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Media Information Exposure and Green Consumption Behavior Among University Students in Shanghai: A Cross-Sectional Study

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Abstract

Green consumption has become a central topic in sustainability research. However, the relationship between media information exposure and green consumption behavior among university students, as well as the psychological processes underlying this relationship, remains insufficiently understood. This cross-sectional study examined the association between media information exposure and green consumption behavior and tested the hypothesized sequential mediating roles of collectivism and green consumption attitudes. A total of 419 university students were recruited from multiple universities in Shanghai, China. Participants were recruited through university student networks and completed an online questionnaire. All variables were self-reported using established scales: media information exposure, collectivism, green consumption attitudes, and green consumption behavior. Pearson correlation analysis, regression analysis, and bootstrap mediation analysis were employed to test the proposed relationships. The results indicated that media information exposure was positively associated with green consumption behavior ($r = 0.542, p < 0.001$). Both collectivism and green consumption attitudes served as significant mediators and jointly formed a sequential mediation pathway ($B = 0.025, 95\% \text{ CI } [0.006, 0.052]$). Because the design was cross-sectional, the proposed sequence represents a theoretical interpretation of the concurrent associations rather than an observed temporal process. These findings suggest that media information exposure, value orientation, attitudes toward green consumption, and green consumption behavior are interconnected, and provide empirical evidence for understanding green consumption behavior among university students, with implications for green consumption education and environmental communication practices in higher education settings.

Keywords: media information exposure; university students; green consumption behavior; collectivism; green consumption attitudes; sequential mediation



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1. Introduction

Growing concerns about climate change, resource scarcity, and environmental degradation have made green consumption an important aspect of sustainable development (UNEP, 2024). By linking sustainable production with sustainable lifestyles, green consumption helps reduce resource waste and environmental pressures while supporting the development of green industries and the transition toward a low-carbon economy (UNEP, 2024; White et al., 2019). Among young people, consumption behavior reflects not only their purchasing choices but also their broader value orientations (Hong et al., 2024). University students constitute an important consumer group whose consumption patterns may

contribute to the wider adoption of sustainable consumption practices (Herrera Burstein & Goñi Avila, 2024; M. Zhang et al., 2024). Examining the factors associated with green consumption behavior among university students is therefore relevant to understanding young people's engagement in sustainable consumption.

The international community has placed increasing emphasis on the role of green consumption in achieving sustainable development goals. The United Nations 2030 Agenda for Sustainable Development identifies responsible consumption and production (SDG 12) as a key objective, emphasizing the need to change consumption patterns to support environmental, social, and economic sustainability (United Nations, 2015). International sustainability initiatives have also emphasized the role of education in promoting sustainable lifestyles and consumption practices (UNESCO, 2020). Research has increasingly examined the factors associated with green consumption behavior, with recent reviews highlighting the diverse psychological, social, and contextual factors involved (Megha, 2024). Previous studies have identified environmental knowledge, ecological values, environmental responsibility, and social norms as important factors associated with green consumption behavior (Perera et al., 2018; Joshi & Rahman, 2015; Gleim et al., 2013). Research has also examined the relationship between media information exposure and pro-environmental behavioral intentions among young adults (Meng et al., 2023). However, these factors have generally been examined as separate predictors rather than within a sequential framework, and much of the existing research has focused on purchase intentions rather than self-reported behavior.

Digital media and social networks have become important channels through which individuals access information about environmental issues and sustainable consumption. Media information exposure has therefore become increasingly relevant to understanding green consumption decisions among young consumers (Truc, 2024). Previous research suggests that the association between media-related information and green purchasing behavior may involve internal psychological processes, particularly environmental attitudes (Yu et al., 2024). The Stimulus–Organism–Response (S–O–R) model provides a theoretical basis for understanding these associations by proposing that individuals' behavioral responses to external stimuli are influenced by underlying cognitive and affective processes (Mehrabian & Russell, 1974). Within this framework, media information exposure can be conceptualized as an external stimulus associated with green consumption behavior through individuals' psychological responses.

Media information exposure allows individuals to encounter environmental information and knowledge related to sustainable consumption and can therefore be conceptualized as an external stimulus. However, the "organism" component of the S–O–R framework encompasses a broad range of internal psychological processes and requires further specification in particular research contexts. The Value–Attitude–Behavior (VAB) framework provides a useful perspective for understanding the psychological processes associated with green consumption behavior (Y. Wang et al., 2023). According to the VAB model, individuals' values are related to their attitudes, which, in turn, are associated with behavior (Homer & Kahle, 1988).

The S–O–R framework and the VAB model provide complementary perspectives for examining the relationship between media information exposure and green consumption behavior. The S–O–R framework conceptualizes media information exposure as an external stimulus associated with psychological states and behavioral responses, while the VAB model provides a theoretical basis for distinguishing general value orientations from more specific attitudes. Drawing on these perspectives, the present study examines collectivism as a general value orientation and green consumption attitude as a consumption-specific evaluation within a hypothesized sequential mediation model. Specifically, the study examines the sequential indirect association through collectivism and green consumption

attitude, alongside the separate indirect associations through each mediator. By focusing on university students in Shanghai, the study also provides evidence concerning self-reported green purchasing behavior rather than focusing solely on purchase intentions.

Within this framework, collectivism is an important value orientation associated with prosocial and pro-environmental behavior. Individuals with stronger collectivist orientations tend to place greater emphasis on collective welfare, social responsibility, and shared benefits. This orientation may also be associated with greater concern for environmental issues and stronger support for environmentally friendly consumption choices (Kim & Choi, 2005). Collectivism reflects an internalized value orientation that emphasizes group interests and interdependence (Triandis & Gelfand, 1998), whereas subjective norms reflect perceived social pressure to engage in a particular behavior (Ajzen, 1991). Although the two constructs may be correlated, they are not interchangeable. The present study focuses on collectivism rather than subjective norms.

Green consumption attitudes refer to individuals' overall evaluations of green products and environmentally responsible consumption practices. Previous research has identified green consumption attitudes as important psychological factors associated with green consumption behavior (Sharma et al., 2023). A meta-analysis of 90 empirical studies by Zaremohzzabieh et al. (2021) further highlighted the role of consumer attitudes in predicting green purchasing intentions. More recent research has also documented associations between green attitudes and self-reported purchasing behavior. For example, Ngo et al. (2025) found that green attitudes were positively associated with both green purchasing intentions and green purchasing behavior among Generation Z consumers in Vietnam. Research further suggests that collectivist values and social norms may be associated with attitudes toward environmentally responsible consumption (Ogiemwonyi & Jan, 2023). Taken together, these findings suggest that green consumption attitudes may serve as an important psychological link between value orientations and green consumption behavior.

Although previous studies have documented associations among media information exposure, collectivism, green consumption attitudes, and green consumption behavior, several issues warrant further investigation. First, relatively little attention has been paid to the sequential associations among these four constructs within a single analytical model. Second, although green consumption behavior has been widely studied, the proposed sequential relationship has received less attention in studies examining self-reported purchasing behavior. Third, existing studies involving Chinese university students vary in their research populations and the operationalization of collectivism, leaving room for further investigation in this context. The present study addresses these issues by examining the hypothesized sequential mediation model among university students in Shanghai.

To examine these relationships, the study draws on the S-O-R model and the VAB framework. Within this framework, media information exposure is conceptualized as an external stimulus (Stimulus), while collectivism and green consumption attitudes represent theoretically ordered internal psychological factors (Organism). Green consumption behavior is specified as the behavioral outcome (Response). Accordingly, the proposed sequential mediation model examines the indirect association between media information exposure and green consumption behavior through collectivism and green consumption attitudes.

1.1. Media Information Exposure and Green Consumption Behavior

Green consumption behavior is a multidimensional construct that encompasses product selection, use, and disposal. Consumers may engage in green consumption by purchasing environmentally friendly products, reducing resource consumption during product use, and participating in recycling and reuse activities after consumption (Joshi & Rahman, 2015). As research on sustainable consumption has developed, greater attention has been

paid to the factors associated with green consumption behavior and the role of consumption practices in promoting sustainable development (White et al., 2019; Ern et al., 2022). Previous studies suggest that price, convenience, product availability, information transparency, and consumption habits may be associated with consumers' green purchasing decisions (Carrington et al., 2010).

In the present study, green consumption behavior refers specifically to self-reported purchasing practices involving environmental considerations. The measurement items address purchasing less-polluting products, switching brands for ecological reasons, choosing green product alternatives, avoiding non-recyclable products, selecting energy-efficient products, purchasing reusable or recyclable products, and choosing products with minimal packaging. These items concern respondents' reported consumption practices rather than their intentions to purchase green products. Nevertheless, the measures are based on self-reports and do not provide independently verified records of actual purchases.

