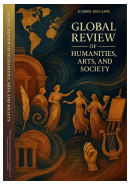
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Unveiling the Link Between Nostalgia and Community Support in Rural Tourism: The Moderating Role of Place Identification and Psychological Closeness

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ABSTRACT

Grounded in Conservation of Resources (COR) theory, this study explores the psychological mechanisms driving community support behavior (CSB) in rural tourism. Drawing on data from 637 rural tourists, it applies Partial Least Squares Structural Equation Modeling (PLS-SEM), Necessary Condition Analysis (NCA), and machine learning techniques including Support Vector Machine (SVM) classification and heatmap visualization. The findings reveal that nostalgia indirectly influences CSB through intergenerational responsibility, with psychological closeness and place identity serving as significant moderators. SVM confirms the predictive value of these psychological constructs by accurately classifying high and low CSB groups, while heatmap analysis illustrates strong emotional and cognitive interrelations. Additionally, environmental concern enhances the effect of nostalgia on CSB, suggesting the importance of value-driven engagement strategies.
Theoretically, this study contributes by framing nostalgia as a resource within COR theory and integrating advanced analytical methods.
Practically, it provides actionable insights for destination managers to promote emotional connection, environmental stewardship, and sustainable community engagement in rural tourism contexts.

1. Introduction

Rural tourism has emerged as a significant segment of the global tourism industry, attracting an increasing number of visitors due to its pristine natural landscapes and culturally immersive experiences (Lane, 1994; Phillips, 1998; Taylor & Lennon, 2011). According to the Food and Agriculture Organization of the United Nations (Canton, 2021a), approximately 35% of global tourism activities are rural in nature, underscoring its pivotal role in the global tourism economy. In China, rural tourism attracted over 3 billion visitors in 2022, accounting for around 55% of domestic travel and generating more than 1 trillion CNY in related consumption (Zheng et al., 2023). This surge has significantly contributed to economic revitalization in remote regions, as revenues are often reinvested in infrastructure and public services to improve residents' quality of life.

However, the rapid expansion of rural tourism has brought about considerable environmental sustainability challenges. Estimates by the United Nations World Tourism Organization and the World Bank indicate that tourism accounts for 8%–10% of global greenhouse gas emissions and generates approximately 1.3 billion tons of solid waste annually, representing 4%–6% of the global total (Canton, 2021b). These environmental impacts are especially pronounced in rural areas where waste management systems remain underdeveloped (Mihai et al., 2021).

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In this context, nostalgia emerges as a vital psychological resource, often evoked through tourists' engagement with historical heritage, traditional customs, and natural environments. Encounters with ancient villages, vernacular architecture, and sacred sites can elicit nostalgic sentiments that inspire respect for local traditions and foster greater willingness to engage in cultural preservation and environmental protection (S. Coghlan et al., 2012). Nostalgia, therefore, serves as a psychological driver of pro-environmental behavior. A key mediating mechanism in this process is intergenerational responsibility—a sense of moral obligation toward future generations—which has been shown to motivate sustained environmentally conscious behaviors (Robinson, 2016; Thompson, 2009). When tourists experience awe and reverence rooted in nostalgia, they may become more committed to sustainable resource use and more inclined to support local communities.

Community Support Behavior (CSB) refers to a range of voluntary, prosocial actions undertaken by individuals or groups to enhance community well-being, environmental quality, and collective development (Chiu et al., 2015). These actions are typically altruistic and extend beyond personal gain (Barrio, 2000). While initial studies have explored the connection between nostalgia and CSB, the mediating role of intergenerational responsibility and the potential influence of other psychological moderators remain underexamined.

Psychological Closeness (PC) and Place Identity (PI) are two such moderators that may shape the process through which nostalgia translates into CSB via intergenerational responsibility (Lin et al., 2022). Psychological closeness refers to perceived emotional proximity to a place or community, influencing one's affective bonds and willingness to safeguard local assets (Zhao et al., 2022). Place identity, on the other hand, denotes an individual's sense of belonging and self-identification with a particular locale, which often correlates with protective attitudes toward that place (Peng et al., 2020). In rural tourism contexts, both PC and PI have been associated with a reduction in environmentally detrimental behaviors. Tourists with stronger emotional ties or a heightened sense of place identity are more attuned to local environmental concerns and more motivated to engage in long-term preservation efforts (Sharpley & Jepson, 2011). Nonetheless, the specific moderating roles of PC and PI in the nostalgia–CSB pathway remain underexplored, particularly within the distinctive socio-ecological dynamics of rural destinations (Zhou et al., 2020).

This study addresses these gaps by applying Conservation of Resources (COR) theory (Timmé, 2023) to investigate how nostalgia influences CSB through intergenerational responsibility, and how PC and PI moderate these effects. COR theory posits that individuals strive to acquire, maintain, and protect resources that hold personal significance, and that changes in these resources can significantly impact emotional and behavioral outcomes (Ramli & Badarulzaman, 2023). Within this framework, nostalgia is conceptualized as a psychological resource that strengthens emotional attachment to cultural and environmental assets, thereby enhancing intergenerational responsibility and fostering CSB (Wu et al., 2022). The study addresses the following research questions:

RQ1: How does nostalgia influence community support behavior through intergenerational responsibility?

RQ2: Does psychological closeness moderate the relationship between nostalgia and intergenerational responsibility?

RQ3: Does place identity moderate the relationship between intergenerational responsibility and community support behavior?

This research empirically examines the mediating role of intergenerational responsibility and the moderating roles of psychological closeness and place identity. Nostalgia deepens tourists' emotional attachment to rural tourism destinations and fosters a sense of moral duty toward future generations, thereby encouraging environmentally responsible behavior (Christou et al., 2018; Yeh et al., 2012). Tourists who experience stronger psychological closeness are more likely to feel profound nostalgia and, in turn, exhibit a heightened sense of intergenerational responsibility (Yeh et al., 2012). Likewise, a strong sense of place identity reinforces the connection between intergenerational responsibility and CSB, promoting cultural preservation and environmental sustainability (Christou et al., 2018).

The theoretical contributions of this study are threefold:

(1) It extends the application of COR theory to rural tourism by developing a novel model that links nostalgia, intergenerational responsibility, and CSB (Zhou & Wang, 2022).

(2) It elucidates the moderating roles of psychological closeness and place identity, offering deeper insights into the psychological drivers of pro-environmental behavior (Zeng & Xu, 2021).

(3) It provides empirical evidence to inform tourism management strategies that foster ecological sustainability and community involvement. By uncovering the psychological pathways through which nostalgia motivates community support behavior, this study contributes both theoretical and practical insights to advance the sustainable development of rural tourism destinations.

2. Literature Review and Hypothesis Development

2.1. Conservation of Resources Theory (COR)

The Conservation of Resources (COR) theory serves as a foundational framework for understanding how individuals acquire, preserve, and protect valued resources to manage stress and navigate challenges (Halbesleben et al., 2014). Central to COR theory is the premise that resources are essential for coping with stress: the loss or threat of losing resources can induce psychological strain, whereas resource acquisition can mitigate stress, enhance adaptability, and improve overall well-being (Hobfoll & Shirom, 2000).

Recent extensions of COR theory have been applied to the domain of Community Support Behavior (CSB), positioning nostalgia as a salient emotional resource that significantly shapes individuals' cognition, affect, and behavior (Hobfoll, 2011). The activation of nostalgic thoughts and feelings contributes to behavioral outcomes, initiating a cyclical process of resource protection and replenishment (Lin et al., 2022). For example, Lin et al. (2023) investigated the effect of tour guide humor on tourists' CSB and found that positive emotional resources, such as amusement, can foster environmentally responsible behavior (Liu, 2023). Similarly, Huang et al. (2023) explored how personal resources and situational stressors interact to influence CSB, employing COR to examine the joint effects of stressor appraisals and individual traits on procrastination-related behaviors.

