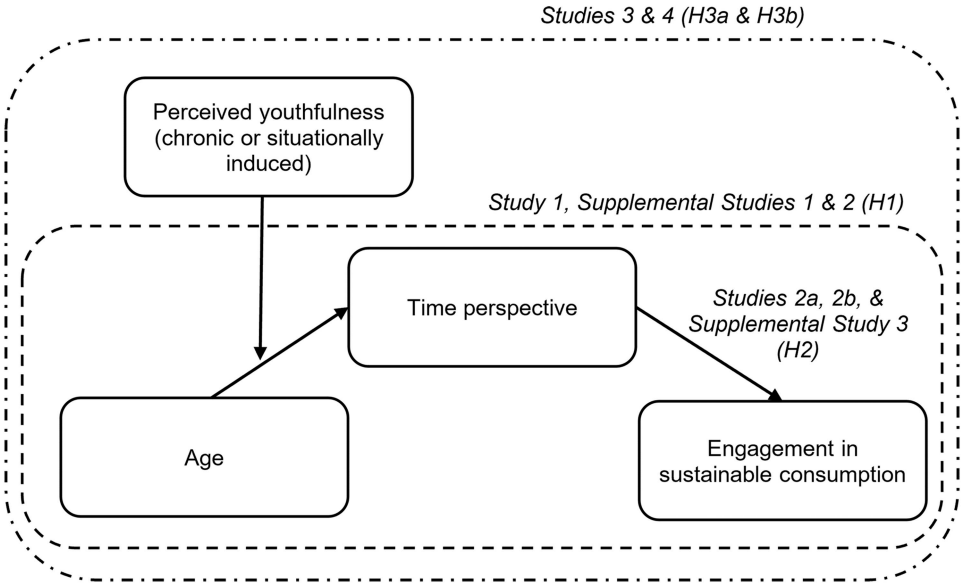

FIGURE 1 | Conceptual framework.

5 | Overview of Studies

Five studies were conducted to test our framework. Study 1 examines whether older consumers adopt a shorter time perspective and, consequently, exhibit lower endorsement of sustainable consumption (H1), while accounting for alternative explanations to isolate time perspective as the focal mechanism. Study 2a manipulates time perspective to assess whether inducing a long (vs. short or neutral) time perspective increases older consumers' sustainable consumption (H2), and Study 2b extends this test to a real retail setting to enhance ecological validity. Study 3 examines perceived youthfulness as a moderator, showing that older consumers who feel younger adopt time perspectives and exhibit sustainable consumption patterns more similar to those of younger consumers (H3a). Study 4 manipulates social cues (young vs. old) to demonstrate their effects on perceived youthfulness and time perspectives, thereby attenuating age-related differences in sustainable consumption (H3b). The Web Appendix reports three supplemental studies (S1 in Web Appendix B, S2 in Web Appendix C, and S3 in Web Appendix F) that further support the main findings (see Table 2).

6 | Study 1

Study 1 investigates whether older consumers engage less in sustainable consumption and tests time perspective as the mediating mechanism.

6.1 | Method

Four hundred and fifty consumers (age range = 18–88, $M_{Age} = 49.04$, SD = 20.34; 216 female) were recruited in a shopping area of a mid-sized European city to participate in a survey. Two female and two male interviewers approached same-gender respondents to minimize potential gender-of-interviewer effects (Fuchs 2009).[1] Interviewers approached respondents individually and followed a standardized procedure and dress code (i.e., classic clothing in neutral colors; see Amatulli et al. 2018). To avoid potential confounding factors related to the timing of recruitment, interviewers approached respondents at random on weekdays, both in the morning and afternoon (see Yoon 1997).

Participants completed a ten-item time perspective scale adapted from Lang and Carstensen (2002), which assessed the extent to which individuals perceive their future as limited or expansive and served as the focal mediator. The questionnaire also included measures of altruism, openness to change, perceived control, optimism, and subjective and objective environmental knowledge to account for alternative explanations (see Web Appendix A, Table A.1, for the full items). In a separate section, the questionnaire included the six-item, Green Consumption Values scale (Haws et al. 2014), which measured attitudes toward sustainable consumption and served as the main dependent variable. Demographic data (i.e., year of birth, gender, health status, education level, annual income, and presence of children) were collected at the end of the survey.

6.2 | Results and Discussion

Responses to each multi-item scale were combined to create an aggregate measure (see Web Appendix A). Regressing green consumption values on age revealed a significant negative relationship ($b = -0.012$, $t(448) = -4.205$, $p < 0.001$), indicating that older respondents had a lower inclination toward sustainable consumption.

We next ran a simple mediation model (PROCESS Model 4; Hayes 2022) with age as the independent variable, propensity to adopt a long time perspective as the mediator, and green consumption values as the dependent variable. Age was negatively related to propensity to adopt a long time perspective ($b = -0.053$, $t(448) = -22.056$, $p < 0.001$), which in turn positively predicted green consumption values ($b = 0.387$, $t(447) = 7.343$, $p < 0.001$) (Table 3). Consistent with H1, the indirect effect of age on green

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TABLE 2 | Summary of studies.