Media information exposure refers to individuals' contact with information disseminated through various media channels in their daily lives. Traditional communication research primarily focused on television as a major source of information for mass audiences (McQuail, 2005). However, contemporary information environments are characterized by the coexistence of traditional media and digital platforms. In China, mainstream media outlets such as People's Daily, Xinhua News Agency, China Central Television (CCTV), and People's Daily Online operate alongside social media platforms such as Weibo, WeChat Official Accounts, Xiaohongshu, Douyin, and Zhihu. Together, these media channels provide individuals with access to a wide range of environmental and sustainability-related information.

In the context of this study, media information exposure refers to the overall degree to which university students encounter information related to climate change and green consumption across various media platforms. Rather than comparing different media types, the study focuses on cumulative exposure to sustainability-related information across multiple channels. This aggregation is deliberate: the study asks about the overall information environment that students inhabit rather than the effect of any single platform, and cumulative exposure provides a parsimonious summary of that environment. The approach trades channel-level resolution for a general estimate of exposure, and this trade-off is revisited in the Limitations.

Previous studies suggest that Media Information Exposure may be associated with green consumption behavior through several psychological processes. Social Cognitive Theory suggests that media messages can shape behavior through informational, motivational, and social learning processes (Bandura, 2001). Similarly, agenda-setting theory, research on priming effects, and the Elaboration Likelihood Model suggest that repeated exposure to media content may influence individuals' judgments and consumption decisions. Empirical studies have also reported associations between media information exposure and environmentally responsible consumption. Cheung and To (2019), using survey data from consumers in Hong Kong, found that green product information was associated with green purchasing behavior within an extended value–attitude–behavior framework. Research conducted in China has similarly reported positive associations between media use and low-carbon consumption practices (Li et al., 2025). Using nationally representative survey data from Belarus, Shershunovich and Mirzabaeu (2026) found that exposure to climate change information was positively associated with both mitigation-oriented and adaptation-oriented sustainable consumption behaviors. Huang (2016), drawing on nationwide survey data from Taiwan, also reported an association between exposure to media information about global warming and several forms of environmentally responsible behavior.

A recent study is especially relevant to this link. Vrselja et al. (2024), drawing on 1075 Croatian adults, found that exposure to climate-change information through traditional

media was indirectly associated with self-reported pro-environmental behavior through climate-change worry, whereas the corresponding indirect paths for modern media were not significant. Three implications follow. First, the exposure–behavior association has been documented for self-reported behavior, which is the outcome examined here, rather than for independently observed purchases. Second, the association can vary by channel, which cautions against treating an aggregate exposure score as representing a single uniform mechanism. Third, the mediating role of worry suggests that the internal process linking exposure to behavior is not exhausted by a single mediator, leaving room for value- and attitude-based pathways of the kind proposed here. The present study differs from Vrselja et al. in population (university students in Shanghai rather than Croatian adults) and in the proposed mediators, and it therefore extends rather than replicates their finding.

Taken together, existing evidence suggests that media information exposure may be associated with green consumption behavior among university students.

Hypothesis 1 (H1). *Media information exposure is positively associated with green consumption behavior among university students.*

1.2. The Mediating Role of Collectivism

Collectivism refers to the extent to which individuals define themselves in relation to social groups and prioritize collective interests over individual concerns. Triandis and Gelfand (1998) examined collectivism as both a cultural orientation and an individual-level value disposition, distinguishing between its horizontal and vertical dimensions. More recent research has increasingly examined collectivism as an individual-level value orientation that can be assessed through psychological measures.

Cultivation theory provides a perspective for understanding the association between Media Information Exposure and collectivism. According to this theory, long-term exposure to recurring media narratives may contribute to the development of shared understandings and common value orientations (Gerbner & Gross, 1976; Gerbner et al., 1980). Repeated exposure to media messages emphasizing cooperation, collective responsibility, and shared interests may therefore reinforce collectivist value orientations. Previous meta-analyses have also provided evidence of cultivation effects across different periods of media research (Morgan & Shanahan, 1997; Hermann et al., 2021). Two qualifications must be stated at the outset. First, the present design cannot distinguish whether exposure is associated with a change in value orientation or with selective attention, whereby already collectivist respondents seek out collective-oriented content. Both would produce a positive concurrent association, and only longitudinal or experimental data can separate them. Second, the direction of the exposure–collectivism association is not necessarily uniform across channels. Z. Su et al. (2021), using Chinese General Social Survey data, found that television use was associated with stronger collectivist tendencies, whereas internet use was more closely associated with individualistic orientations. This contrast indicates that different media carry different content and relational cues, so an aggregate exposure score should be understood as capturing cumulative contact with sustainability-related content rather than a single uniform mechanism. We therefore treat the exposure–collectivism path as an association to be estimated rather than as evidence of value change, and we return to the aggregation decision in the Limitations.

Evidence from China provides further support for this perspective. Using data from the Chinese General Social Survey (CGSS), Z. Su et al. (2021) found that television and internet use were associated with different value orientations. Television viewing was associated with stronger collectivist tendencies, whereas internet use was more closely related to individualistic orientations. These findings suggest that media use may be as-

sociated with individuals' value orientations, although the nature and strength of these associations may vary depending on media content and institutional context. Previous research has also documented associations between collectivism and environmentally responsible consumption. Individuals with stronger collectivist values tend to consider social welfare and collective interests when evaluating consumption choices and may therefore be more inclined to support environmentally responsible practices (McCarty & Shrum, 2001). Collectivism has also been associated with greater environmental concern, stronger sensitivity to social norms, and higher levels of sustainable consumption (Cho et al., 2013; Halder et al., 2020; J. Wang et al., 2021). Jung and Cho (2023) investigated horizontal and vertical collectivism in relation to pro-environmental purchasing behavior and found that their associations varied according to consumers' environmental self-identity. Yang et al. (2024) also identified relationships between collectivist culture, environmental values, and pro-environmental behavior, highlighting the relevance of collective cultural orientations to environmental decision-making. In a related study of 559 Chinese Generation Z consumers, Borah et al. (2024), using data from 559 Chinese Generation Z consumers, found that consumer social responsibility partially mediated the relationship between green consumer knowledge and green purchasing behavior, while green advertising and green consumer trust were relevant to the strength of these associations. A recent study also bears on how collectivism should be operationalized. AlGhamdi et al. (2026), studying 369 Generation Z consumers across four Arab countries, reported that attitudes, green influencer marketing, and vertical collectivism were positively associated with sustainable-skincare purchase intention, whereas horizontal collectivism was not significant. Two points follow. First, the two dimensions may relate differently to outcomes, so aggregating them requires justification; the present study reports the factor structure of the collectivism measure and the evidence for aggregation in the Measures section. Second, this study again concerns intention rather than reported behavior, and perceived influencer influence should not be equated with information-exposure frequency, which is the construct measured here.

Collectivism may provide an explanatory link between media information exposure and green consumption behavior, although its theoretical placement warrants clarification. As a relatively enduring value orientation, collectivism may develop through family socialization, educational experiences, and broader cultural influences before individuals encounter particular environmental messages. The present model nevertheless specifies collectivism as an intermediate variable because the integrated S-O-R and VAB frameworks provide a basis for examining how exposure to sustainability-related information is associated with general value orientations and, subsequently, with consumption-specific evaluations. This specification permits the estimation of an indirect association through collectivism within the proposed theoretical ordering. An alternative interpretation is that students with stronger collectivist values selectively attend to environmental information emphasizing collective welfare. The cross-sectional data cannot distinguish between these possibilities. Collectivism is therefore treated as a theoretically specified statistical mediator, without assuming that media exposure necessarily precedes or changes the underlying value orientation.

Hypothesis 2 (H2). *Collectivism mediates the relationship between media information exposure and green consumption behavior.*

1.3. The Mediating Role of Green Consumption Attitudes

Green consumption attitudes refer to individuals' overall evaluations of environmentally friendly products, sustainable consumption practices, and their perceived environmental benefits. Attitude theory suggests that attitudes represent relatively stable psychological tendencies reflecting favorable or unfavorable evaluations of specific behaviors or objects

(Ajzen, 1991). Within the context of green consumption, green consumption attitudes are commonly defined as consumers' evaluations of purchasing and using environmentally friendly products, as well as their perceptions of the value and desirability of sustainable consumption practices (Mostafa, 2007).

Previous research suggests that media information exposure is associated with green consumption attitudes. Frequent exposure to information about environmental issues, green products, and sustainable lifestyles may be related to how individuals evaluate their consumption choices. Agenda-setting theory provides a theoretical perspective on this relationship by explaining how media coverage can increase the salience of particular issues by directing public attention toward selected topics (Cohen, 1963; McCombs & Shaw, 1972).

Recent empirical research provides further evidence of this association. Drawing on the Elaboration Likelihood Model (ELM), Fan et al. (2024) employed text-mining techniques to examine green consumption information disseminated through social media platforms. Their findings indicated significant associations between media content and public attitudes toward green consumption, although the direction and strength of these associations varied according to message characteristics. Content emphasizing environmental policies, ecological governance, and collective welfare tended to be associated with more favorable green consumption attitudes, whereas commercially oriented content showed weaker associations. Environmental communication may also increase public awareness of environmental consequences by drawing attention to issues such as climate change, pollution, and resource depletion. Greater exposure to such information may therefore be associated with stronger environmental concern and more favorable attitudes toward environmentally responsible consumption (Luo et al., 2023).