In contrast to studies that directly apply COR to understand CSB, other research has adopted alternative theoretical frameworks to explain environmental and community-related behaviors. For instance, López-Mosquera and Sánchez (2012) employed the Theory of Planned Behavior and the Value-Belief-

Norm Theory to predict individuals' willingness to pay for suburban park access, demonstrating that different theoretical lenses can yield valuable insights into complex behavioral processes. Likewise, Ágoston et al. (2022) highlighted the roles of age and residential environment in shaping CSB, underscoring the interplay between personal resources and contextual factors. Toh et al. (2023) further illustrated the broad applicability of COR theory by using it to explain behavioral dynamics in technology adoption contexts.

Despite the diversity of approaches, a growing body of literature emphasizes the critical role of resource dynamics in shaping CSB. These studies collectively point to the importance of understanding how psychological, emotional, and contextual resources interact to influence pro-social and pro-environmental behavior.

2.2. Hypotheses development and conceptual framework of the study

2.2.1 Nostalgic

Nostalgia has been explored through various theoretical frameworks (Burke & Cowley, 1990; Lazarus, 1991), yet empirical research remains relatively limited. One of the early empirical perspectives stems from prototype theory, as proposed by Keltner and Haidt (2003), who conceptualized nostalgia as an emotional response triggered when an individual's frame of reference is challenged by a perceptual stimulus (Lazarus, 1991). They identified two core features of nostalgia: "perceived vastness" and "need for accommodation" (Shiota, Keltner, & Mossman, 2007). "Perceived vastness" refers to the sense that the object or experience exceeds one's typical understanding or self-perception, often inducing awe (Shiota et al., 2007). The "need for accommodation" reflects a psychological demand to adjust existing mental frameworks in response to such expansive experiences (Shiota et al., 2003; Shiota et al., 2007).

As a positive and self-transcendent emotion, nostalgia can reduce self-focus and promote reflection on the individual's relationship with the broader social and natural world (Rudd et al., 2012). It fosters a sense of psychological "small self," whereby individuals feel humbled or diminished in the face of something greater than themselves (Bai et al., 2017; Rudd et al., 2012). This emotional shift diminishes egocentric concerns and encourages a greater sense of meaning derived from sharing, empathy, and support for others (Bai et al., 2017; Ecclestone, 2007).

Such a transformation not only enhances prosocial tendencies but also activates a heightened sense of intergenerational responsibility—a moral orientation toward the welfare of future generations (Ferguson et al., 2016). By prompting individuals to perceive themselves as part of a broader continuum that includes nature, community, and future society, nostalgia strengthens both environmental concern and cultural stewardship. It shifts attention from immediate self-interest toward long-term collective well-being (Rudd et al., 2012; Shiota et al., 2007).

This psychological shift fosters forward-looking behavior, encouraging individuals to consider the long-term consequences of their actions on future generations. Empirical studies have shown that nostalgia can motivate individuals to engage in the protection of natural and cultural resources (Yan et al., 2023). Under the influence of nostalgia, individuals are more inclined to adopt resource-conserving behaviors and support community development efforts aimed at preserving assets for future use. This emotional state deepens one's psychological connection with nature and society, thereby reinforcing intergenerational responsibility and increasing the likelihood of engaging in community support behaviors (Livingstone et al., 2011).

Based on this theoretical reasoning, the following hypothesis is proposed:

H1: *Nostalgia has a positive effect on intergenerational responsibility.*

2.2.2 Moderating Effect of Place Identity

The concept of place identity (also referred to as *place identification*) originates from the field of environmental psychology and was first introduced by Proshansky in 1978. He defined place identity as the relationship that individuals form with specific physical settings, viewing it as an integral component of self-identity (Proshansky, 1978). This construct encompasses the interaction of one's thoughts, beliefs, emotions, values, goals, behavioral tendencies, and skills—whether consciously or unconsciously developed—in relation to a place. Place identity thus reflects not only an individual's emotional attachment to a particular location, but also their cognitive and value-based identification with it.

Building on this foundation, Jorgensen and Stedman (2001) conceptualized place identity as a positive response within the person–environment relationship. They described it as a structured system of beliefs about the environment, comprising cognitive, affective, and evaluative dimensions (Jorgensen & Stedman, 2001).

In the context of tourism, destinations can foster self-identification and a sense of belonging among visitors, which may in turn influence their behavioral inclinations. For instance, local residents may develop emotional security and a willingness to invest emotional and material resources in a place with which they are familiar or upon which they are dependent (Pierce et al., 2003).

Intergenerational responsibility refers to individuals' concern for the well-being of future generations and the long-term sustainability of resources. This sense of moral obligation often drives engagement in community support behaviors (Summers & Smith, 2014). However, the strength of this relationship may be conditioned by place identity. As a form of cognitive and emotional connection to a specific place, place identity has the potential to enhance individuals' sense of responsibility and motivation for local action, thereby moderating the relationship between intergenerational responsibility and community support behavior.

Place identity reinforces an individual's sense of belonging and psychological ownership of a place (Page, 2007). When individuals strongly identify with a place, their sense of responsibility toward its future tends to increase (Williams & Vaske, 2003). This heightened identification leads to greater concern for sustainable development and a stronger willingness to contribute to community building and environmental preservation.

For example, Pierce et al. (2003) noted that place identity can evoke a sense of being "at home," and that such feelings of familiarity and emotional dependence can foster security and a corresponding sense of responsibility. This emotional connection further reinforces individuals' motivation to engage in community support behaviors.

Based on this theoretical rationale, the following hypothesis is proposed:

H2: *Place identity positively moderates the relationship between intergenerational responsibility and community support behavior.*

2.2.3 Moderating Effect of Psychological Closeness

The concept of psychological closeness originates from psychological distance theory, initially proposed by Swiss psychologist Blum. According to this theory, the psychological distance between an individual and a reference object is measured relative to the self in the present moment. A greater psychological distance reflects a higher level of psychological alienation, whereas a smaller distance indicates stronger psychological closeness (Liberman & Förster, 2009). Psychological distance significantly influences individuals' judgments about external stimuli and their behavioral decisions (Stokols, 1975). When individuals experience psychological alienation from the external world, they are more likely to disregard contextual details, leading to distorted perceptions and inaccurate judgments (Johnson, 1975). Conversely, psychological closeness fosters more grounded evaluations and enhances the likelihood of warmth, intimacy, and prosocial behavioral orientations.

As a common emotional phenomenon in group interactions, psychological closeness exerts a motivational influence on individual behavior. Sedikides et al. (2008) found that psychological closeness can significantly enhance community support behavior (CSB) by increasing individuals' perceived sense of meaning in life.

In rural tourism settings, nostalgia can be triggered by specific environmental stimuli such as the air, food, and local customs (Yeh et al., 2012). The activation of nostalgia not only revives tourists' recollections of pleasant past experiences but also prompts them to reflect on the value of natural and cultural heritage, thereby strengthening their intergenerational responsibility—a moral concern for the welfare of future generations (Shi et al., 2021). Within this context, psychological closeness may play a moderating role in the relationship between nostalgia and intergenerational responsibility.

When tourists experience a high degree of psychological closeness to a destination, the effect of nostalgia on intergenerational responsibility is amplified (Wang et al., 2023). This heightened closeness fosters a stronger sense of belonging and identification with the destination's natural and cultural assets, thereby facilitating the transformation of nostalgic emotion into a commitment to future generations (Obst & White, 2007). Conversely, low psychological closeness may attenuate the positive impact of nostalgia, weakening the emotional bridge that connects past experiences with future-oriented responsibility.

Importantly, nostalgia itself can foster psychological closeness by evoking emotionally meaningful memories that deepen individuals' perceived connection with a place (Rudd et al., 2012; Sedikides et al., 2008). Sedikides et al. (2008) also demonstrated that psychological closeness enhances prosocial behavior and responsibility by reinforcing one's sense of environmental identification and existential meaning.