Study	Data source	Age range	Dependent variable	Key finding(s)
1	Survey	18–88	Green consumption values	*Time perspective mechanism (H1):* Age is negatively related to green consumption values through a lower propensity to adopt a long time perspective.
S1	Survey	19–87	Future commitment to recycling	*Time perspective mechanism (H1):* Age is negatively related to future commitment to recycling through a lower propensity to adopt a long time perspective.
S2	Survey	65–95 (older consumers)	Scenario-based product choice (environmentally friendly vs. conventional plastic water bottle; comparable quality; 20% price difference)	*Time perspective mechanism (H1):* Age-related differences in time perspective and sustainable consumption persist within the older consumer segment: older-old consumers are less likely than younger-old consumers to choose the environmentally friendly option due to a shorter time perspective.
2a	Online experiment (national paid pool)	65–88 (older consumers)	Scenario-based product choice (i.e., environmentally friendly vs. conventional pen; comparable quality; 20% price difference)	*Theory-consistent and intervention-relevant time perspective manipulation (H2):* Older consumers exposed to a long time perspective (vs. short or neutral) message are more likely to select the environmentally friendly option.
2b	Preregistered field experiment	65–92 (older consumers)	Real product choice (i.e., environmentally friendly vs. conventional pen; comparable quality; free gift)	*Theory-consistent and intervention-relevant time perspective manipulation (H2):* Older consumers exposed to a long time perspective (vs. neutral) message are more likely to select the environmentally friendly option.
S3	Preregistered field experiment	18–35 (younger consumers)	Real product choice (i.e., environmentally friendly vs. conventional pen; comparable quality; free gift)	*Boundary condition:* Younger consumers' sustainable consumption is unaffected by message cues manipulating time perspective.
3	Survey	18–96	Scenario-based product choice (environmentally friendly vs. conventional batteries; comparable quality; 20% price difference)	*Theory-consistent moderator – perceived youthfulness (H3a):* Older consumers with higher perceived youthfulness do not differ significantly from younger consumers in their time perspective and engagement in sustainable consumption.
4	Field experiment	18–80	Scenario-based service choice (environmentally friendly vs. conventional hotel; comparable quality; 20% price difference)	*Theory-consistent and intervention-relevant moderator – social cues (H3b):* Exposure to young (vs. old) social cues reduces age-related differences in time perspective and sustainable consumption.

Supplemental studies S1, S2, and S3 are reported in Web Appendices B, C, and F, respectively.

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consumption values via time perspective was negative and significant ($b = -0.021$, SE = 0.003, 95% confidence interval [CI] = [−0.027, −0.015]). All results remained robust when controlling for demographic variables and the time of day at which the survey was completed (Web Appendix A, Table A.2).

Furthermore, we explored the alternative mechanisms using a parallel mediation model (PROCESS Model 4; Hayes 2022). This confirmed the mediating role of propensity to adopt a long time perspective, as well as a significant negative indirect effect of age on green consumption values via subjective knowledge (see Web Appendix A, Tables A.3 and A.4, for the full analyses). Although the role of subjective environmental knowledge aligns with prior work linking perceived knowledge to pro-environmental attitudes and behaviors (Diamantopoulos et al. 2003; Ellen 1994; Nascimento and Maria Correia Loureiro 2024), our findings highlight time perspective as a distinct and independent mechanism uniquely contributing to age-related differences in sustainable consumption: older consumers' tendency to adopt a shorter time perspective emerged as a novel factor influencing their engagement in sustainability-related behaviors.

Supplemental Studies 1 and 2 (S1 and S2; see Web Appendices B and C) replicate and extend these results using alternative dependent variables and a within-group analysis of older consumers by comparing "old-old" versus "young-old" individuals. Building on this correlational evidence, Studies 2a and 2b provide causal tests of the proposed mechanism by examining how situational factors might affect older consumers' time perspective and, in turn, their engagement in sustainable consumption.

7 | Study 2a

Study 2a provides a causal test of H2, which posits that older consumers are more likely to engage in sustainable consumption when situationally induced to adopt a long (rather than short) time perspective. Relative to Study 1, this study introduces three key changes: it focuses exclusively on older consumers (aged 65 and over), experimentally manipulates time perspective rather than measuring it, and employs a behavioral choice task instead of an attitudinal measure of sustainable consumption. These procedural differences allow us to isolate the causal effect of an extended time perspective on older consumers' sustainable behavior.

7.1 | Method

One hundred and thirty participants aged 65 and over (age range = 65–88, $M_{Age} = 70.18$, SD = 4.47; 64 female) were recruited from a national paid online panel of older U.S. consumers. To avoid drawing attention to age, no age-screening questions were included, and participants were told the study examined responses to advertising messages.

Participants were randomly assigned to one of three between-subjects conditions manipulating time perspective (short, neutral, or long), adapted from Williams and Drolet (2005). All participants evaluated an advertisement for a fictional mineral water brand ("Pure Fresh") accompanied by a claim. In the short time perspective condition, the claim emphasized a limited time horizon ("Life is Short... Enjoy It Now!"), whereas in the long time perspective condition it emphasized an expanded time horizon ("Life is Long... Enjoy It Forever!"). The neutral condition included a time-unrelated claim ("Drink Pure Fresh... The Mineral Water!"). Participants then completed a brief writing task consistent with the assigned claim (see Web Appendix D).

In an ostensibly unrelated part of the study, participants were asked to imagine shopping for a pen (adapted from Amatulli et al. 2019) and then had to choose between two versions of a pen of comparable quality: one made from standard materials that could not be recycled and potentially harm the environment (conventional option), and another made from recyclable materials, hence environmentally friendly, but 20% more expensive (environmentally friendly option). Choice of the environmentally friendly pen served as the dependent variable.

Participants then completed a manipulation check assessing perceived time perspective (two items), as well as measures of liking for the advertisement, credibility of the advertisement, mood, and demographics (see Web Appendix D).

TABLE 3 | Simple mediation analysis.