A substantial body of research has documented a positive association between green consumption attitudes and green consumption behavior. Consumers with favorable attitudes toward environmental protection and social welfare generally report stronger support for green consumption practices and are more likely to express green purchasing intentions and engage in environmentally responsible consumption (do Paço et al., 2019). Similarly, Testa et al. (2021) found that green consumption attitudes were more strongly associated with green purchasing decisions than general environmental awareness. A recent meta-analysis by Cheng et al. (2024), which synthesized 132 independent effect sizes from 45 studies, found a significant positive association between green attitudes and green food purchasing behavior.

Studies focusing on younger consumers have reported similar findings. Positive attitudes toward green consumption have been associated with sustainable purchasing decisions among university students and young consumers (Roy, 2023; Hong et al., 2024). Young consumers who express stronger support for sustainable consumption are generally more likely to purchase products from environmentally responsible companies (Mehraj et al., 2023). Studies conducted across different national contexts have also identified associations between favorable evaluations of green products and environmental sustainability and environmentally responsible purchasing behavior (Paul et al., 2016; Tanner & Wölfling Kast, 2003). Le-Anh and Nguyen (2026) found that attitudes toward green products were associated with green loyalty intention, while household norms and affective commitment were relevant to green purchase behavior. Studies grounded in the Theory of Planned Behavior (TPB) provide an additional perspective on the relationship between attitudes and consumption-related outcomes. Using an online convenience sample of 391 Turkish adults, Efendioğlu et al. (2023) found that attitudes, subjective norms, and perceived behavioral control were associated with intentions to purchase organic food online. Two distinctions are particularly relevant to the present study. First, the outcome examined was purchase intention rather than actual purchasing behavior. The findings therefore provide

evidence concerning the attitudinal antecedents of purchase intention, whereas the present study examines self-reported green consumption behavior. Second, subjective norms and collectivist values are conceptually distinct. Subjective norms refer to perceived social pressure to perform a particular behavior, whereas collectivism reflects an internalized value orientation. The present study measures collectivism and treats these two constructs as conceptually separate.

Existing evidence therefore suggests that green consumption attitudes may serve as an important psychological link between media information exposure and green consumption behavior. Studies examining social media environments have repeatedly identified a pathway in which media information exposure is associated with attitudes toward sustainable consumption, which, in turn, are associated with behavioral intentions and consumption outcomes (Samaniego-Arias et al., 2025; Zhong et al., 2025; Wu & Long, 2024). Although the specific behavioral outcomes vary across studies, the overall pattern suggests that media information exposure may be associated with behavior through attitudinal processes. Studies that examine purchase intentions rather than actual purchasing behavior are therefore discussed as evidence concerning intentions and are not treated as direct evidence of purchasing behavior. Accordingly, the following hypothesis is proposed.

Hypothesis 3 (H3). *Green consumption attitudes mediate the relationship between media information exposure and green consumption behavior.*

1.4. The Sequential Mediating Roles of Collectivism and Green Consumption Attitudes

Previous research suggests that collectivism is associated with green consumption attitudes. Collectivism emphasizes collective welfare, social interdependence, and shared responsibility, while green consumption decisions often have implications beyond individual interests. Individuals with stronger collectivist values may therefore hold more favorable attitudes toward environmentally responsible consumption. Previous studies have documented associations between collectivism and environmental attitudes, green purchasing behavior, and other forms of pro-environmental behavior (Kim & Choi, 2005; Kim, 2011). Research conducted in China has also identified an association between collectivist culture and regional green transition (Qu, 2023), suggesting that collective cultural orientations may be relevant to environmental practices at a broader societal level.

Recent empirical studies provide further insight into the relationship between collectivist values and consumption-related attitudes. Using survey data from 5326 consumers in Vietnam, Duong (2024) found that collectivism was positively associated with attitudes toward purchasing organic food, which were, in turn, associated with purchase intentions and behavior. Goswami et al. (2025) examined the relationships between individual-level collectivism and green purchasing attitudes among consumers in India, Japan, and Bangladesh, highlighting differences across cultural contexts. Drawing on the VAB framework, B. L. Sun and Kim (2026) found that collectivism was associated with ethical evaluations, which were subsequently related to green hotel purchasing behavior among Korean consumers. Although ethical evaluations are conceptually distinct from green consumption attitudes, these findings provide a basis for examining how general value orientations may be associated with consumption-specific evaluations and behavioral outcomes.

Although previous studies have examined the relationships among media information exposure, collectivism, green consumption attitudes, and green consumption behavior, relatively little attention has been given to their associations within a single sequential mediation model. Recent evidence provides a basis for examining these relationships together. Y. Zhang and Cham (2025), drawing on Social Cognitive Theory and cognition-affect-conation frameworks, found that social media marketing and collectivist values were

associated with green consumption intentions through cognitive and emotional pathways. Peng et al. (2026) further demonstrated that the association between social media content and green consumption intention varied according to information framing and whether the content emphasized individual or collective behavior. Their findings also highlighted the mediating role of social identity, suggesting that collective-oriented information may be relevant to the psychological processes underlying green consumption intentions. Their findings suggest that media-related factors may be linked to consumption outcomes through psychological processes involving values and attitudes. However, the outcome examined in that study was purchase intention, whereas the present study focuses on self-reported green purchasing behavior. Within the integrated S-O-R and VAB framework, media information exposure is conceptualized as an external stimulus, collectivism as a general value orientation, and green consumption attitudes as consumption-specific evaluations. The theoretical ordering places collectivism before green consumption attitudes, allowing their sequential indirect association with green consumption behavior to be examined. This specification also permits the sequential pathway to be evaluated alongside the two separate indirect pathways through collectivism and green consumption attitudes. Given the cross-sectional design, the proposed ordering reflects a theoretical assumption rather than an established temporal sequence. Accordingly, the following hypothesis is proposed.

Hypothesis 4 (H4). *Collectivism and green consumption attitudes jointly form a sequential mediation pathway linking media information exposure and green consumption behavior.*

Based on the hypotheses proposed above, this study develops a sequential mediation model in which media information exposure serves as the independent variable, green consumption behavior serves as the dependent variable, and collectivism and green consumption attitudes function as sequential mediators. The proposed model is presented in Figure 1.

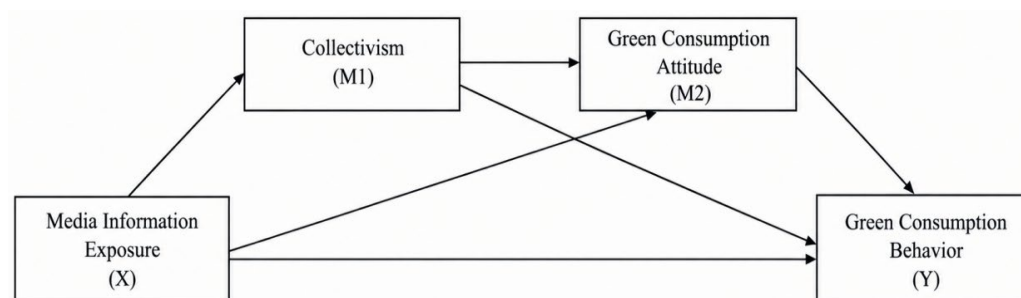


Figure 1. Hypothesized serial mediation model.

2. Materials and Methods

2.1. Participants and Procedure

This study employed a cross-sectional survey design to examine the associations among media information exposure, collectivism, green consumption attitudes, and green consumption behavior among university students in Shanghai, China. Shanghai was selected as the study setting because of its extensive digital media environment and the widespread use of online communication platforms among university students. The target population comprised undergraduate and postgraduate students enrolled at universities in Shanghai, China. Participants were recruited from multiple universities using non-probability convenience sampling supplemented by snowball referrals. The questionnaire link was distributed through university-affiliated online platforms and student communities and was accessible to students within these recruitment networks. The link was initially shared

through campus-related online groups and subsequently circulated by students within their university networks. Participation was entirely voluntary and uncompensated, and no financial or other incentives were offered. Individual students constituted the unit of analysis, and no university-level comparisons were conducted. Eligible participants were required to be enrolled as undergraduate or postgraduate students at a university in Shanghai, be at least 18 years old, and be able to complete the questionnaire in Chinese. Before participating, respondents were informed of the study objectives, survey procedures, voluntary nature of participation, and confidentiality arrangements. All participants provided electronic informed consent before completing the questionnaire. Participation was anonymous, and no personally identifiable information was collected. A total of 425 questionnaire responses were initially received. Six incomplete questionnaires were excluded, leaving 419 valid responses for analysis, corresponding to a retention rate of 98.6%. Of the 419 participants, 146 were male (34.8%) and 273 were female (65.2%). Regarding age, 136 participants (32.5%) were 18 years old, 281 (67.1%) were aged 19–24 years, and 2 (0.5%) were aged 25 years or older. The sample comprised first-year undergraduate students (54.7%), second-year undergraduates (16.7%), third-year undergraduates (5.0%), fourth-year undergraduates (5.7%), and postgraduate students (17.9%).