Based on the above discussion, the following hypothesis is proposed:

H3: *Psychological closeness significantly moderates the relationship between nostalgia and intergenerational responsibility.*

2.2.4 Mediating Effect of Intergenerational Responsibility

Intergenerational responsibility (INR) refers to the moral obligation individuals feel toward the well-being of future generations (Diprose et al., 2019). At its core, INR encourages individuals to consider the long-term consequences of their decisions and behaviors, particularly in areas such as environmental protection, cultural heritage preservation, and social sustainability (Bogacki & Letmathe, 2021). This sense of responsibility extends beyond the sustainable use of natural resources; it also encompasses the safeguarding of cultural assets and active engagement in community development (Vibhute, 1997). In essence, intergenerational responsibility is a multidimensional construct that reflects deep concern for environmental, cultural, and social well-being, with an emphasis on protecting the rights and opportunities of future generations.

As a mediator, intergenerational responsibility can serve as a critical link that explains the mechanism through which one variable influences another. Specifically, in the relationship between nostalgia and community support behavior (CSB), INR may function as a psychological bridge, clarifying how nostalgic emotions translate into prosocial actions (Parth et al., 2020).

Nostalgia, as a complex and universal emotional experience, evokes recollections of positive past events (Holak & Havlena, 1992). These recollections often involve strong identification with traditional culture, natural landscapes, and historical legacies. Such emotional arousal can elicit admiration and respect for cultural and natural resources, thereby fostering a stronger sense of intergenerational responsibility. This, in turn, encourages individuals to consider how their present actions will impact future generations (Gündling, 1990), often resulting in behaviors aimed at community support, environmental protection, and cultural preservation.

Empirical studies have demonstrated that nostalgia can motivate individuals to focus on the conservation of natural and cultural resources (Li et al., 2020). For example, when exposed to historically significant cultural heritage or traditional crafts, individuals are more likely to recognize their enduring value and the importance of transmitting them to future generations. This recognition strengthens their sense of responsibility and long-term orientation. Nostalgia thus shifts individuals' temporal focus from the present to the future, encouraging sustainable thought and action (Sedikides & Wildschut, 2020). While rooted in emotional connections to the past, nostalgia simultaneously motivates individuals to embrace responsibility for the present and future.

Moreover, intergenerational responsibility significantly influences behavioral choices by encouraging individuals to contribute meaningfully to their communities and engage in resource stewardship (Syropoulos & Markowitz, 2023). By emphasizing accountability toward future generations, INR often leads individuals to adopt more environmentally and socially responsible behaviors. For instance, Coghlan et al. (2012) found that a heightened sense of responsibility motivates individuals to participate in cultural conservation and community support initiatives. When individuals are aware of how their current actions affect long-term community development and resource sustainability (Flint, 2013), they are more likely to actively engage in efforts to preserve cultural heritage, support local economies, and protect the natural environment.

INR thus enables individuals to recognize their role in shaping the future of their communities, thereby enhancing their motivation to take action in support of shared resources and collective well-being.

Based on the above discussion, the following hypothesis is proposed:

H4: *Intergenerational responsibility mediates the relationship between nostalgia and community support behavior.*

2.2.5 Community Support Behavior, CSB

Tourists' Community Support Behavior (CSB) refers to proactive actions undertaken by tourists to contribute to the sustainable development of local communities. These behaviors include protecting natural environments, respecting cultural traditions, and supporting local economies. For a destination to effectively foster such support—not only among tourists but also residents—it must appeal to emotional connections rather than relying solely on rational evaluations (Williams & Vaske, 2003). When residents form emotional bonds with a destination, they often develop a strong sense of place attachment (Casais & Poço, 2023). This emotional attachment fosters loyalty and encourages discretionary, extra-role behaviors that contribute positively to community well-being (Gursoy et al., 2014).

The relationship between place attachment and CSB can be further understood through the lens of social exchange theory (Blau, 1986), which posits that individuals are more likely to engage in reciprocal, prosocial behaviors—such as CSB—when they perceive emotional or psychological benefits from their association with a place.

Local residents frequently engage in a range of supportive behaviors that promote the destination, even without formal incentives or explicit expectations within the tourism context. This concept aligns with Organizational Citizenship Behavior (OCB), defined by Organ (1988) as discretionary behavior not formally rewarded by policies but which contributes to the effective functioning of the organization. Community Citizenship Behavior (CCB) shares similarities with OCB but differs in that residents' relationships with their communities are more informal, emotionally driven, and less structured than the employee-organization dynamic (Wu et al., 2022).

Place attachment, influenced by emotional connectedness to a destination, has been shown to promote positive behaviors such as CSB (Chen & Šegota, 2015). Previous research has explored the antecedents of these discretionary behaviors in tourism settings. For example, individuals' attachment styles to their communities have been identified as critical determinants of destination citizenship behavior (Chiu et al., 2019). Residents who express high satisfaction and commitment to their localities often develop deeper emotional bonds, which in turn strengthen their sense of responsibility and willingness to engage in prosocial behaviors.

Moreover, tourists' CSB is similarly shaped by their emotional attachment to destinations and their personal values. Emotional bonds encourage both residents and tourists to support the long-term sustainability and well-being of local communities (Chiu et al., 2019).

Based on the above theoretical foundation, the conceptual model proposed in this study is presented in Fig 1.

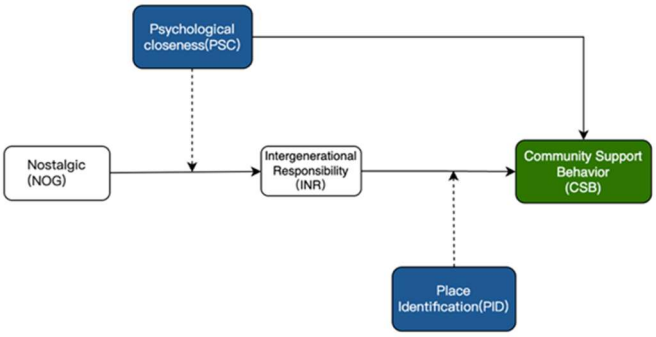


Fig 1. Conceptual framework

3. Methodology

3.1. Data collection

We developed a meticulously structured survey questionnaire, with sample data collected via the WJX platform using a random sampling method. To minimize common method bias, a multi-wave data collection strategy was implemented. Data were gathered in two phases, separated by a two-month interval. In the first phase, the questionnaire measured the independent and mediating variables. A total of 579 questionnaires were distributed, and 386 valid responses were obtained, yielding a response rate of 67%. Two months later, in the second phase, the questionnaire measured the dependent and moderating variables, with 367 questionnaires distributed and 251 valid responses collected, resulting in a response rate of 68%.

The survey instrument was divided into three main sections. The first section included a series of carefully formulated screening questions to ensure that only eligible participants were included. Specifically, respondents were required to have prior experience with rural tourism. Those who did not meet this criterion were automatically disqualified to ensure the validity and relevance of the collected data.

The second section consisted of 22 well-designed items, each rated on a 5-point Likert scale, intended to capture participants' perceptions and reactions across the study's theoretical framework. These items comprehensively measured the ten core constructs defined in the conceptual model, ensuring both construct validity and theoretical rigor (Barnard et al., 2008).

Since the original questionnaire was developed in English, cross-linguistic consistency was ensured through the back-translation method. A bilingual expert first translated the English version into Chinese, followed by a second expert who back-translated it into English. The original and back-translated versions were then compared to identify and resolve any discrepancies, ensuring semantic equivalence (Isaacs et al., 2018). Both the English and Chinese versions of the questionnaire were subsequently reviewed by two senior scholars specializing in Community Support Behavior (CSB) to further enhance the instrument's accuracy, clarity, and reliability.

To validate the applicability and clarity of the questionnaire, a pilot study was conducted prior to the formal data collection. This pilot phase helped identify potential issues in item wording and structure. Based on participant feedback, refinements were made to optimize the clarity, coherence, and usability of the scale, ultimately improving the quality and robustness of the final dataset

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Table 1. Respondent profiles (n = 637).

Variable	Category	Frequency	Cumulative percentage
GENDER	Male	293	46.00%
	Female	344	54.00%
AGE	18-25	103	16.17%
	26-30	189	29.67%
	31-40	200	31.40%
	41-50	82	12.87%
	Above50	63	9.89%
EDU	College or below	163	25.59%
	Bachelor's degree	363	56.99%
	Master's degree or above	111	17.43%
TRAVEL TIMES (Year)	3 times or below	255	40.03%
	4-8 times	212	33.28%
	9-15 times	100	15.70%
	16 times or above	70	10.99%
		637	100

Table 1 presents a summary of the key demographic characteristics of the study sample.