Dependent variable: Propensity to adopt a long time perspective (*Me*)	***b***	***SE***	***t***	***p***
Constant	6.649	0.128	51.992	< 0.001
Age (*X*)	−0.053	0.002	−22.056	< 0.001
$R^2 = 0.521$, MSE = 1.078, $F(1, 448) = 486.487$, $p < 0.001$				
Dependent variable: Green consumption values (*Y*)	***b***	***SE***	***t***	***p***
Constant	2.807	0.378	7.421	< 0.001
Age (*X*)	0.009	0.004	2.219	0.027
Propensity to adopt a long time perspective (*Me*)	0.387	0.053	7.343	< 0.001
$R^2 = 0.142$, MSE = 1.341, $F(2, 447) = 36.844$, $p < 0.001$				
Indirect effect	***b***	***SE***	***LLCI***	***ULCI***
$X \rightarrow Me \rightarrow Y$	−0.021	0.003	−0.027	−0.015

Note: $N = 450$.
Abbreviations: *LLCI* = Lower limit of 95% confidence interval, *ULCI* = Upper limit of 95% confidence interval.

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7.2 | Results and Discussion

The two items assessing time perspective were averaged to form an aggregate measure of the construct ($M = 3.02$, SD = 0.81). The manipulation check was successful ($F(2, 127) = 20.036$, $p < 0.001$, partial $\eta^2 = 0.240$): participants in the short time perspective condition perceived their time horizon as less expansive and focused less on the future time ($M = 2.52$, SD = 0.74) than those in the neutral condition ($M = 3.06$, SD = 0.65; $t(127) = -3.534$, $p = 0.001$) and long time perspective condition ($M = 3.49$, SD = 0.74; $t(127) = -6.312$, $p < 0.001$). Participants' perceptions of time also differed significantly across the neutral and long time perspective conditions ($t(127) = -2.820$, $p = 0.006$). Potential confound checks were conducted by testing participants' mood, liking, and credibility ratings for the advertisements, and there were no significant differences across the three time perspective conditions ($ps = 0.823$, 0.505, and 0.354, respectively).

We tested the effect of time perspective on product choice using logistic regression. Since the manipulation involved three treatment conditions, two binary variables were created (Hayes 2022). X_{STP} was assigned a value of 1 for the short time perspective condition and 0 otherwise, while X_{LTP} was assigned a value of 1 for the long time perspective condition and 0 otherwise. The neutral condition was the baseline. By regressing product choice (1 = environmentally friendly pen, 0 = conventional pen) on these binary variables, a positive significant effect was observed for X_{LTP} ($b = 1.099$, Wald $\chi^2(1) = 5.793$, $p = 0.016$, Odds Ratio [OR] = 3.000), indicating that participants in the long time perspective condition were more likely to choose the environmentally friendly option than those in the neutral condition (71.43% vs. 45.45%; see Figure 2). However, X_{STP} had a non-significant effect ($b = 0.182$, Wald $\chi^2(1) = 0.182$, $p = 0.670$), suggesting that the likelihood of choosing the environmentally friendly option did not differ significantly between the short time perspective and neutral conditions (50% vs. 45.45%; see Figure 2).

We conducted another logistic regression to compare the long time perspective condition with the short time perspective condition. Here, X_{NEU} was assigned a value of 1 for the neutral condition and 0 otherwise, while X_{LTP} was coded as previously described. The short time perspective condition was the baseline. By regressing product choice on these binary variables, a significant positive effect was observed for X_{LTP} ($b = 0.916$, Wald $\chi^2(1) = 4.045$, $p = 0.044$, OR = 2.500). This finding suggested that participants in the long time perspective condition were more likely to choose the environmentally friendly option than those in the short time perspective condition (71.43% vs. 50%; see Figure 2), thereby supporting H2. The effects remained robust when controlling for demographic variables (see Web Appendix D, Tables D.1 and D.2).

Together, these results provide causal support for H2, demonstrating that inducing a long time perspective increases older consumers' sustainable choices. Study 2b extends these findings by testing the same mechanism in a real-world retail setting.

8 | Study 2b

Study 2b extends Study 2a by enhancing the external validity through a preregistered field experiment. Using advertising messages adapted from Study 2a, we test whether inducing a long (vs. neutral) time perspective increases older consumers' environmentally friendly choices in a real retail setting. Study 2b focuses only on two conditions: a long time perspective message and a neutral message. Furthermore, to rule out financial concerns as a possible explanation, the study eliminates the price difference between environmentally friendly and conventional options. These procedural differences allow us to provide ecologically valid insights into potential interventions in real marketing contexts capable of extending older consumers' time perspectives and promoting more sustainable choices.

8.1 | Method

A preregistered experiment (https://aspredicted.org/BBX_ZVY) was conducted in a bakery shop in a European town with 120