2.2. Measures

The study included four constructs: Media Information Exposure (MIE), Collectivism (COL), Green Consumption Attitude (GCA), and Green Consumption Behavior (GCB). The questionnaire comprised 28 items adapted from previous research and administered to 419 university students. Each construct was measured using multiple items, with higher scores indicating higher levels of the corresponding attribute. Internal consistency was assessed using Cronbach's alpha. Confirmatory factor analysis (CFA) was used to examine the proposed measurement model. The questionnaire was administered in Chinese. Items were selected and adapted with reference to previously published measures, with wording adjusted to reflect the study population and the context of environmental information exposure and green consumption in China. The adaptations are described in the respective scale sections.

2.2.1. Media Information Exposure Scale

Media Information Exposure was measured using six items adapted with reference to previous research on environmental information exposure (Taddicken, 2013). The items assessed the frequency with which respondents encountered information concerning climate change, green consumption, environmentally friendly products, and environmental policies during the preceding 12 months. The questionnaire covered both mainstream media, including People's Daily, Xinhua News Agency, and CCTV News, and digital platforms such as Weibo, WeChat Official Accounts, Xiaohongshu, Douyin, and Zhihu. The six items addressed news reports, expert analyses, government policy communications, online discussions, audiovisual content, and public service advertisements. Representative items included "I have seen media reports about climate change, green consumption, and environmentally friendly products" and "I have seen media coverage of government environmental policies." Responses were recorded on a five-point frequency scale, with higher scores indicating more frequent exposure to sustainability-related information. The CFA results showed standardized factor loadings ranging from 0.828 to 0.905 (all $p < 0.001$). The scale demonstrated high internal consistency (Cronbach's $\alpha = 0.947$), with a composite reliability (CR) of 0.948 and an average variance extracted (AVE) of 0.752.

2.2.2. Collectivism Scale

Collectivism was measured using eight items adapted from the Horizontal and Vertical Individualism and Collectivism Scale developed by Triandis and Gelfand (1998). The original scale distinguishes between horizontal collectivism, which emphasizes interdependence and a sense of equality among group members, and vertical collectivism, which places greater emphasis on group obligations and the acceptance of collective decisions. In the present study, collectivism was conceptualized as a general value orientation characterized by concern for group members, interpersonal cooperation, and commitment to collective responsibilities. The eight items captured respondents' concern for the well-being of others, satisfaction derived from social interaction, willingness to cooperate, family obligations, and respect for group decisions. Representative items included "The well-being of my classmates or colleagues is important to me" and "Taking care of my family is my responsibility, even if I have to sacrifice my own interests." All items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), with higher scores representing stronger collectivist orientations. The eight items were specified as indicators of a single latent construct in the proposed measurement model. Although the source instrument distinguishes horizontal and vertical collectivism, the present study examined collectivism as a broader individual-level value orientation encompassing interpersonal interdependence, concern for group members, and commitment to collective obligations. Accordingly, the eight items were specified as reflective indicators of a single collectivism factor, consistent with the theoretical role assigned to collectivism in the proposed model. This specification was theoretically motivated, while the relatively low AVE indicates that the empirical coherence of the single-factor measure should be interpreted with caution. The CFA results showed that standardized factor loadings ranged from 0.435 to 0.796 (all $p < 0.001$). The scale demonstrated acceptable internal consistency (Cronbach's $\alpha = 0.851$; CR = 0.849). However, its AVE was 0.426, below the commonly recommended threshold of 0.50, indicating a limitation in convergent validity under the single-factor specification. All eight items were retained to preserve the conceptual coverage of the original collectivism measures. This limitation was considered when interpreting the measurement results.

2.2.3. Green Consumption Attitude Scale

Green Consumption Attitude was assessed using seven items developed with reference to the attitude component of the Theory of Planned Behavior (Ajzen, 1991) and previous research on green consumption (Paul et al., 2016). The scale measured respondents' evaluations of green products, including their perceived benefits, moral acceptability, and consistency with family expectations, broader social trends, and national industrial policies. Representative items included "I think purchasing green products is a wise choice" and "I think green products are more consistent with my moral values." Responses were recorded on a five-point Likert scale, with higher scores indicating more favorable evaluations of green products. The CFA results showed standardized factor loadings ranging from 0.715 to 0.857 (all $p < 0.001$). The scale demonstrated high internal consistency (Cronbach's $\alpha = 0.919$), with a CR of 0.921 and an AVE of 0.627.

2.2.4. Green Consumption Behavior Scale

Green Consumption Behavior was measured using seven items adapted with reference to previous measures of ecologically conscious consumer behavior and green purchasing practices (Roberts & Bacon, 1997; Chan & Lau, 2000; Kim & Choi, 2005). The items assessed respondents' self-reported purchasing practices involving environmental considerations, including purchasing less-polluting products, switching brands for ecological reasons, choosing green product alternatives, avoiding non-recyclable products, purchasing

energy-efficient products, selecting products labeled as reusable or recyclable, and choosing products with minimal or no packaging. Representative items included “I purchase products that cause less pollution” and “I switch to other brands for ecological reasons.” Responses were recorded on a five-point scale, with higher scores indicating greater engagement in green consumption practices. The CFA results showed that standardized factor loadings ranged from 0.650 to 0.815 (all $p < 0.001$). The scale demonstrated high internal consistency (Cronbach’s $\alpha = 0.904$), with a composite reliability (CR) of 0.906 and an average variance extracted (AVE) of 0.579.

2.3. Data Analysis

Data were analyzed using IBM SPSS Statistics 27.0, Mplus 8.3, and Hayes’ PROCESS macro. Descriptive statistics, Pearson correlations, Cronbach’s alpha, and Harman’s single-factor test were performed using SPSS 27.0. Confirmatory factor analysis (CFA) was conducted in Mplus 8.3 using robust maximum likelihood estimation (MLR). Model fit was assessed using χ^2/df , CFI, TLI, RMSEA with its 90% confidence interval, and SRMR. Construct reliability and validity were evaluated using standardized factor loadings, composite reliability (CR), average variance extracted (AVE), the Fornell–Larcker criterion, and the heterotrait–monotrait ratio (HTMT). Sequential mediation analysis was performed using PROCESS Model 6, with Media Information Exposure as the independent variable, Collectivism and Green Consumption Attitude as sequential mediators, and Green Consumption Behavior as the dependent variable. Indirect effects were examined using 5000 bootstrap resamples and 95% confidence intervals. Demographic variables were not included as covariates. Given the cross-sectional design, indirect effects were interpreted as statistical associations rather than causal relationships.

3. Results

3.1. Common Method Bias

Common method bias was preliminarily assessed using Harman’s single-factor test. All 28 measurement items were included in an unrotated principal component analysis. The first component accounted for 41.41% of the total variance, below the commonly used 50% reference value. This finding indicated that no single component accounted for the majority of the observed variance. Nevertheless, Harman’s test has limited sensitivity to common method bias, and potential method-related effects cannot be ruled out given the self-reported, cross-sectional nature of the data.

3.2. Correlation Analysis

Pearson correlation analysis indicated significant positive associations among all four constructs (Table 1). Media Information Exposure was positively correlated with Collectivism ($r = 0.478$, $p < 0.001$), Green Consumption Attitude ($r = 0.584$, $p < 0.001$), and Green Consumption Behavior ($r = 0.542$, $p < 0.001$). Collectivism was positively associated with Green Consumption Attitude ($r = 0.412$, $p < 0.001$) and Green Consumption Behavior ($r = 0.529$, $p < 0.001$). Green Consumption Attitude was also positively correlated with Green Consumption Behavior ($r = 0.539$, $p < 0.001$). Among the six correlations, the strongest association was observed between Media Information Exposure and Green Consumption Attitude, whereas the association between Collectivism and Green Consumption Attitude was the weakest. All correlations were statistically significant, providing preliminary support for examining the proposed indirect associations.

Table 1. Means, standard deviations, and Pearson correlations.

Variable	Cronbach's α	M	SD	1	2	3	4
1. Media Information Exposure	0.947	4.085	0.712	1			
2. Collectivism	0.851	3.719	0.654	0.478 ***	1		
3. Green consumption attitude	0.919	4.275	0.605	0.584 ***	0.412 ***	1	
4. Green consumption behavior	0.904	3.633	0.774	0.542 ***	0.529 ***	0.539 ***	1

Note: $N = 419$. M = mean; SD = standard deviation. *** $p < 0.001$ (two-tailed).