In terms of gender distribution, the sample included 293 male respondents (46%) and 344 female respondents (54%), indicating a slight predominance of female participants. However, the overall gender distribution remains relatively balanced, suggesting minimal gender bias in the sample composition.

Regarding age distribution, respondents aged 18–25 years accounted for 16.2% (n = 103), those aged 26–30 years comprised 29.7% (n = 189), and individuals aged 31–40 years represented the largest proportion at 31.4% (n = 200). Respondents aged 41–50 years made up 12.9% (n = 82). These figures indicate that the majority of participants were between 26 and 40 years old, a demographic typically associated with greater financial independence and a stronger propensity for tourism-related activities.

In terms of educational attainment, most respondents held a bachelor's degree or higher. The largest subgroup consisted of individuals with bachelor's degrees, followed by those with associate degrees or lower. A smaller proportion of the sample reported having postgraduate degrees. This distribution suggests that the sample primarily comprised highly educated individuals, who may demonstrate a more rational and informed approach to tourism consumption and decision-making.

With respect to annual travel frequency, 39.8% of respondents (n = 213) reported traveling three times or fewer per year, making them the largest subgroup. The second-largest group, comprising 31.4% (n = 168), traveled 4–8 times per year. In contrast, 16.4% (n = 88) traveled 9–15 times, while 12.3% (n = 66) traveled more than 16 times annually. These results indicate that the majority of participants were occasional travelers, with relatively few engaging in high-frequency travel. This pattern may be influenced by factors such as time availability, disposable income, occupational constraints, and personal lifestyle preferences.

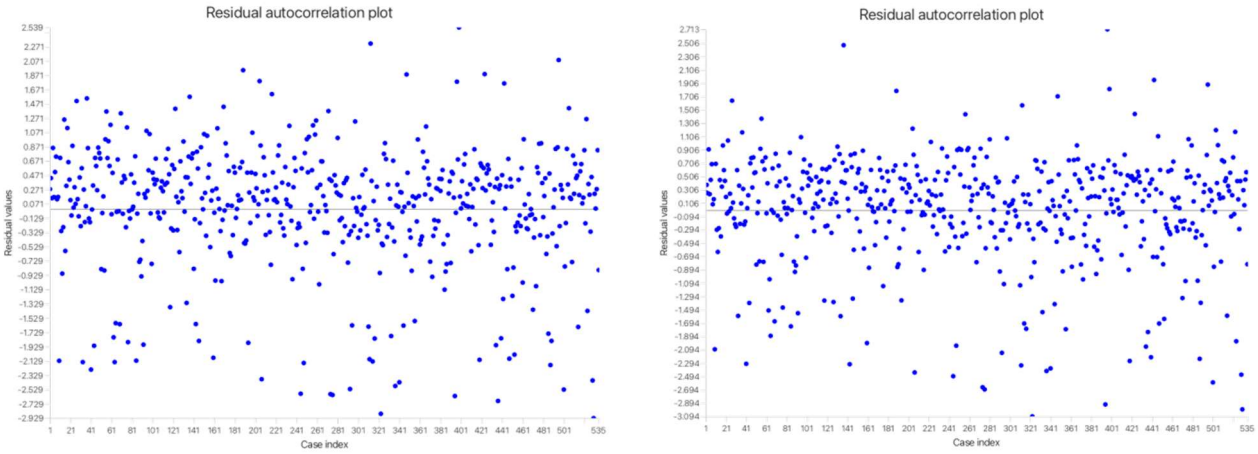


Fig 2. Residual autocorrelation plot Test

In this study, the residual autocorrelation plot was used to assess the independence assumption of residuals in the regression model. As shown in Figure 2, the residual data points are randomly scattered across the full range of case indices, without exhibiting any discernible patterns or systematic trends. Most of the residuals fluctuate closely around the zero line, indicating no evidence of significant autocorrelation. This pattern confirms that the residuals meet the independence assumption required for valid regression analysis. Accordingly, the estimated regression coefficients can be considered robust and unbiased, enhancing the statistical reliability of the results. In summary, no serious autocorrelation issues were detected, suggesting that the regression model is suitable for further hypothesis testing and statistical inference.

3.2. Measures and Data Analysis

All measurement items in this study were adapted from established, peer-reviewed research to ensure scientific validity and contextual relevance. Each construct was measured using multiple items rated on a 5-point Likert scale, ranging from *1 = Strongly Disagree* to *5 = Strongly Agree*. The detailed items and descriptive results are provided in the Appendix.

- Nostalgia (NOG) was measured using a four-item scale adapted from the framework of Charng, Piliavin, and Callero (1988).
- Place Identity (PID) was measured with four items based on the study by Hsiao et al. (2010).
- Psychological Closeness (PSC) included five items adapted from Wu and Fang (2010b).
- Intergenerational Responsibility (INR) was measured using a four-item scale developed from the research of van der Pas et al. (2005).
- Community Support Behavior (CSB) was assessed using four items derived from the studies of Herrero & Gracia (2007) and Shakespeare-Finch & Obst (2011).

To ensure methodological rigor, this study employed a mixed-method analytical approach that combined Partial Least Squares Structural Equation Modeling (PLS-SEM) with Necessary Condition Analysis (NCA). This dual approach allowed for a comprehensive examination of both sufficient and necessary conditions influencing tourists' community support behavior (CSB) within the context of nostalgia.

PLS-SEM was used to analyze both the measurement model and the structural model. The measurement model assessed the reliability and validity of the latent constructs by examining the relationships between observed indicators and their corresponding latent variables. The structural model explored the hypothesized causal relationships among latent variables, thereby uncovering the underlying mechanisms linking nostalgia to community support behavior.

In addition to PLS-SEM, this study incorporated Necessary Condition Analysis (NCA) to identify the critical factors that must be present for CSB to occur. While PLS-SEM reveals whether certain constructs *can* influence CSB, NCA reveals whether these constructs *must* be present—thereby deepening the theoretical insights into indispensable antecedents of CSB. Together, these methods provide a robust framework for distinguishing between sufficient pathways and necessary preconditions.

This integrated approach contributes to both theoretical advancement and practical implications. The findings not only validate the mediating roles of place identity, psychological closeness, and intergenerational responsibility, but also highlight the necessity of these psychological factors in promoting sustainable and prosocial behaviors. The study offers valuable guidance for policy makers, destination managers, and community leaders aiming to foster residents' and tourists' engagement in sustainable community development.

4. Result

4.1. PLS-SEM Results

4.1.1 Assessment of the Outer (Measurement) Model

The robustness of the measurement model was evaluated by assessing the reliability and validity of the constructs, including Intergenerational Responsibility (INR), Community Support Behavior (CSB), Place Identity (PID), Psychological Closeness (PSC), and Nostalgia (NOG). To ensure that the observed indicators accurately and consistently capture the underlying theoretical constructs, this study conducted a series of tests focusing on internal consistency reliability and convergent validity.

Reliability was assessed through Cronbach's alpha and Composite Reliability (CR). According to the established thresholds suggested by Hair, Ringle, and Sarstedt (2014), values above 0.70 for both Cronbach's alpha and CR are considered acceptable indicators of internal consistency (Sarstedt et al., 2014).

As shown in Table 2, the Cronbach's alpha values for all latent constructs ranged from 0.84 to 0.917, while the corresponding CR values ranged from 0.893 to 0.937. These results clearly demonstrate that all constructs exhibit strong internal reliability, confirming the stability and consistency of the measurement instruments used in this study.

In summary, the measurement model satisfies the reliability criteria, thereby providing a solid foundation for the subsequent evaluation of convergent and discriminant validity within the structural model analysis.