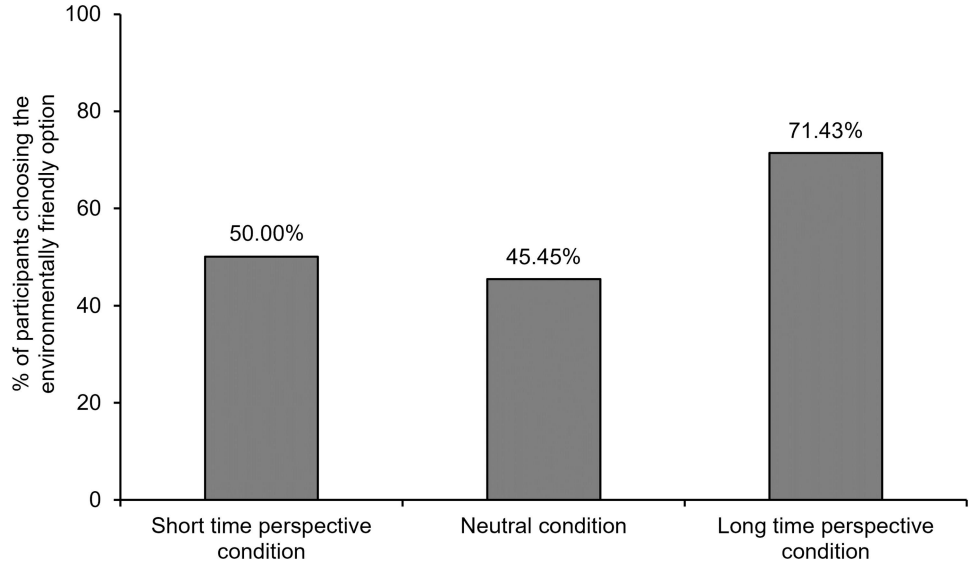

FIGURE 2 | Environmentally friendly product choice as a function of time perspective. $N = 130$.

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older consumers (age range = 65–92, $M_{Age} = 73.96$, SD = 6.54; 63 female). After completing their purchase, customers were approached and invited to choose a complimentary pen. To avoid demand and confounding effects, the experimenter approached participants at random on weekdays, solely based on apparent age; chronological age was verified only after the choice. Consistent with our preregistration, those younger than 65 were excluded.[2]

Participants were randomly assigned to view one of two pretested advertising messages displayed near the pen selection area (see Web Appendix E for the pretest's details): a long time perspective message (i.e., "Life is long. Enjoy it forever!") or a neutral message (i.e., "Welcome. Enjoy your shopping!"). They then chose between two versions of a pen, displayed simultaneously with randomized placement and accompanied by descriptions emphasizing either the quality of writing (the conventional version) or environmental friendliness (the environmentally friendly version; see Web Appendix E). Choice of the environmentally friendly pen served as the dependent measure. Participants subsequently reported their liking of the ad message, mood, and demographics. All the data were collected in the morning.

8.2 | Results and Discussion

As preregistered, a chi-square test showed that participants exposed to the long time perspective message selected the environmentally friendly pen more frequently (81.67%) than those in the neutral condition (66.67%; $\chi^2(1) = 3.523$, $p = 0.061$). Although marginally significant, this result is consistent with our preregistered directional hypothesis. Furthermore, ad liking and mood did not differ significantly across conditions ($ps = 0.411$ and 0.430, respectively).

A logistic regression controlling for demographics yielded a convergent result. Product choice (1 = environmentally friendly pen, 0 = conventional pen) was regressed on the time perspective manipulation (1 = long time perspective, 0 = neutral), while controlling for demographics. Participants exposed to the long time perspective message were more likely to choose the environmentally friendly pen than those in the neutral condition ($b = 0.861$, Wald $\chi^2(1) = 3.556$, $p = 0.059$, OR = 2.366; see Web Appendix E, Table E.1).

Together, these findings provide additional empirical support for H2, demonstrating that extending older consumers' time perspective can increase sustainable choices in real-world retail contexts. By using incentive-compatible decisions and eliminating price differences, Study 2b strengthens the ecological validity of Study 2a and rules out financial concerns as an alternative explanation. Interestingly, Supplemental Study 3 (S3; see Web Appendix F) shows that similar manipulations do not significantly affect younger consumers, suggesting that this phenomenon may be specific to older adults. The next study examines whether perceived youthfulness similarly expands older consumers' time perspective and moderates age-related differences in sustainable consumption.

9 | Study 3

Study 3 tests whether older consumers with higher perceived youthfulness adopt time perspectives and exhibit sustainable consumption patterns similar to those of younger consumers (H3a). Relative to prior studies, this study introduces three changes: it directly measures perceived youthfulness, uses an alternative operationalization of time perspective (i.e., propensity to adopt a short time perspective), and examines sustainable consumption in a new product category. These procedural differences allow us to assess whether age-related declines in sustainable consumption are attenuated among individuals who feel younger than chronological age.

9.1 | Method

Four hundred and eleven consumers (age range = 18–96, $M_{Age} = 51.74$, SD = 20.11; 236 female) completed a survey administered in a shopping area of a mid-sized European city. A female and a male interviewer recruited same-gender respondents following the procedure implemented in Study 1 (Fuchs 2009). Respondents were approached at random on weekdays, both in the morning and afternoon, and were told the study involved general consumption habits.

Respondents first indicated how old they felt (i.e., subjective age) by answering a question adapted from prior research (Amatulli et al. 2018; Mock and Eibach 2011). In a separate section, they completed a five-item scale, adapted from Mogilner et al. (2011, 2012), which assessed their propensity to focus on the present moment, with higher scores indicating a stronger present-focused orientation (see Web Appendix G).

In an ostensibly unrelated part of the study, respondents were asked to imagine themselves in a shopping situation where they were looking for batteries. Then they chose between two versions of batteries of comparable quality: one version was made with polluting materials that could thus harm the environment (conventional option), and the other version was made with recycled materials, which was environmentally friendly but cost 20% more (environmentally friendly option). Choice of the environmentally friendly option served as the dependent variable. Respondents then provided the same demographic data as in the previous studies.

9.2 | Results and Discussion

Time perspective scores were averaged to form a composite measure ($M = 4.45$, SD = 1.42). Perceived youthfulness was calculated by subtracting respondents' subjective age from their chronological age and standardizing this difference by dividing it by chronological age (Kotter-Grühn et al. 2015; Lee and Kim 2024). Higher values on this standardized measure indicated a stronger tendency to feel younger.