3.3. Measurement Model and Discriminant Validity

Confirmatory factor analysis (CFA) was conducted to evaluate the measurement properties of the four constructs included in the proposed research model: Media Information Exposure (MIE), Collectivism (COL), Green Consumption Attitude (GCA), and Green Consumption Behavior (GCB). The analysis included 28 observed items from 419 valid questionnaires and was performed using Mplus 8.3 with maximum likelihood estimation with robust standard errors (MLR). The five-point item responses were treated as continuous indicators. Model fit was evaluated using the MLR-scaled chi-square statistic (χ^2), degrees of freedom (df), comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA) with its 90% confidence interval, and standardized root mean square residual (SRMR). Three alternative measurement models were examined. The one-factor model specified all 28 items as indicators of a single latent factor and served as a baseline for evaluating the proposed measurement structure. The hypothesized four-factor model specified MIE, COL, GCA, and GCB as four distinct latent factors, corresponding to the theoretical framework of the present study. An alternative five-factor model was additionally estimated to examine the internal dimensionality of COL. In this supplementary model, COL1–COL4 were specified as indicators of Horizontal Collectivism (HC), whereas COL5–COL8 were specified as indicators of Vertical Collectivism (VC). The measurement specifications of MIE, GCA, and GCB remained unchanged. The inclusion of the five-factor model was motivated by the theoretical distinction between horizontal and vertical collectivism proposed by Triandis and Gelfand (1998). Horizontal collectivism emphasizes interpersonal interdependence, cooperation, and equality among group members, whereas vertical collectivism places greater emphasis on group obligations, family responsibilities, and acceptance of collective decisions. Although these dimensions share an orientation toward collective interests, their psychological characteristics are not entirely identical. The supplementary model was therefore examined to assess whether separating these dimensions provided a more adequate representation of the observed item relationships.

Importantly, the present study conceptualizes COL as an overall individual-level value orientation rather than examining the independent relationships of its horizontal and vertical dimensions. Accordingly, the four-factor model represents the primary measurement specification associated with the proposed sequential mediation model, while the five-factor model provides supplementary evidence concerning the dimensional properties of COL. As shown in Table 2, the one-factor model demonstrated poor overall fit, $\chi^2(350) = 2708.956$, $p < 0.001$, CFI = 0.561, TLI = 0.526, RMSEA = 0.127, 90% CI [0.122, 0.131], and SRMR = 0.114. These results indicate that the relationships among the 28 observed indicators could not be adequately represented by a single latent factor. Nevertheless, the poor fit of the one-factor model does not establish the absence of common method bias, which remains a potential concern given the self-reported nature of the data. The hypothesized four-factor model demonstrated substantially improved fit, $\chi^2(344) = 1093.623$, $p < 0.001$, CFI = 0.861, TLI = 0.847, RMSEA = 0.072, 90% CI [0.067, 0.077], and SRMR = 0.062. The RMSEA and

SRMR values were below the commonly applied reference value of 0.08. However, both CFI and TLI remained below 0.90, indicating that the four-factor model did not fully meet conventional overall fit criteria. Thus, the results support the relative improvement of the hypothesized measurement structure over the one-factor specification, while also indicating limitations in its overall fit. The supplementary five-factor model demonstrated further improvement, $\chi^2(340) = 909.216, p < 0.001$, CFI = 0.894, TLI = 0.882, RMSEA = 0.063, 90% CI [0.058, 0.068], and SRMR = 0.061. Compared with the four-factor model, the five-factor specification showed higher CFI and TLI values and a lower RMSEA. These differences suggest that distinguishing HC and VC provides a more favorable representation of the observed measurement relationships. Nevertheless, the CFI and TLI values remained below 0.90, indicating that the five-factor model also retained some limitations in overall fit.

Table 2. Comparison of alternative measurement models using Mplus 8.3 (MLR).

Model	MLR χ^2	df	χ^2/df	Scaling Factor	CFI	TLI	RMSEA	90% CI	SRMR
One-factor	2708.956	350	7.740	1.522	0.561	0.526	0.127	[0.122, 0.131]	0.114
Four-factor	1093.623	344	3.179	1.455	0.861	0.847	0.072	[0.067, 0.077]	0.062
Five-factor	909.216	340	2.674	1.455	0.894	0.882	0.063	[0.058, 0.068]	0.061

Note: $N = 419$. MLR = maximum likelihood estimation with robust standard errors; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual. The reported fit statistics were obtained from the Mplus 8.3 MLR output. The one-factor model included all 28 items as indicators of a single latent factor. The four-factor model comprised MIE, COL, GCA, and GCB. The five-factor model separated COL into HC and VC while retaining the remaining three constructs. The four-factor model was retained as the primary theoretical measurement specification, whereas the five-factor model was examined as a supplementary assessment of collectivism dimensionality.

The model comparison suggests that distinguishing MIE, COL, GCA, and GCB provides a substantially more appropriate representation of the observed data than specifying a single common factor. However, the additional improvement observed in the five-factor model raises an important measurement consideration regarding the treatment of collectivism as a unified construct. Because the models were estimated using MLR, no conventional chi-square difference significance test was inferred from the direct subtraction of their scaled chi-square statistics. To further examine the measurement properties of the primary four-factor model, the standardized factor loadings of all 28 observed indicators were evaluated. Table 3 presents the STDYX-standardized factor loadings and their MLR standard errors, together with composite reliability (CR) and average variance extracted (AVE). CR was used to assess construct reliability, whereas AVE was employed to evaluate convergent validity.

Table 3. STDYX-standardized item loadings, robust standard errors, internal consistency, and convergent validity of the four-factor model.

Construct	Item	Loading (λ)	MLR SE	CR	AVE
Media Information Exposure	MIE1	0.905	0.018	0.948	0.752
	MIE2	0.828	0.026		
	MIE3	0.856	0.033		
	MIE4	0.877	0.022		
	MIE5	0.830	0.026		
	MIE6	0.905	0.017		

Table 3. Cont.

Construct	Item	Loading (λ)	MLR SE	CR	AVE
Collectivism	COL1	0.783	0.035	0.849	0.426
	COL2	0.773	0.043		
	COL3	0.744	0.038		
	COL4	0.796	0.029		
	COL5	0.475	0.060		
	COL6	0.435	0.059		
	COL7	0.499	0.061		
	COL8	0.587	0.040		
Green Consumption Attitude	GCA1	0.851	0.024	0.921	0.627
	GCA2	0.810	0.029		
	GCA3	0.799	0.032		
	GCA4	0.857	0.023		
	GCA5	0.729	0.032		
	GCA6	0.770	0.038		
	GCA7	0.715	0.036		
Green Consumption Behavior	GCB1	0.741	0.046	0.906	0.579
	GCB2	0.765	0.050		
	GCB3	0.798	0.045		
	GCB4	0.815	0.036		
	GCB5	0.790	0.047		
	GCB6	0.756	0.047		
	GCB7	0.650	0.042		

Note: $N = 419$. λ = standardized factor loading; SE = standard error; CR = composite reliability; AVE = average variance extracted. Standardized factor loadings and MLR standard errors were obtained from the STDYX Standardization section of the four-factor Mplus 8.3 output. All factor loadings were statistically significant at $p < 0.001$. CR and AVE were calculated using the standardized factor loadings and corresponding standardized residual variances.

As shown in Table 3, the standardized factor loadings for MIE ranged from 0.828 to 0.905, indicating relatively strong associations between the observed indicators and their underlying construct. The CR of 0.948 exceeded the commonly recommended reference value of 0.70, while the AVE of 0.752 was above the conventional threshold of 0.50. These results provide support for the construct reliability and convergent validity of MIE. Similarly, GCA exhibited standardized factor loadings ranging from 0.715 to 0.857, with CR = 0.921 and AVE = 0.627. GCB demonstrated factor loadings ranging from 0.650 to 0.815, with CR = 0.906 and AVE = 0.579. The corresponding reliability and convergent validity estimates indicate that the indicators of these two constructs shared a substantial common component. Although some variation in item loadings was observed, the overall results provide support for retaining their respective measurement items. In contrast, COL exhibited greater variability in its standardized factor loadings, ranging from 0.435 to 0.796. Although the CR of 0.849 indicated acceptable construct reliability, the AVE was 0.426, below the commonly recommended reference value of 0.50. This finding indicates relatively weak convergent validity under the single-factor specification. Further examination revealed that COL1–COL4 demonstrated comparatively strong loadings ranging from 0.744 to 0.796, whereas COL5, COL6, and COL7 exhibited lower loadings of 0.475, 0.435, and 0.499, respectively. These differences suggest that the eight observed items were not equally well represented by a single underlying collectivism factor. Although all loadings were statistically significant, statistical significance alone does not establish adequate item-level convergence. The observed loading pattern may be understood in relation to the conceptual differences between horizontal and vertical collectivism. The first four items primarily reflect interpersonal cooperation, concern for others, and interdependence among group

members. In comparison, the remaining items place greater emphasis on family obligations, personal sacrifice, and acceptance of collective decisions. Although both dimensions reflect collective-oriented values, their distinct emphases may contribute to differences in their relationships with an aggregate collectivism factor. The supplementary five-factor model provided additional evidence relevant to this interpretation. When HC and VC were specified separately, the standardized factor loadings ranged from 0.750 to 0.811 for HC and from 0.538 to 0.839 for VC. The corresponding CR and AVE values were 0.870 and 0.626 for HC and 0.796 and 0.501 for VC. Both dimensions therefore demonstrated more favorable convergent validity than the aggregate collectivism measure. Their estimated latent correlation was 0.516 ($p < 0.001$), suggesting that HC and VC shared a related value orientation while retaining distinguishable measurement characteristics.