Table 2. Reliability and convergent validity

Construct	Item	Loading	VIF	Cronbach's alpha	rho_A	CR	AVE
INR	INR1	0.806	1.818	0.84	0.855	0.893	0.676
	INR2	0.875	2.159				
	INR3	0.825	1.875				
	INR4	0.779	1.733				
CSB	CSB1	0.86	2.636	0.917	0.918	0.937	0.750
	CSB2	0.883	2.925				
	CSB3	0.837	2.263				
	CSB4	0.872	2.721				
	CSB5	0.878	2.935				
PID	PID1	0.874	2.574	0.890	0.893	0.924	0.752
	PID2	0.859	2.387				
	PID3	0.851	2.099				
	PID4	0.884	2.522				
PSC	PSC1	0.879	2.808	0.905	0.914	0.93	0.726
	PSC2	0.904	3.342				
	PSC3	0.864	2.537				
	PSC4	0.837	2.416				
	PSC5	0.77	1.898				
NOG	NOG1	0.817	2.056	0.873	0.878	0.913	0.724
	NOG2	0.879	2.497				
	NOG3	0.852	2.128				
	NOG4	0.854	2.181				

The validity assessment of the measurement model is divided into two key components: convergent validity and discriminant validity.

As presented in Table 3, all constructs demonstrate Average Variance Extracted (AVE) values greater than 0.50, indicating that each latent construct explains more than half of the variance in its respective indicators. This meets the criteria established by Fornell and Larcker (1981) and confirms that the model possesses strong convergent validity.

With regard to discriminant validity, two complementary approaches were employed: the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio of correlations, both generated using PLS-SEM software. As shown in Tables 4 and 5, the results are as follows:

- For the Fornell–Larcker criterion, the square root of the AVE for each construct is greater than its correlations with any other construct in the model, fulfilling the standard threshold for discriminant validity.
- For the HTMT ratio, all values fall below the conservative threshold of 0.85, as recommended by Henseler et al. (2014), further reinforcing discriminant validity.

Collectively, these results provide strong empirical support for the discriminant validity of the measurement model, indicating that the latent constructs are both conceptually distinct and empirically separable from one another.

Table 3. Forel-larcker criterion

	INR	CSB	PID	PSC	NOG
INR	0.822				
CSB	0.151	0.866			
PID	0.096	0.416	0.867		
PSC	0.084	0.409	0.248	0.852	
NOG	0.086	0.405	0.433	0.409	0.851

Note: The off-diagonal values (bold) in the above matrix are the square correlations between the latent constructs and the diagonals are AVEs.

Table 4. HTMT

	INR	CSB	PID	PSC	NOG	INR x PID	INR x NOG	INR x PSC
INR								
CSB	0.17							
PID	0.11	0.458						
PSC	0.093	0.446	0.271					
NOG	0.097	0.452	0.487	0.455				
INR x PID	0.138	0.036	0.101	0.117	0.124			
INR x NOG	0.241	0.083	0.119	0.101	0.135	0.46		
INR x PSC	0.184	0.109	0.121	0.048	0.096	0.389	0.421	

4.1.2 Assessment of the Inner Structural Model

To begin the evaluation of the inner structural model, the issue of multicollinearity was assessed by examining the Variance Inflation Factors (VIFs) for all predictor constructs. As presented in Table 5, all VIF values ranged from 1.000 to 1.429, which are well below the commonly accepted threshold of 3.0, indicating that collinearity is not a concern in this model (Hair Jr et al., 2021).

Subsequently, bootstrapping analysis with 5,000 resamples was conducted to assess the statistical significance of the hypothesized paths.

The results demonstrated that most structural paths were statistically significant at the 0.05 level, thereby providing support for the majority of the proposed hypotheses. Specifically, the following direct effects were found to be significant:

- NOG → PSC ($\beta = 0.409$, $t = 9.191$, $p < 0.001$)
- PSC → PID ($\beta = 0.085$, $t = 2.184$, $p < 0.05$)
- NOG → PID ($\beta = 0.398$, $t = 4.987$, $p < 0.001$)
- INR → CSB ($\beta = 0.137$, $t = 2.844$, $p < 0.01$)
- PID → CSB ($\beta = 0.285$, $t = 6.187$, $p < 0.001$)
- PSC → CSB ($\beta = 0.266$, $t = 28.649$, $p < 0.001$)
- NOG → CSB ($\beta = 0.191$, $t = 4.129$, $p < 0.001$)

Note: The variables PU → PI and PEOU → PI appear in the original text but are not defined in the theoretical framework provided thus far. Unless they are relevant constructs in your full model (e.g., from TAM – Technology Acceptance Model), they should be removed or explained. Here's the cleaned-up version excluding those undefined paths. Please let me know if they should be retained.

To further explore moderation effects, a two-stage approach was applied using SmartPLS 4.0, following the recommendations of Henseler et al. (2015). The results of the moderation analysis (see Table 5) revealed the following:

- The interaction between NOG and INR on CSB was statistically significant ($\beta = 0.114$, $t = 2.599$, $p < 0.01$), indicating that intergenerational responsibility moderates the effect of nostalgia on community support behavior.
- Similarly, the interaction between PSC and INR on CSB was also significant ($\beta = 0.119$, $t = 2.541$, $p < 0.05$), suggesting a significant moderating effect of psychological closeness in the INR–CSB relationship.

However, the interaction between PID and INR on CSB was not significant (β = 0.015, t = 0.275, p = 0.784), and thus the corresponding hypothesis was not supported.

In summary, the structural model results provide empirical support for the majority of the hypothesized relationships, while also identifying specific interaction effects that further illuminate the complex mechanisms through which nostalgia, place-based factors, and intergenerational values influence community support behavior.

Table 5. Assessment of Structural Model.

Hypothesis and Path	Coefficient	Std	T values	P Values	f^2	VIF	Result
NOG -> PSC	0.409	0.045	9.191	***	0.201	1.00	Supported
PSC; R^2= 0.168; Q^2 predict= 0.585							
PSC -> PID	0.085	0.039	2.184	0.029	0.007	1.201	Supported
NOG -> PID	0.398	0.047	8.527	***	0.164	1.201	Supported
PID; R^2= 0.194; Q^2 predict= 0.571							
INR -> CSB	0.137	0.048	2.844	0.004	0.027	1.067	Supported
PID -> CSB	0.285	0.046	6.187	***	0.1	1.253	Supported
PSC -> CSB	0.266	0.043	6.199	***	0.089	1.22	Supported
NOG -> CSB	0.191	0.046	4.129	***	0.04	1.407	Supported
CSB; R^2= 0.35; Q^2 predict= 0.615							
INR x NOG -> CSB	0.114	0.044	2.599	0.009	0.018	1.429	Supported
INR x PSC -> CSB	0.119	0.047	2.541	0.011	0.019	1.308	Supported

Note: ***, p < 0.001

4.1.3 Inspecting the Inner Structural Model (Moderation Analysis)

To further investigate the moderating effects of individual and contextual factors on Community Support Behavior (CSB), additional logistic regression analyses were conducted. The CSB variable was dichotomized using a median-split method to create a binary outcome for modeling purposes. Two interaction models were tested:

1. The interaction between Nostalgia (NOG) and Place Identity (PID)
2. The interaction between Intergenerational Responsibility (INR) and Psychological Closeness (PSC)

As shown in Figure 3, the interaction between NOG and PID revealed a significant moderating effect. Specifically, the positive relationship between NOG and the probability of exhibiting high CSB was stronger when PID was low, but this effect weakened or even reversed as PID increased. This suggests that individuals with a high level of place identity may experience cognitive or motivational saturation when simultaneously engaging in elevated nostalgic reflection and personal duty, which could paradoxically reduce their outward community-oriented behavior.

Similarly, the interaction between INR and PSC demonstrated that Psychological Closeness (PSC) significantly amplifies the effect of Intergenerational Responsibility (INR) on CSB. As illustrated in Figure X, under conditions of high PSC, the influence of INR on CSB was markedly stronger. In contrast, when PSC was low, the effect of INR on CSB diminished substantially. This finding underscores the importance of a supportive psychosocial environment in translating internalized moral responsibility into tangible community engagement.