We conducted a bootstrapped moderated mediation analysis (PROCESS Model 7; Hayes 2022) to examine the interaction effect between age (continuous and mean-centered) and perceived youthfulness (continuous and mean-centered) on product choice (1 = environmentally friendly batteries, 0 = conventional

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batteries) via time perspective. As expected, the interaction between age and perceived youthfulness significantly predicted propensity to adopt a shorter time perspective ($b = -0.044$, $t(407) = -2.841$, $p = 0.005$). This effect remained robust when controlling for demographics (see Web Appendix G, Tables G.1 and G.2). A Johnson-Neyman floodlight analysis (Spiller et al. 2013) showed that age exerted a positive and significant effect on propensity to adopt a short time perspective only among respondents with (standardized and mean-centered) values of perceived youthfulness lower than 0.080 ($b_{JN} = 0.008$, $SE = 0.004$, $p = 0.050$). In contrast, for those with perceived youthfulness values higher than 0.080, the relationship between age and time perspective was nonsignificant (Figure 3).

Consistent with H3a, the interaction between age and perceived youthfulness exerted a significant indirect effect on environmentally friendly choice via propensity to adopt a short time perspective ($b = 0.017$, SE = 0.009, 95% CI = [0.004, 0.039]). The conditional indirect effect was negative and significant when perceived youthfulness was low ($M - 1$ SD; $b = -0.008$, SE = 0.003, 95% CI = [−0.016, −0.003]) but nonsignificant when perceived youthfulness was high ($M + 1$ SD; $b = -0.001$, SE = 0.002, 95% CI = [−0.004, 0.004]), indicating that feeling younger attenuates age-related declines in sustainable consumption (Figure 4). All results remained robust when controlling for demographics (Web Appendix G).

Together, these findings provide initial evidence that perceived youthfulness mitigates age-related differences in time perspective and, in turn, sustainable consumption, supporting H3a. Older consumers with higher perceived youthfulness do not differ significantly from younger consumers in their time perspective or environmentally friendly choices. The next study investigates whether consumers' time perspectives and engagement in sustainable consumption also vary in response to contextual social cues.

10 | Study 4

Study 4 examines whether exposure to young (vs. old) social cues attenuates age-related differences in time perspective and sustainable consumption (H3b). Relative to Study 3, this study incorporates two main changes: it manipulates perceived youthfulness via social cues rather than measuring it, and operationalizes sustainable consumption through a choice-based service context. These procedural differences allow us to draw causal inferences about the moderating role of social cues and offer insights into intervention-relevant contexts.

10.1 | Method

Three hundred and sixty-five tourists (age range = 18–80, $M_{Age} = 48.20$, SD = 17.84; 173 female) participated in a field experiment conducted in a European tourist destination. Our focus on tourists stemmed from the type of service we considered in the choice task (i.e., hotels), which is particularly relevant to this consumer segment. Participants were recruited using the same procedure as in Studies 1 and 3, and were told the study concerned local attractions and tourism communication. Two experimenters (one male and one female) individually approached same-gender respondents who clearly appeared to be tourists at random on weekdays, both in the morning and afternoon.

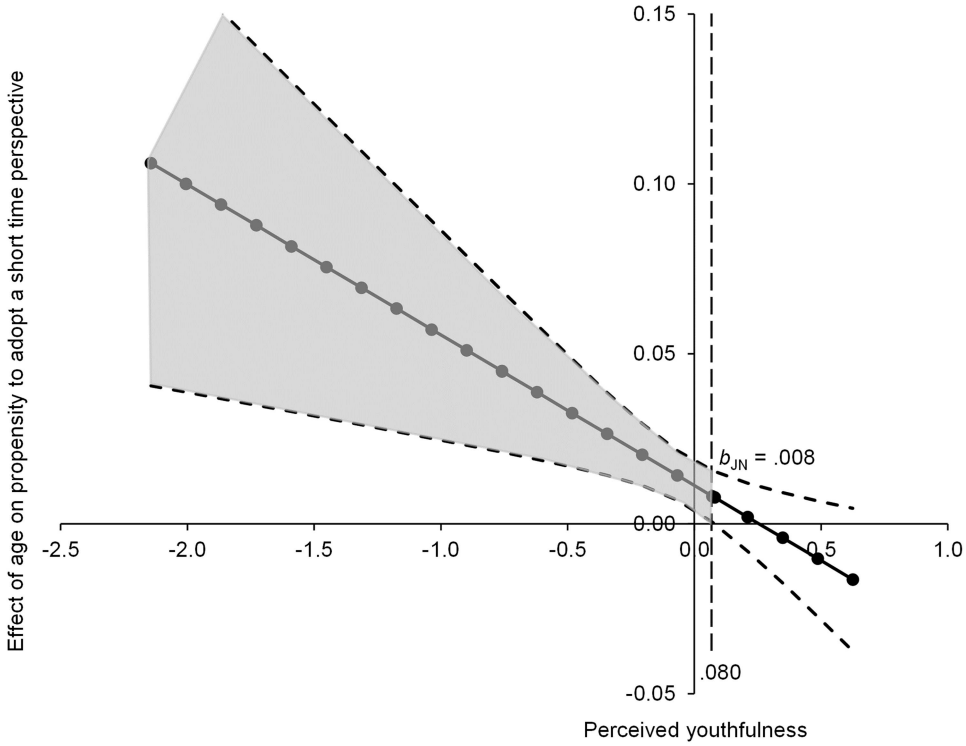

FIGURE 3 | Effect of age on propensity to adopt a short time perspective across perceived youthfulness values. $N = 411$. The grey region indicates the values of perceived youthfulness for which the effect of age on propensity to adopt a short time perspective is statistically significant. Perceived youthfulness values are standardized and mean-centered.