These results suggest that the relatively low AVE of the aggregate COL measure may partly reflect the multidimensional nature of collectivism. Combining the two dimensions into a single factor permits the examination of collectivism as a broader psychological orientation but may also obscure differences in the contribution of individual indicators. Nevertheless, the present study focuses on collectivism as an overall individual-level value orientation associated with collective welfare and shared responsibility. The proposed hypotheses were developed to examine the indirect associations involving this broader construct rather than the separate roles of HC and VC. Accordingly, the four-factor model was retained as the primary measurement specification corresponding to the theoretical framework and subsequent sequential mediation analysis. The five-factor model was included only to assess the dimensional properties of collectivism and to identify potential limitations associated with its aggregation. This decision reflects the theoretical scope of the study and does not imply that the four-factor model demonstrated superior empirical fit. The more favorable fit of the five-factor specification indicates that the aggregate collectivism construct should be interpreted cautiously. The possibility that HC and VC have different relationships with media information exposure, green consumption attitudes, and green consumption behavior remains an important consideration for future research.

Discriminant validity was subsequently evaluated using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). These assessments were conducted for the four constructs specified in the primary measurement model. As shown in Table 4, the square root of the AVE for each construct exceeded its correlations with the remaining latent constructs, satisfying the Fornell–Larcker criterion. This finding provides evidence supporting the empirical distinction among MIE, COL, GCA, and GCB under the hypothesized four-factor specification.

Table 4. Discriminant Validity Assessment Using the Fornell–Larcker Criterion.

Construct	Media Information Exposure	Collectivism	Green Consumption Attitude	Green Consumption Behavior
Media Information Exposure	0.867			
Collectivism	0.559	0.653		
Green consumption attitude	0.621	0.474	0.792	
Green consumption behavior	0.580	0.589	0.582	0.761

Note: MIE = Media Information Exposure; COL = Collectivism; GCA = Green Consumption Attitude; GCB = Green Consumption Behavior. Bold diagonal values represent the square roots of AVE, whereas off-diagonal values represent latent construct correlations obtained from the four-factor Mplus model. These latent correlations are distinct from the Pearson correlations among composite scores reported in Table 1.

The HTMT results, presented in Table 5, ranged from 0.470 to 0.628, with all values below the commonly applied threshold of 0.85. These findings provide additional evidence supporting discriminant validity among the four constructs.

Table 5. Heterotrait–monotrait ratios (HTMT) among the four constructs.

Construct	Media Information Exposure	Collectivism	Green Consumption Attitude	Green Consumption Behavior
Media Information Exposure	—			
Collectivism	0.540	—		
Green consumption attitude	0.628	0.470	—	
Green consumption behavior	0.586	0.603	0.593	—

Note: MIE = Media Information Exposure; COL = Collectivism; GCA = Green Consumption Attitude; GCB = Green Consumption Behavior. HTMT values were calculated from the observed item correlation matrix of the same 419 valid responses. Values below 0.85 are commonly interpreted as supporting discriminant validity.

Taken together, the Fornell–Larcker and HTMT results indicate that the four constructs were empirically distinguishable. However, evidence of discriminant validity should not be interpreted as resolving the limitations identified in the overall model fit or the convergent validity of COL. In particular, the relatively low AVE of the aggregate collectivism measure and the improvement observed under the five-factor specification suggest that the dimensionality of collectivism warrants further consideration. Overall, the measurement results provide support for the reliability and convergent validity of MIE, GCA, and GCB, while indicating weaker convergent validity for COL under the single-factor specification. The hypothesized four-factor model demonstrated substantially better fit than the one-factor alternative, although some overall fit indices remained below conventional reference values. The supplementary five-factor model further indicated that distinguishing HC and VC improved the measurement representation of collectivism. Given the theoretical objectives of the present study, the four-factor model was retained for the primary sequential mediation analysis. Nevertheless, the empirical advantages of the five-factor specification and the limitations of the aggregate collectivism measure are acknowledged. Accordingly, the subsequent indirect-effect estimates involving COL should be interpreted as associations based on a broader collectivism construct, without assuming that its horizontal and vertical dimensions necessarily exhibit identical relationships with the other study variables.

3.4. Sequential Mediation Analysis

A sequential mediation analysis was performed using Hayes' PROCESS macro (Model 6; Hayes, 2013) with 5000 bootstrap resamples. Media Information Exposure was specified as the predictor, Collectivism as the first mediator, Green Consumption Attitude as the second mediator, and Green Consumption Behavior as the outcome variable. The total association between Media Information Exposure and Green Consumption Behavior was statistically significant ($B = 0.590$, $SE = 0.045$, $t = 13.168$, $p < 0.001$, 95% CI [0.502, 0.678]). After including the two mediators, the direct association remained significant ($B = 0.256$, $SE = 0.052$, $t = 4.914$, $p < 0.001$, 95% CI [0.154, 0.359]). As shown in Table 6, Media Information Exposure was positively associated with Collectivism ($B = 0.439$, $p < 0.001$) and Green Consumption Attitude ($B = 0.427$, $p < 0.001$). Collectivism was positively associated with both Green Consumption Attitude ($B = 0.159$, $p < 0.001$) and Green Consumption Behavior ($B = 0.358$, $p < 0.001$). In addition, Green Consumption Attitude was positively associated with Green Consumption Behavior ($B = 0.355$, $p < 0.001$). The regression models accounted for 22.9% of the variance in Collectivism, 36.4% in Green Consumption Attitude, and 43.7% in Green Consumption Behavior. The significant direct association, together with

the positive associations involving both mediators, was consistent with the hypothesized sequential mediation model. The corresponding path coefficients are presented in Figure 2.

Table 6. Regression Path Coefficients of the Sequential Mediation Model.

Regression Path	B	SE	t	p	95% CI	R ²	F
Media Information Exposure → Green consumption behavior (Direct effect)	0.256	0.052	4.914	<0.001	[0.154, 0.359]	0.437	107.280 ***
Media Information Exposure → Collectivism	0.439	0.040	11.120	<0.001	[0.362, 0.517]	0.229	123.656 ***
Media Information Exposure → Green consumption attitude	0.427	0.038	11.283	<0.001	[0.353, 0.501]	0.364	119.282 ***
Collectivism → Green consumption attitude	0.159	0.041	3.868	<0.001	[0.078, 0.240]		
Collectivism → Green consumption behavior	0.358	0.051	7.071	<0.001	[0.258, 0.457]		
Green consumption attitude → Green consumption behavior	0.355	0.059	5.997	<0.001	[0.238, 0.471]		
Media Information Exposure → Green consumption behavior (Total effect)	0.590	0.045	13.168	<0.001	[0.502, 0.678]	0.294	173.408 ***

Note: B = unstandardized regression coefficient; SE = standard error; CI = confidence interval; R² = coefficient of determination; F = overall model F-statistic. The direct effect was estimated after including both mediators, whereas the total effect was estimated without the mediators. *** $p < 0.001$.

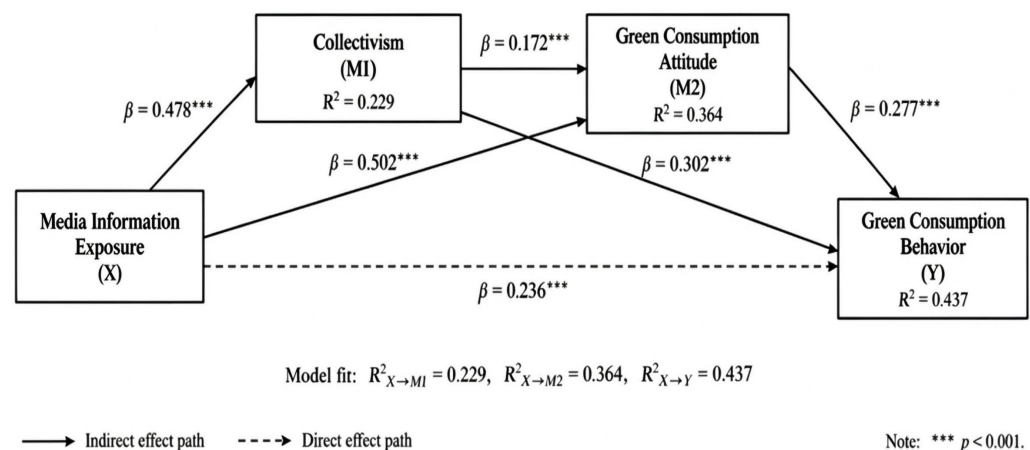


Figure 2. Standardized Path Coefficients for the Hypothesized Sequential Mediation Model. Note. Standardized regression coefficients obtained from PROCESS Model 6 are presented. *** $p < 0.001$.