Taken together, these moderation effects reveal that neither internal motivations (e.g., nostalgia, norms, or duty) nor behavioral tendencies alone are sufficient to explain civic engagement in environmental contexts. Instead, the interaction between psychological drivers and the surrounding social climate plays a pivotal role in shaping pro-environmental behavior. These insights offer important implications for the design of behaviorally informed environmental policies—policies that should account not only for individual-level psychological determinants but also for the contextual conditions that enable or inhibit the expression of such motivations.

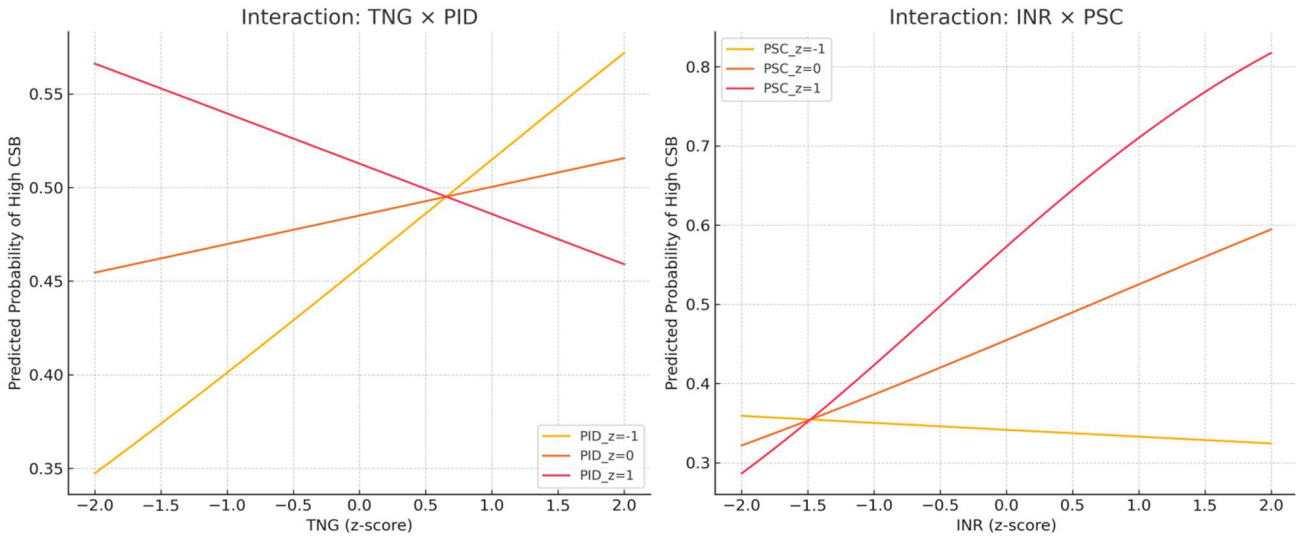


Fig 3. Moderate slope

4.2. Correlation Analysis of Latent Variables

To explore the interrelationships among the key latent constructs, a Pearson correlation analysis was performed. The results are visualized as a heatmap in Figure 4, facilitating intuitive interpretation of both the strength and direction of bivariate associations.

The analysis revealed several noteworthy patterns:

1. Positive correlations were observed among the core behavioral constructs, including Community Support Behavior (CSB), Intergenerational Responsibility (INR), Nostalgia (NOG), and Place Identity (PID), suggesting a degree of behavioral coherence across these variables. For instance, CSB showed a moderate positive correlation with PID (r = 0.459), while INR was positively associated with NOG (r = 0.467).
2. The interaction term PID × INR exhibited significant negative correlations with most core variables, including NOG (r = -0.545) and CSB (r = -0.420). This may point to a suppressor effect or overjustification phenomenon, where overlapping psychological constructs may interfere with each other's explanatory power or motivation-enhancing effects.
3. Similarly, the interaction term PSC × NOG showed weak or negative correlations with several variables, particularly with Psychological Closeness (PSC) itself (r = -0.214). This could indicate a potential dampening effect of a highly pro-social climate on the behavioral activation typically associated with nostalgic experiences.

The heatmap, rendered using a red–blue color gradient, provides a clear visual summary of the correlations, where red shades indicate stronger positive associations and blue shades reflect negative ones. These preliminary findings offer valuable insights that inform subsequent structural modeling and moderation analysis, while also highlighting complex interactions among individual, social, and affective drivers of community-oriented behavior.

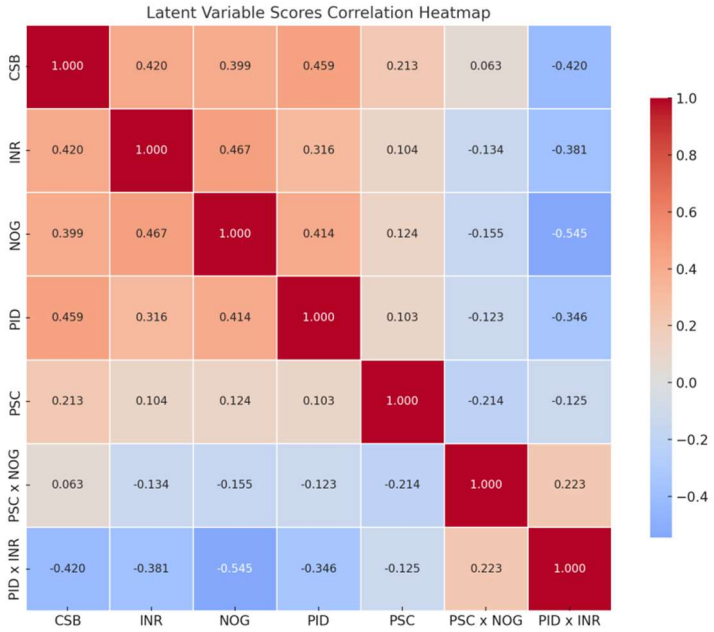


Figure 4. Latent Variable Scores Correlation Heatmap

4.3. Support Vector Machine (SVM) and Comparative Machine Learning Analysis

To assess the predictive accuracy and structural separability of key psychological and contextual variables—Nostalgia (NOG), Psychological Closeness (PSC), Place Identity (PID), and Intergenerational Responsibility (INR)—we employed three machine learning algorithms: Support Vector Machine (SVM), K-Nearest Neighbors (KNN), and K-Means clustering.

Prior to modeling, all input variables were standardized and subjected to Principal Component Analysis (PCA) for dimensionality reduction and visualization purposes. This preprocessing ensured comparability across models and facilitated interpretation in the transformed feature space.

As depicted in Figure 5, the SVM classifier successfully identified a clear linear decision boundary between individuals exhibiting high versus low Community Support Behavior (CSB). This outcome underscores the discriminative power of the selected predictors in distinguishing behavioral engagement profiles.

In comparison, both KNN and K-Means also uncovered meaningful data structures, but their classification boundaries were less defined. Among the three models, SVM demonstrated the highest classification precision, suggesting that the relationship between the predictor set and CSB status is linearly separable in the transformed space.

These findings provide additional empirical support for the study's theoretical framework. They highlight the importance of behavioral, normative, and psychosocial factors in shaping community-oriented outcomes and demonstrate the utility of machine learning approaches in validating latent variable models.

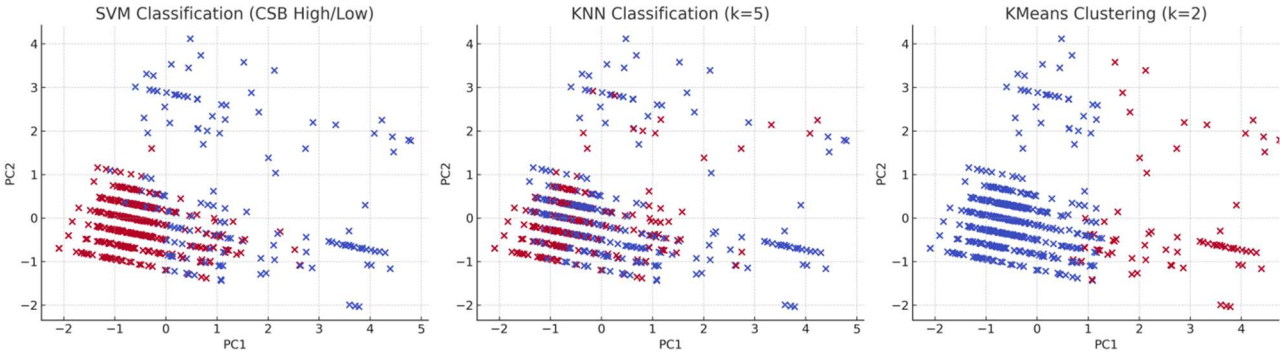


Fig 5. Support Vector Machine (SVM)

4.4. Necessary Condition Analysis (NCA)

Necessary Condition Analysis (NCA) offers a novel methodological approach for exploring complex causal relationships by identifying conditions that are essential—but not sufficient—for an outcome to occur. Unlike traditional regression-based or sufficiency-oriented methods, NCA goes a step further by quantifying the necessity of specific independent variables and determining their effect sizes and threshold constraints (Dul, 2016). It is particularly suited for detecting "necessary but not sufficient" conditions—factors that must be present to enable a desired outcome but do not, on their own, guarantee its occurrence.