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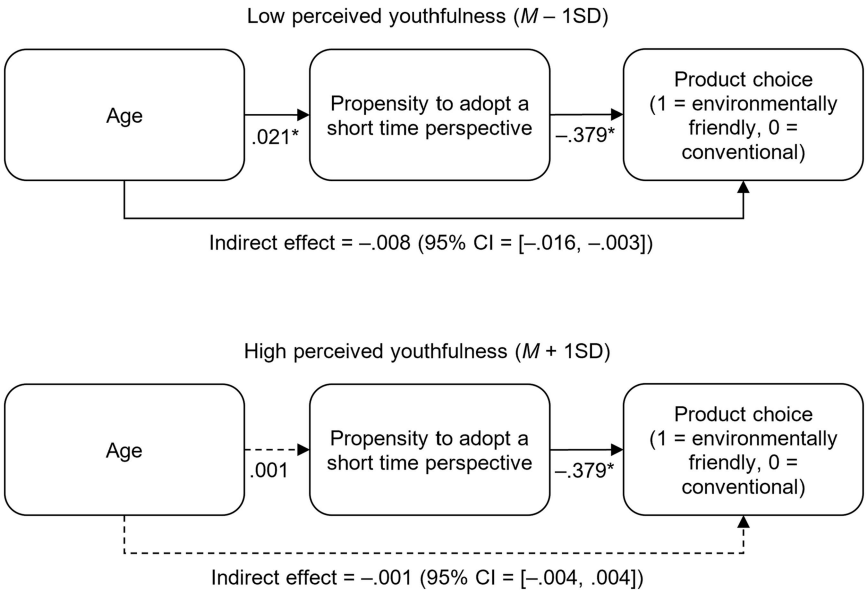

FIGURE 4 | Conditional indirect effects of age on product choice. $N = 411$. $^*p < 0.001$. Dotted arrows indicate nonsignificant effects. Perceived youthfulness values are standardized and mean-centered.

Participants were randomly assigned to either a young or old social cue condition using a between-subjects design. They viewed a fictitious print advertisement for a hotel chain that would soon be opening new hotels in the area. The ad contained a claim unrelated to age (i.e., "A&P Hotels. Ready to Serve You!"), paired with a pictorial prime depicting either a younger pair of individuals or an older pair. These primes served as age-related social cues (see Web Appendix H). This manipulation was adapted from prior work (Amatulli et al. 2018; Gambicorti et al. 2026), and a posttest with 300 respondents confirmed that, while the two pictorial primes did not significantly differ in terms of liking and visual clarity, they successfully influenced older consumers' perceived youthfulness (see Web Appendix H). Therefore, participants in the old social cue condition were presented with the pictorial prime displaying the pair of older people, while those in the young social cue condition were presented with the pictorial prime featuring the pair of younger people.

Participants then completed the same time perspective measure as Study 3. In a subsequent choice task, they were asked to imagine that they were planning to spend one night at one of two A&P Hotels in the area and to select between two hotels of comparable quality: a conventional hotel offering standard rooms at a good quality-price ratio (conventional option), and an environmentally friendly hotel offering similar rooms at a 20% higher cost (environmentally friendly option). Choice of the environmentally friendly hotel served as the dependent variable. Finally, participants provided the same demographic data as in the previous studies.

10.2 | Results and Discussion

We conducted a bootstrapped moderated mediation analysis (PROCESS Model 7; Hayes 2022), which tested the mediating role of propensity to adopt a short time perspective ($M = 4.75$, $SD = 1.45$) in the interactive effect of age (continuous and mean-centered) and social cue (a binary variable with values of –0.5 for old, and 0.5 for young; Hayes 2022) on service choice (1 = environmentally friendly hotel, 0 = conventional hotel). The analysis revealed a significant interaction between age and social cues on time perspective ($b = –0.027$, $t(361) = –3.008$, $p = 0.003$). This interaction remained robust when controlling for demographics (see Web Appendix H, Tables H.1 and H.2). Follow-up analyses showed that age was significantly and positively related to propensity to adopt a short time perspective in the presence of the old social cue ($b = 0.019$, $t(361) = 2.657$, $p = 0.008$; point estimates: 4.32 vs. 4.98), but not in the presence of the young social cue ($b = –0.008$, $t(361) = –1.482$, $p = 0.139$; point estimates: 4.90 vs. 4.61; Figure 5).

Consistent with H3b, the age by social cue interaction exerted a significant indirect effect on environmentally friendly service choice via propensity to adopt a shorter time perspective ($b = 0.004$, SE = 0.003, 95% CI = [0.0003, 0.011]). The conditional indirect effect was significantly negative in the presence of the old social cue ($b = –0.003$, SE = 0.002, 95% CI = [–0.008, –0.0001]) but nonsignificant in the presence of the young social cue ($b = 0.001$, SE = 0.001, 95% CI = [–0.0004, 0.004]; Figure 6). All effects remained robust when controlling for demographics (Web Appendix H).

Overall, these findings identify social cues as a situational moderator of age-related differences in sustainable consumption. Exposure to young social cues aligns older consumers' time perspectives more closely with those of younger consumers, thereby increasing their likelihood of choosing environmentally friendly services.