3.5. Bootstrap Analysis of Indirect Effects

The indirect associations were examined using 5000 bootstrap resamples. As presented in Table 7, the indirect effect of Media Information Exposure on Green Consumption Behavior through Collectivism was statistically significant ($B = 0.157$, $\text{BootSE} = 0.036$, 95% CI [0.091, 0.232]). A significant indirect effect was also observed through Green Consumption Attitude ($B = 0.151$, $\text{BootSE} = 0.039$, 95% CI [0.078, 0.231]). The sequential indirect effect through Collectivism and Green Consumption Attitude was likewise significant ($B = 0.025$, $\text{BootSE} = 0.012$, 95% CI [0.006, 0.052]). Although smaller in magnitude than either of the two individual indirect effects, its confidence interval excluded zero, providing statistical support for the hypothesized sequential pathway. The total indirect effect was 0.333 ($\text{BootSE} = 0.047$, 95% CI [0.244, 0.427]), accounting for approximately 56.5% of the total statistical association. The direct association remained significant after including both mediators. Given the cross-sectional design, these indirect effects should not be interpreted as evidence of causal mediation.

Table 7. Bootstrap analysis results for indirect effects.

Indirect Pathway	Effect (B)	BootSE	95% Bootstrap CI
Media Information Exposure → Collectivism → Behavior	0.157	0.036	[0.091, 0.232]
Media Information Exposure → Attitude → Behavior	0.151	0.039	[0.078, 0.231]
Media Information Exposure → Collectivism → Attitude → Behavior	0.025	0.012	[0.006, 0.052]
Total Indirect Effect	0.333	0.047	[0.244, 0.427]

Note: B = unstandardized indirect effect; BootSE = bootstrap standard error; CI = confidence interval. Confidence intervals were estimated using 5000 bootstrap resamples. An indirect effect was considered statistically significant when its 95% bootstrap confidence interval excluded zero.

4. Discussion

Drawing on the integrated S–O–R and VAB frameworks, this study examined the associations among media information exposure, collectivism, green consumption attitudes, and green consumption behavior among university students. Significant positive associations were observed among all four constructs, and the pattern of indirect associations was consistent with the hypothesized sequential mediation model. Specifically, higher levels of media information exposure were associated with stronger collectivist orientations, more favorable green consumption attitudes, and higher levels of self-reported green consumption behavior. The analysis also identified a significant sequential indirect association through collectivism and green consumption attitudes, suggesting that these constructs may help account for the relationship between media information exposure and green consumption behavior. These findings, however, should be interpreted with caution given the cross-sectional nature of the study. Although the proposed model was informed by theoretical assumptions about the relationships among information exposure, value orientations, attitudes, and behavior, the data cannot establish the temporal ordering or causal direction of these relationships. Maxwell and Cole (2007) demonstrated that cross-sectional mediation analyses may produce biased estimates of longitudinal mediation processes. Similarly, O’Laughlin et al. (2018) showed that cross-sectional mediation models may not accurately represent relationships that develop over time. Rohrer et al. (2022) further highlighted the limitations of drawing causal conclusions from statistical mediation models when alternative causal explanations and unmeasured confounding cannot be ruled out. Accordingly, the significant sequential indirect association observed in this study should be understood as a statistical finding consistent with the proposed theoretical model, rather than evidence of an established causal or temporal process. Students with stronger environmental values or greater engagement in sustainable consumption may therefore be more likely to seek sustainability-related information, which could partly account for the observed associations. Moreover, because all four constructs were measured through self-reports collected in a single questionnaire, common method bias cannot be ruled out (Podsakoff et al., 2003). Future studies employing longitudinal or experimental designs could help establish the temporal ordering of these relationships and provide stronger evidence regarding the psychological processes underlying the association between media information exposure and green consumption behavior.

4.1. The Association Between Media Information Exposure and Green Consumption Behavior

The empirical results of this study supported the hypothesized positive association between Media Information Exposure and Green Consumption Behavior. Students reporting higher levels of exposure to environmental and sustainability-related information also tended to report higher levels of green consumption behavior. In this study, Media Information Exposure refers to individuals’ exposure to environmental information related

to climate change, green consumption, and environmental protection. Previous research has suggested that environmental information environments are closely related to sustainable consumption practices. Lee (2011), based on a sample of 6010 young consumers in Hong Kong, identified a significant relationship between environmental information exposure and green purchasing behavior, suggesting that media communication represents an important contextual factor associated with young consumers' environmental choices. Similarly, Y. Sun et al. (2025) found that the quality of environmental information and product-related information presented in social media green advertisements was associated with green purchasing behavior, while environmental crisis awareness and responsibility attribution further strengthened this relationship. Evidence from other media environments indicates that these associations may differ across channels: Hlaváček et al. (2023) reported positive associations for print media and online forums, but negative associations for television exposure and certain uses of social networks in a Czech survey. The observed association may partly reflect the informational relevance of sustainability-related media content to everyday purchasing decisions. Reports on environmentally friendly products, environmental policies, and resource conservation may make the environmental implications of product choices more salient to university students. Repeated encounters with such information may also be associated with greater familiarity with green alternatives, potentially making environmental considerations more accessible when evaluating products. Experimental evidence further suggests that how environmental information is presented may matter: H. Zhang et al. (2025) found that information depicting environmental damage elicited stronger green consumption responses than information depicting undamaged environments. Research on e-commerce product information has likewise identified associations between information about the environmental consequences of purchases and reported purchasing behavior for particular product categories (X. Wang et al., 2025). The measure captures the reported frequency of encountering different forms of environmental information rather than the credibility, persuasive quality, or specific content of individual messages. However, the present study does not demonstrate that Media Information Exposure directly produces behavioral changes. Another possible explanation is that students who already possess stronger environmental awareness or stronger intentions to engage in sustainable consumption may be more likely to seek, attend to, and retain environmental information. This possibility is consistent with the selective exposure perspective, which suggests that individuals tend to actively seek information that corresponds with their existing beliefs, values, and interests (Hart et al., 2009). Accordingly, the observed association should be interpreted without assuming a particular causal direction. Longitudinal and experimental research is needed to determine whether environmental information exposure precedes changes in consumption behavior, whether existing environmental commitments influence information-seeking practices, or whether both processes contribute to the relationship.

4.2. Collectivism as a Potential Explanatory Link

The results of this study indicate that Media Information Exposure was significantly associated with Collectivism, and that Collectivism was positively associated with Green Consumption Behavior. These findings suggest that collectivism represents a potential explanatory pathway linking environmental information exposure and sustainable consumption behavior. Previous studies have emphasized the importance of collective values, social responsibility, and interpersonal norms in explaining environmentally responsible behaviors. Y. Zhang and Cham (2025) found that social media marketing and collectivist values were associated with green consumption intention through cognitive and affective processes. Ngo and Doan (2026), based on a two-wave survey of Asian consumers, demonstrated that collectivism-oriented and authority-oriented green advertising was as-

sociated with actual green purchasing behavior through relevant psychological processes. Gandhi et al. (2025) further reported that moral obligation and social norms were important factors associated with sustainable consumption behavior, highlighting the influence of social relationships and collective responsibility in everyday consumption practices. The relevance of collectivism may be understood in relation to the social consequences of environmentally responsible consumption. Many green purchasing decisions involve benefits that extend beyond the individual consumer, including reduced pollution and resource conservation. Students who attach greater importance to collective welfare may therefore evaluate environmentally responsible purchasing practices in relation to their perceived benefits for others. This interpretation is consistent with the positive association between collectivism and green consumption behavior. At the same time, the collectivism measure encompasses interpersonal concern and family obligations, which may not be equally relevant to environmental purchasing decisions. The relatively low AVE of the single-factor measure further suggests that the interpretation of collectivism as a unified explanatory construct requires caution. Nevertheless, the mediation result should not be interpreted as evidence that Media Information Exposure develops or transforms collectivist values. Because the data were collected at a single time point, alternative interpretations remain possible. For instance, individuals with stronger collectivist orientations may be more likely to attend to environmental information because such information corresponds with their existing concern for collective welfare. In addition, environmental values shaped by family socialization, educational experiences, and social contexts may simultaneously influence both media exposure patterns and green consumption behavior (Stern, 2000). Thus, the present findings identify Collectivism as a meaningful explanatory factor, while the temporal relationship among these variables requires further examination.