As a complement to the sufficiency-based PLS-SEM analysis, NCA provides asymmetrical insights into causal structures by identifying bottlenecks and non-compensatory relationships among variables. Specifically, it answers the question: *What is the minimum level of an antecedent that must be present to achieve a certain level of the outcome?*

In this study, PLS-SEM scores of the latent variables were first generated, following the procedure outlined by Richter et al. (2020). These latent scores served as input for the subsequent NCA, which was conducted using the NCA package in R, in accordance with the methodological guidelines of Dul et al. (2021).

The foundational step of NCA involves plotting a ceiling line—either CR-FDH (ceiling regression–free disposal hull) or CE-FDH (ceiling envelopment–free disposal hull)—on a scatterplot. This line traces the upper-left boundary of the data distribution, indicating the maximum outcome level achievable given a certain level of the predictor. As shown in Figure 6, scatterplots were generated for all relevant bivariate relationships, each displaying the ceiling line that defines the necessary condition space.

Through this approach, the analysis identifies not only which antecedents are non-compensable requirements for achieving high levels of Community Support Behavior (CSB), but also quantifies the effect size (d) of each necessary condition. These findings offer valuable insights into the minimum thresholds that must be met for successful community engagement, serving as critical input for both theoretical refinement and policy design.

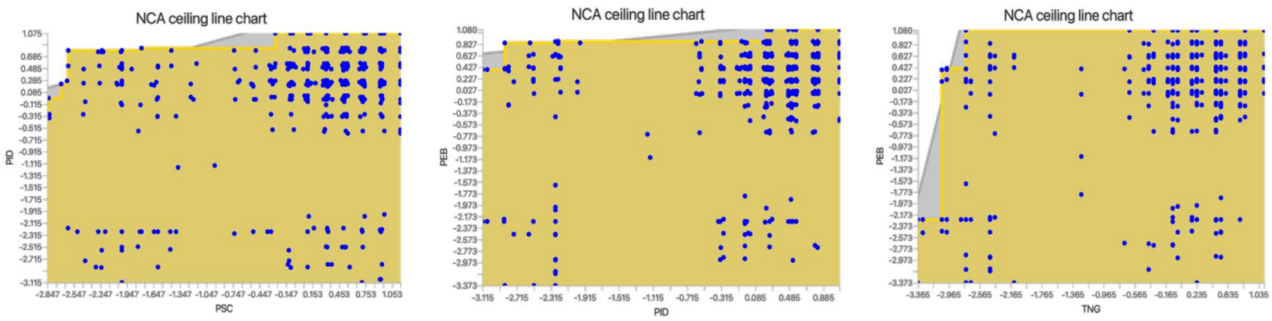


Fig 6 Scatter plots of necessary condition analysis.

Subsequent to the visual inspection of ceiling lines, a statistical significance test was conducted to evaluate the effect sizes (d) of the latent variable scores, following the guidelines proposed by Dul (2016) and Dul et al. (2021). A random permutation procedure with 10,000 resamples was employed to assess the robustness of the necessity relationships.

Given the nature of the data—survey responses measured on a five-point Likert scale—the CE-FDH (Ceiling Envelopment–Free Disposal Hull) line was adopted, as it is well-suited for such ordinal data (see Table 6 for detailed results).

The findings indicate that several latent variables demonstrate statistically significant necessity effects, summarized as follows:

- For Place Identity (PID):
    - Psychological Closeness (PSC) ($d = 0.061$, $p < 0.001$)
    - Nostalgia (NOG) ($d = 0.052$, $p = 0.003$)
- For Psychological Closeness (PSC):
    - Nostalgia (NOG) ($d = 0.034$, $p = 0.002$)
- For Community Support Behavior (CSB):
    - Place Identity (PID) ($d = 0.033$, $p < 0.001$)
    - Psychological Closeness (PSC) ($d = 0.115$, $p < 0.001$)
    - Nostalgia (NOG) ($d = 0.400$, $p < 0.001$)

These results confirm that Nostalgia (NOG) emerges as a consistently necessary condition across multiple outcome variables, with particularly large effect sizes observed in relation to CSB.

To complement the effect size analysis, a bottleneck analysis was conducted to determine the minimum threshold levels of predictor variables required to achieve specific target levels of CSB. As shown in Table 7, the following minimum levels are necessary:

- To achieve 90% of the maximum CSB level:
    - PID ≥ 1.4%
    - PSC ≥ 2.7%

- NOG ≥ 1.6%

- To achieve 100% of the maximum CSB level:
  - PID ≥ 4.1%
  - PSC ≥ 3.2%
  - NOG ≥ 1.7%

These findings offer practical insight into the critical resource levels needed for optimal behavioral outcomes. Notably, even small increases in nostalgia and psychological closeness are required to reach higher levels of CSB, reinforcing their role as necessary but non-compensatory conditions.

Table 6. Necessary condition analysis result (Method: CE-FDH)

Condition inefficiINRy (100%)	Outcome inefficiINRy (100%)	p values	Rel. inefficiINRy (100%)	Abs. inefficiINRy (100%)
		PID		
44.287	77.993	0	87.739	14.687
77.347	54.099	0.003	89.602	16.774
		PSC		
88.02	43.769	0.002	93.263	16.647
		CSB		
30.068	90.507	0	93.361	17.419
38.622	62.579	0	77.032	13.704
87.87	33.549	0	91.939	18.292

Note: ***, $p < 0.001$

Table 7. Bottleneck table (CE-FDH)

CSB	PID	PSC	NOG
0.00%	NN	NN	NN
10.00%	NN	NN	NN
20.00%	NN	NN	NN
30.00%	NN	NN	NN
40.00%	NN	NN	1.3
50.00%	NN	NN	1.367
60.00%	NN	NN	1.433
70.00%	NN	1.6	1.5
80.00%	NN	2.16	1.567
90.00%	1.429	2.72	1.633
100.00%	4.143	3.28	1.7

5. Discussion

5.1. Theoretical Implications

Grounded in Conservation of Resources (COR) theory, this study investigates the underlying mechanisms by which nostalgia influences community support behavior (CSB) in the context of rural tourism. By integrating key constructs—including intergenerational responsibility, psychological closeness, and place identity—the study reveals that intergenerational responsibility plays a mediating role, while psychological closeness and place identity serve as moderators in the nostalgia–CSB relationship (Haipeng Zhao, 2024). These findings extend the theoretical application of nostalgia in tourism research and provide novel insights into tourist decision-making mechanisms.

First, this study contributes to the literature by identifying nostalgia as an antecedent of place identity and psychological closeness, thereby expanding the nomological network of these constructs.

Previous studies have examined place identity and psychological closeness in various contexts (Cao et al., 2021), particularly in relation to community support behavior. However, research focusing on these constructs within the context of nostalgia remains limited. By positioning nostalgia as a critical external stimulus, this study fills a notable gap and deepens our understanding of the formation of sustainable, emotionally driven behaviors in tourism.