11 | General Discussion

This research investigates why older consumers tend to engage less in sustainable consumption, identifying time perspective as a central explanatory mechanism. Across eight studies—five main

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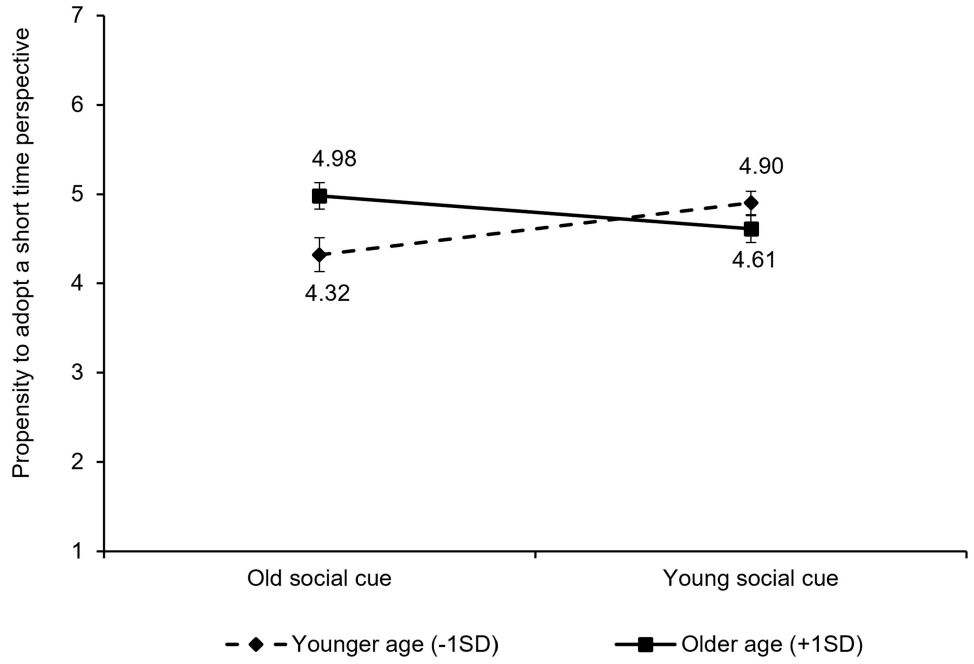

FIGURE 5 | Time perspective as a function of age and social cue condition. $N = 365$. Error bars indicate standard errors.

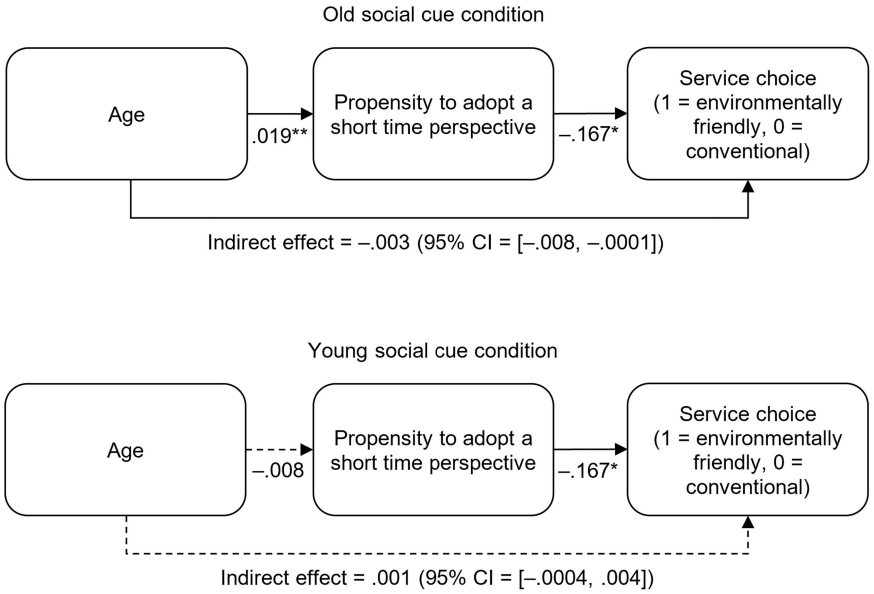

FIGURE 6 | Conditional indirect effects of age on service choice. $N = 365$. *$p < 0.05$, **$p < 0.01$. Dotted arrows indicate nonsignificant effects.

and three supplemental—we provide convergent evidence that older consumers' tendency to adopt a shorter time perspective represents a distinct and critical mechanism underlying age-related differences in pro-environmental attitudes and behaviors. Importantly, our findings support our valuation-based mechanism while ruling out several alternative explanations.

Consistent with prior research, Study 1 documents a negative relationship between age and green consumption values. Extending this literature, we demonstrate that time perspective mediates this relationship, revealing a novel psychological mechanism. Study 1 further accounts for competing explanations, showing that, although subjective environmental knowledge also contributes to age differences in sustainable consumption, time perspective exerts an independent and theoretically meaningful effect. Subsequent studies strengthen this conclusion. In Studies 2a and 2b, we provide causal evidence by manipulating time perspective across different study settings, while ruling out mood and financial concerns as alternative explanations. Studies 3 and 4 further show that both chronic and situationally induced perceived youthfulness attenuate age differences in time perspective and sustainable consumption.

Our results are also inconsistent with a cohort explanation (Olli et al. 2001). If age differences in sustainable consumption were driven solely by formative experiences, situational interventions,

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such as message cues inducing a long time horizon or exposure to young social cues, would not affect older consumers' time perspective or sustainable behavior. Instead, our findings demonstrate that these factors meaningfully shift older consumers' intertemporal orientation and choices.