4.3. The Explanatory Role of Green Consumption Attitudes

The significant indirect effect through Green Consumption Attitude indicates that attitudes represent an important explanatory factor associated with the relationship between Media Information Exposure and Green Consumption Behavior. Students with higher levels of Media Information Exposure also tended to report more favorable evaluations of green consumption, which were subsequently associated with higher levels of green consumption behavior. Previous research has demonstrated the relevance of environmental attitudes in explaining sustainable consumption practices. Kalam and Mollah (2026) examined the relationships among social media networks, celebrity endorsement, green consumption attitude, green consumption intention, and actual green consumption behavior using data from 1667 consumers in Malaysia and Bangladesh. Their findings demonstrated the relevance of attitudinal factors in understanding how environmental information relates to consumption outcomes. Similarly, Ogiemwonyi et al. (2023) found that environmental factors were partially associated with green purchasing behavior through environmental attitudes. Within the context of university students, the present findings suggest that Media Information Exposure is associated with differences in green consumption evaluations, which are further related to behavioral engagement. However, the mediation result does not indicate that information exposure must first develop into a positive attitude before affecting behavior. Nor does it suggest that attitude represents the only pathway through which environmental information relates to consumption behavior. Individuals may also engage in green consumption because of social norms, personal values, institutional environments, or previous behavioral experiences. Therefore, Green Consumption Attitude should be regarded as one important explanatory pathway within the relationship between Media Information Exposure and Green Consumption Behavior.

4.4. The Sequential Indirect Association Through Collectivism and Green Consumption Attitudes

The sequential mediation analysis identified a statistically significant indirect association between Media Information Exposure and Green Consumption Behavior through Collectivism and Green Consumption Attitude, consistent with the theoretically specified ordering of the proposed model. An important feature of the findings is that the sequential indirect effect ($B = 0.025$) was considerably smaller than the separate indirect effects through collectivism ($B = 0.157$) and green consumption attitude ($B = 0.151$). This pattern suggests that the association between media information exposure and green consumption behavior may involve partly distinct value-related and attitude-related processes. Collectivism reflects a relatively broad orientation toward collective welfare and social responsibility, whereas green consumption attitude concerns evaluations of particular consumption practices. Their associations with purchasing behavior may therefore extend beyond the ordered pathway specified in the model. The relatively small sequential indirect effect is consistent with this distinction and suggests that the proposed sequence accounts for a limited share of the total indirect association. However, differences in the estimated magnitudes of the indirect effects should not be treated as statistically established differences without formal contrasts between the specific indirect effects (Preacher & Hayes, 2008). However, the existence of a significant sequential indirect effect does not demonstrate that collectivism and green consumption attitude constitute consecutive psychological stages or that individuals necessarily experience a fixed process from information exposure to value formation and behavioral action. As noted by Maxwell and Cole (2007), cross-sectional mediation models cannot establish temporal ordering among mediators, even when the hypothesized indirect pathway is statistically significant (Selig & Preacher, 2009). Accordingly, the sequential pathway identified in this study should be interpreted as one possible explanatory pattern rather than a confirmed developmental mechanism. The significant association between Media Information Exposure and Collectivism suggests that environmental information contexts may be related to individuals' perceptions of collective responsibility, while the association between Collectivism and Green Consumption Attitude indicates that social value orientations are relevant to consumption evaluations. Nevertheless, these relationships may also reflect reciprocal processes or shared underlying factors (Slater, 2007). For example, students who already possess stronger environmental commitments may selectively seek sustainability-related information, develop stronger collectivist interpretations of environmental issues, and report more positive attitudes toward green consumption. Therefore, alternative variable arrangements and longitudinal investigations are necessary to determine whether the proposed ordering reflects actual temporal processes. The contribution of this study lies in identifying an integrated association framework linking Media Information Exposure, Collectivism, Green Consumption Attitude, and Green Consumption Behavior. Rather than demonstrating a causal psychological sequence, the findings provide empirical evidence that multiple theoretically meaningful factors are jointly related to university students' green consumption behavior.

4.5. Theoretical Contributions

This study contributes to the literature by extending existing explanations of green consumption behavior in several respects. First, this study integrates the Stimulus–Organism–Response framework with the Value–Attitude–Behavior model to examine the associations among Media Information Exposure, Collectivism, Green Consumption Attitude, and Green Consumption Behavior within a unified analytical framework. By incorporating both information-related factors and value-based psychological factors, the study provides a more comprehensive perspective for understanding the factors associated with university students' sustainable consumption practices. Second, this study distinguishes the roles of

Collectivism and Green Consumption Attitude within the proposed model. The findings indicate that both constructs represent meaningful explanatory factors associated with green consumption behavior, while reflecting different theoretical dimensions. Collectivism represents a broader value orientation concerning individuals' relationship with social groups, whereas Green Consumption Attitude reflects individuals' evaluations of environmentally responsible consumption practices. Examining these constructs simultaneously provides additional insight into the multiple factors associated with green consumption behavior. Third, this study contributes empirical evidence from the context of Chinese university students. University students represent an important population for examining sustainable consumption because this life stage involves the development of personal values, consumption patterns, and social responsibility orientations. By focusing on this population, the present study extends existing discussions of green consumption behavior within a specific cultural and educational context.

4.6. Practical Implications

The findings provide several implications for sustainability communication and environmental education. Given the positive association between Media Information Exposure and Green Consumption Behavior, universities and communication practitioners may consider creating more opportunities for students to encounter sustainability-related information in everyday environments. Possible approaches include incorporating environmental themes into campus communication activities, digital media content, and sustainability-related educational initiatives. In addition, the association between Collectivism and Green Consumption Behavior suggests that future communication strategies may examine whether messages emphasizing collective welfare, shared environmental responsibility, and social consequences are more effective in encouraging sustainable consumption orientations. However, the present study did not manipulate information framing or implement educational interventions; therefore, it cannot determine whether increasing exposure opportunities or emphasizing collective welfare messages would directly improve purchasing behavior. Experimental and intervention-based research is needed to evaluate the effectiveness of specific communication strategies. Furthermore, the relationship between Green Consumption Attitude and Green Consumption Behavior suggests that educational initiatives may explore approaches that help students connect environmental concerns with consumption-related decisions. Future studies should assess whether attitude-focused interventions can effectively reduce the gap between positive evaluations of green consumption and actual behavioral engagement.

4.7. Limitations and Future Research

Several limitations should be acknowledged. First, the cross-sectional design limits causal inference and prevents conclusions regarding the temporal ordering among Media Information Exposure, Collectivism, Green Consumption Attitude, and Green Consumption Behavior. The observed indirect effects therefore represent statistical associations rather than evidence of causal processes. Future longitudinal and experimental studies are needed to establish temporal precedence. Second, Media Information Exposure was measured as a general construct encompassing sustainability-related information across different media contexts. Future research could distinguish among mainstream media, social media, and interpersonal communication channels to examine their respective associations with green consumption behavior. Third, the model included only Collectivism and Green Consumption Attitude as mediators. Other factors, including environmental concern, perceived social norms, environmental knowledge, and prior environmental education, may also account for variations in green consumption behavior. Fourth, participants were recruited from

multiple universities in Shanghai through university-affiliated online platforms and student communities using non-probability sampling. The relatively high proportions of female students and first-year undergraduates may limit the generalizability of the findings. Future studies could employ stratified probability sampling across institutions and academic levels to obtain more diverse samples. In addition, demographic characteristics and other potential common antecedents were not included as covariates in the mediation models, leaving the estimated indirect associations susceptible to unmeasured confounding. Future research should examine their robustness through more comprehensive covariate adjustment and longitudinal designs. Finally, all variables were measured using self-reported questionnaires administered within a single survey context, potentially introducing common method variance, social desirability bias, and recall errors. Although the statistical assessments supported the distinction among the constructs, future research should incorporate behavioral measures, multi-source data, or longitudinal designs to reduce potential measurement bias.

5. Conclusions

This study examined the associations among Media Information Exposure, Collectivism, Green Consumption Attitude, and Green Consumption Behavior among university students recruited from multiple universities in Shanghai, China. Media Information Exposure was positively associated with self-reported Green Consumption Behavior, with significant indirect associations through Collectivism and Green Consumption Attitude, both separately and sequentially. These findings provide additional evidence concerning the relationships among sustainability-related information exposure, collectivist values, consumption attitudes, and reported purchasing practices. Given the cross-sectional design, the proposed sequential pathway should be interpreted as a statistical association rather than evidence of temporal or causal mediation.

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Institutional Review Board Statement: Ethical review and approval were waived for this study in accordance with the local legislation and institutional requirements (Article 32 of Measures for Ethical Review of Life Sciences and Medical Research Involving Human Beings of China; detailed information can be found at https://www.gov.cn/zhengce/zhengceku/2023-02/28/content_5743658.htm (accessed on 22 October 2026)). Formal ethical review was not required because the study involved only anonymous and voluntary questionnaire surveys, collected anonymous survey responses, and did not obtain any sensitive personal information.

Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The individual-level data are not publicly available because their release requires consideration of participant privacy and the scope of the original informed consent. Requests for access to de-identified data may be directed to the corresponding author and will be evaluated in accordance with applicable ethical and institutional requirements. The questionnaire, variable codebook, scoring instructions, and non-identifying statistical outputs can be made available upon reasonable request.

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