Furthermore, this study is among the first to examine how different nostalgic contexts shape the relationships between psychological closeness and place identity. The results indicate that nostalgia significantly enhances both constructs, supporting existing literature (Ajzen & Fishbein, 2000; Park et al., 2024). Notably, in contemporary tourism settings, emotional value is becoming a key factor in driving behavior, and tourists are increasingly influenced by affective experiences rather than cognitive evaluations such as place identity or psychological closeness (Chen et al., 2023). This shift reflects a broader socio-cultural trend in which tourists prioritize individual emotional fulfillment and spontaneous decision-making.

These findings contribute to the growing body of literature on community support behavior by integrating emotional triggers, such as nostalgia, into the behavioral framework. This integration not only highlights the psychological underpinnings of tourists' environmental and community engagement but also aligns with evolving consumer values in the post-pandemic era.

Second, this study reaffirms the significant influence of both place identity and psychological closeness on community support behavior in rural tourism.

In line with prior research (e.g., Zhang et al.; Qu Ying et al.), our findings confirm that tourists' emotional connection to a destination, as reflected in place identity and psychological closeness, meaningfully impacts their willingness to support the local community. However, unlike traditional studies that treat CSB as an outcome of cognitive-affective evaluations, this research situates CSB within the context of nostalgia, emphasizing emotion-driven pathways.

Building on the work of Luo and Ye (2019), who emphasized the structural, relational, and cognitive aspects of emotional response, this study shows how nostalgia amplifies these dimensions, enhancing tourists' concern for environmental and cultural preservation. While prior research (e.g., Kim et al., 2014) has touched on the role of place identity and psychological closeness, this study breaks new ground by embedding these constructs within a nostalgic framework and analyzing them from both sufficiency and necessity perspectives.

Notably, the analysis demonstrates that place identity and psychological closeness serve as necessary conditions, while nostalgia emerges as both a sufficient and necessary condition for triggering CSB (Zhao & Furuoka, 2025). This supports the S-O-R model (Stimulus–Organism–Response) (Ahmad & Zhang, 2020; Cheung & To, 2019), wherein nostalgia acts as the external stimulus, place identity and psychological closeness function as the organism, and CSB represents the response. This conceptualization enriches the theoretical understanding of how emotional, psychological, and environmental variables interact to shape sustainable tourist behaviors.

Third, this study deepens the understanding of how and when nostalgia influences CSB, particularly by introducing environmental concern as a moderating factor.

While earlier studies have largely focused on the direct and mediating effects of place identity and psychological closeness on CSB, they have overlooked the contextual moderators that may enhance or weaken these relationships. This study responds to recent academic calls (Liu et al., 2020) by incorporating environmental concern into the analytical framework.

The results show that environmental concern significantly moderates the relationship between nostalgia and CSB, as well as between psychological closeness and CSB. However, its moderating effect between place identity and CSB is not statistically significant. This suggests that while emotional and perceptual proximity (nostalgia and psychological closeness) can be amplified by environmental awareness, the cognitive evaluation of place identity may operate independently of such concerns.

By investigating both direct and interaction effects, this study offers a multi-layered understanding of how tourists engage in community support behaviors. It also helps explain under what conditions emotional drivers are more or less effective—providing a more nuanced view of CSB formation in nostalgic contexts. This contribution advances the field by moving beyond linear models to explore complex psychological–contextual interactions, which are essential for designing more targeted and effective interventions in sustainable tourism.

5.2. Practical Implications

Based on the findings of this study, several practical implications emerge for tourism management, particularly in promoting Community Support Behavior (CSB) among tourists in rural destinations.

5.2.1 Prioritizing Emotional Value Creation through Place Identity and Psychological Closeness

The first implication highlights the positive impact of place identity and psychological closeness on CSB. Tourism authorities and destination managers should prioritize strategies that cultivate emotional value among tourists. One effective approach involves conducting in-depth market research to better understand the environmental concerns, lifestyle preferences, and value orientations of target tourist segments.

Based on these insights, destination marketers can collaborate with sustainability-focused influencers or environmental advocates who resonate with the values of their audience. In an era increasingly oriented toward sustainable living, tourists are not only looking for eco-friendly destinations but also seeking brands and platforms that mirror their own values. Therefore, beyond showcasing environmental initiatives, tourism platforms should emphasize value alignment, thereby fostering emotional resonance and encouraging deeper, values-driven CSB.

5.2.2 Activating Emotional Resonance at the Early Stages of Behavioral Formation

The second implication addresses the role of emotional factors—particularly place identity and psychological closeness—in initiating CSB. While many tourism stakeholders emphasize raising awareness of environmental protection, this study suggests that emotional activation may be more effective in fostering behavioral change.

Management teams should consider emotionally engaging strategies such as:

- Real-time deployment of green public service advertisements at destinations
- Story-driven messaging that evokes emotional identification with the local environment

- Collaborations with influencers who embody eco-conscious lifestyles and use authentic storytelling to promote behavioral change

Additionally, tourism platforms can integrate interactive features, such as:

- Community discussion forums
- Live chat rooms centered on sustainability topics
- Gamified challenges promoting sustainable actions

These features not only increase social interaction among tourists but also build a sense of community, which can serve as a catalyst for CSB.

5.2.3 Leveraging the Mediating Role of Nostalgia for Behavioral Engagement

The third practical insight pertains to the mediating effect of nostalgia in the relationship between place-based emotions and CSB. Environmental protection is not only a means of resource conservation and cost reduction, but also an emotional driver that enhances tourists' inclination toward sustainable behavior.

To capitalize on this, tourism operators can:

- Feature influencers who share emotionally resonant stories about long-term benefits of sustainability
- Collaborate with experts to offer credible, inspirational content on environmental issues
- Introduce interactive content, such as polls, quizzes, or personal pledges around sustainable themes

By framing environmental protection as emotionally meaningful, tourism platforms can boost tourists' internal motivation to support communities and protect local resources.

5.2.4 Strategically Applying Environmental Concern as a Contextual Moderator

The final implication concerns the moderating role of environmental concern in the effect of place identity and psychological closeness on CSB. Findings indicate that the effectiveness of environmental concern varies depending on tourists' pre-existing perceptions and expectations of the local environment.

Destination managers should:

- Segment tourist audiences based on their environmental concern levels
- Tailor communication strategies to different audience segments
- Invite diverse influencers—from various demographic and cultural backgrounds—to promote eco-friendly behaviors in culturally relevant ways

By strategically leveraging environmental concern, tourism organizations can enhance the emotional and psychological impact of their messaging. This allows them to maximize the influence of place identity and psychological closeness on CSB and develop more targeted and effective interventions that resonate with different tourist groups.

6. Limitations

Despite its contributions, this study is not without limitations, which provide valuable directions for future research.

First, the empirical investigation was conducted exclusively with Chinese tourists within the context of nostalgia-driven rural tourism, potentially limiting the generalizability of the findings to other cultural or geographic contexts. Future research should replicate and extend this model using culturally and demographically diverse samples, allowing for cross-cultural comparisons and broader applicability of the theoretical framework.

Second, although grounded in well-established theoretical foundations, this study employed a cross-sectional survey design, which may introduce the risk of common method variance. To mitigate this issue in future studies—particularly in research on Place Identity (PID) and Psychological Closeness (PSC) in the context of Nostalgia (NOG)—researchers are encouraged to adopt longitudinal designs, collect data across multiple time points, and incorporate distractor items or methodological triangulation to improve measurement robustness.

Third, the present study examined the antecedents of PID and PSC primarily through the lens of perceived value. While this offers initial insights, future studies may explore alternative perspectives—such as emotional, cultural, or experiential factors—to better understand the development of PID and PSC among tourists exposed to nostalgic environments.

Finally, while PID and PSC were identified as key psychological conditions facilitating pro-environmental and community support behaviors, further research could investigate different combinations or configurations of antecedents and outcomes. For instance, employing complexity theory and fuzzy-set Qualitative Comparative Analysis (fsQCA) may reveal nonlinear causal pathways, equifinal outcomes, and alternative routes to achieving sustainable behavioral engagement. Such approaches could equip destination managers and platform decision-makers with more tailored, resource-efficient, and context-sensitive strategies for encouraging sustainability in tourism settings.

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