The robustness of our conclusions is further supported by our multi-method approach, which includes surveys, online and field experiments, diverse operationalizations of time perspective (Lang and Carstensen 2002; Mogilner et al. 2012), multiple product and service categories, and samples drawn from both the United States and Europe, thereby extending the current state of knowledge on aging and sustainable consumption.

11.1 | Theoretical Implications

Our research makes three main theoretical contributions. First, it identifies limited time perspective as a critical psychological mechanism driving age-related differences in sustainable consumption. Although prior work has documented lower engagement in pro-environmental behaviors among older consumers (e.g., Diamantopoulos et al. 2003; Jansson et al. 2010) and noted the common association between sustainability and youth (Lee and Kim 2024), the cognitive underpinnings of this phenomenon have remained underexplored. We extend this literature by showing that older consumers' shorter time horizons lead them to prioritize immediate outcomes and undervalue the long-term benefits of sustainable consumption. Our findings thereby offer a valuation-based explanation that complements, rather than replaces, identity-based accounts. By elucidating and empirically validating such a mechanism, we pave the way to investigate novel moderators that can mitigate the negative effects of aging on sustainable consumption.

Second, our research advances the literature on aging and time perspective by highlighting the significant role of older consumers' chronic perceived youthfulness as an individual-level factor that can influence their sense of time. Specifically, our results support prior evidence that older people with higher perceived youthfulness adopt an expanded time perspective (Weiss and Lang 2012). More importantly, while prior work has shown that feeling younger is associated with greater engagement in sustainable consumption (Lee and Kim 2024), our findings clarify the underlying process. In particular, perceived youthfulness does not merely align consumers with a youthful identity; rather, it can serve as a temporal resource that expands time perspective and mitigates age-related declines in sustainable consumption among older consumers. This interaction between chronological age and perceived youthfulness refines existing theory by highlighting how feeling younger shapes intertemporal valuation and trade-off, not just identity alignment.

Third, our findings reveal the malleability of age-related differences in sustainable consumption. Responding to calls for research on behavioral change and intervention design (Van der Wal et al. 2018; White et al. 2025), we demonstrate that age effects are not fixed or purely cohort-driven. Instead, situational cues, such as message frames emphasizing a long-term outlook or young social cues that induce perceived youthfulness, can extend older consumers' time horizons and increase sustainable choices. By linking socioemotional selectivity theory (Carstensen et al. 1999) with behavioral intervention approaches, our work highlights how contextual interventions can meaningfully influence pro-environmental attitudes and actions later in life.

11.2 | Managerial Implications

Our findings offer several actionable implications for companies and policymakers aiming to promote sustainable consumption among older consumers, a rapidly growing demographic segment. For companies offering environmentally friendly products or services, communication strategies that emphasize long-term outcomes or subtly incorporate young social cues may be particularly effective in encouraging sustainable choices among older consumers. Such cues can be integrated across multiple touchpoints, including traditional advertising, digital media, and in-store communications. Firms can leverage these insights to develop more effective communication strategies tailored to older consumers.

Policymakers could also leverage these insights when designing interventions aimed at increasing pro-environmental behavior among older adults. Although improving environmental knowledge remains important, our results suggest that such efforts may be more effective when combined with cues that expand future time perspective or highlight youthful social representations. These approaches represent cost-effective and easily implementable tools that complement existing sustainability initiatives and respond directly to calls for scalable behavioral interventions (White et al. 2019).

More broadly, our findings underscore the importance of refined segmentation strategies. Older consumers are far from homogeneous (Abdel-Ghany and Sharpe 1997; Franco 2023), and reliance on chronological age alone may obscure meaningful differences. Supplemental Study 2 highlights distinctions between "young-old" and "old-old" consumers, while Study 3 shows that perceived youthfulness further differentiates sustainable behavior within age groups. Incorporating both chronological age and subjective age into segmentation frameworks can therefore improve targeting and effectiveness.

11.3 | Limitations and Future Research

Our research has several limitations that suggest avenues for future investigations. First, some studies introduce price differences between sustainable and conventional options to enhance realism, in accordance with prior literature showing that green products often are more expensive (Amatulli et al. 2019) and that consumers expect higher prices for such products (Kumbargeri and Tripathi 2025). Concurrently, such price differences may raise concerns about confounding effects. However, this limitation is mitigated by the inclusion of studies without price differences and the consistency of results across designs. Second, while our samples span multiple countries and data collection methods, they may not fully represent the broader population. Furthermore, although the field studies were adequate for detecting the reported effects, they may have been less well powered to detect smaller or more context-

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dependent effects. However, the convergence of results across eight studies provides consistent support for our core findings. Future research could address them by enhancing generalizability through nationally representative, larger samples. Moreover, as our studies were conducted in Western contexts, future research could explore whether these effects generalize to non-Western or more collectivistic cultures.

Third, although we focus on time perspective as the primary mechanism, future work could examine how it interacts with other psychological processes, such as emotion regulation or moral identity. Finally, while we examine a range of products and services, future studies could extend our framework to other forms of sustainable behavior, such as information sharing, volunteering, or environmental advocacy.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this research are available at https://osf.io/9ef3b/overview?view_only=8d7d729e24124146999f8e3cd98cdbb5.

Endnotes

[1] All interviewers and experimenters employed in this and the following studies were unaware of the study's goal and hypotheses. Participants in Studies 1, 3, 4 and Supplemental Study 1 completed the assigned questionnaire on their own and deposited it in a collection box, thus minimizing interaction with the interviewer or experimenter.

[2] As a consequence of this procedure, the experimenter initially recruited 144 participants, but 24 were excluded from the study as they were younger than 65.

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