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Individuals' Social Identity and Pro-Environmental Behaviors: Cross-Cultural Evidence from 48 Regions

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Abstract: Individual pro-environmental behaviors (PEBs) are essential for addressing critical global environmental challenges. Drawing on the social identity approach, this study examines how different types of social identity (including world, national, regional, and city identities) influence individuals' engagement in PEBs. Using data from the seventh wave of the World Values Survey (2017–2022), which includes responses from 60,577 participants across 48 regions, a hierarchical linear model was used to analyze these relationships. The results show that world identity has a stronger effect than city, national, or regional identity on green orientation and subsequently on PEBs, emphasizing environmental sustainability as a global priority. Moreover, previous cross-cultural research has focused on individualistic and collectivistic cultures. Our study introduces a novel perspective to the existing literature by examining the moderating effect of long-term versus short-term societal orientations. The findings indicate that long-term cultural orientations strengthen the influence of green orientation on PEBs. This study provides actionable insights for researchers, practitioners, and policymakers seeking to develop culturally sensitive strategies to promote sustainable behaviors.

Keywords: individual pro-environmental behaviors; green orientation; social identity; world identity; long-term and short-term orientation; cross-cultural analysis

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1. Introduction

The issues of global warming and ecosystem degradation are becoming increasingly critical, and the conventional environmental protection policies are no longer sufficient to address these challenges [1]. The implementation of individual pro-environmental behaviors (PEBs), such as recycling, reducing energy usage, and adopting sustainable consumption habits, has become a crucial long-term strategy for achieving effective results [2]. While governmental regulations and organizational policies contribute substantially to the development of broader environmental strategies, individual actions are critical to the efficacy of these strategies [3,4]. This is not only because individuals contribute directly to sustainability efforts, but also because they form the basis for broader organizational and policy actions [4]. While organizational initiatives and policy frameworks are of great consequence, their efficacy is often contingent upon the proclivity of individuals to embrace sustainable practices [1,5]. This underscores the significance of elucidating the social and psychological factors that motivate individual PEBs, making it a pivotal area of inquiry in the context of global sustainability. Consequently, an understanding of the underlying motivations and influences on these behaviors has become a central area of environmental psychology [3,6]. The social identity approach provides a valuable framework for examining how group affiliations and social categorizations influence behavior [7]. This approach is particularly relevant for exploring PEBs, as it addresses how individuals' sense of belonging to social groups and their alignment with group norms can drive their commitment to environmental sustainability [8,9].

The social identity approach posits that individuals derive their sense of self-identity from social groups and that the behavioral norms of the group exert a direct influence

on individual behavior [10]. Thus, when an individual identifies with a particular social group, the individual tends to adopt the behaviors advocated by the group, one of which is environmental protection [11]. In the context of PEBs, individuals who strongly identify with groups that value environmental responsibility are more likely to adopt sustainable behaviors consistent with those values [12]. For example, individuals with a robust environmental identity or membership in groups that prioritize sustainability may feel an intrinsic motivation to engage in PEBs, aligning with group norms that emphasize environmental stewardship [13,14]. Additionally, the approach highlights that group influence is context-dependent, and the salience of specific identities, such as national, community-based, or environmental identities, can shift based on social norms, perceived threats, or other contextual factors [7,8].

The majority of cross-cultural studies have concentrated on comparing collectivist and individualist societies with regard to social identity and PEBs [15–17]. For example, research has demonstrated that regional culture serves as a significant amplifier of the influence of individual social identity on PEBs [18]. Furthermore, when global environmental issues are framed as collective responsibilities, individuals in collectivist cultures may be more inclined to engage in PEBs, as these align with the values of cooperation and group welfare [19].While studies have examined the influence of cultural dimensions on environmental behavior, few have conducted a comprehensive analysis of how long-term versus short-term cultural orientations moderate this relationship. Given that environmental behavior is essentially an investment in future environmental sustainability, the differing emphases on the future among different cultures may exert a significant influence on individuals' PEBs [20,21]. Long-term-oriented cultures focus on future planning and persistence, which may align closely with sustainability values [22]. Conversely, short-term-oriented cultures tend to focus on immediate outcomes, which may result in weaker alignment with PEBs [23]. This perspective on temporal orientation remains underexplored, limiting our understanding of how cultural factors shape the influence of social identity on PEBs across various societies.

This study aims to address the aforementioned research gap by exploring the influence of social identity and cultural orientation on PEBs. The study focuses on two key questions: (1) How do long-term and short-term cultural orientations moderate the effects of social identity on PEBs across cultures? (2) Are there differences in the effects of different forms of social identity (e.g., city, world identity, etc.) on PEBs?

This research has the potential to contribute to both theoretical and practical discourse. By applying the social identity approach across diverse cultural orientations, this study expands the theoretical foundation of PEBs research, exploring the influence of long-term and short-term cultural orientations on individuals' engagement in PEBs. Furthermore, the findings provide actionable insights for policymakers and environmental advocates, particularly in the design of culturally adaptive strategies that promote PEBs. By recognizing that the motivational basis for PEBs may vary significantly across temporal orientations, this research offers an evidence-based foundation for the development of interventions that resonate with distinct cultural values. This study may contribute new insights into the fostering of sustainable actions that align with both local and global environmental goals.

2. Literature Review and Hypothesis Development

2.1. Social Identity Approach

The social identity approach (SIA) [24], which includes social identity theory (SIT) [25] and self-categorization theory (SCT) [26], provides a multifaceted framework for understanding how individuals form social identities through group affiliations, which then influence their behaviors and attitudes. In SIT, individuals derive a sense of self from their membership in social groups ranging from local communities to national identities to global affiliations [25]. This membership fosters alignment with the values and norms of each group, as individuals seek to maintain a positive social identity that reflects these shared standards. The SCT complements SIT by emphasizing that individuals categorize

themselves within particular groups according to context, thereby shifting the salience of particular identities [26].

Within this framework, the notion of "superordinate" or higher-level identities becomes particularly relevant. SCT proposes that individuals may hold multiple, hierarchical social identities, with broader group affiliations (e.g., national or global identities) often taking precedence over more localized identities [27,28]. This higher-level identity has implications for behaviors and attitudes that transcend regional boundaries, especially in contexts where individuals recognize their role within a larger, interconnected community [29]. For example, employees or citizens who see themselves as part of a global or multinational community may adopt behaviors that align with the broader goals of these larger groups, prioritizing actions that benefit the collective good [28,30]. This hierarchical identity structure, which emphasizes higher-level affiliations, plays a critical role in promoting behaviors that contribute to common social or environmental goals [29]. The SIA thus provides a comprehensive theoretical foundation for understanding the layers of social identities that individuals hold and how these hierarchies influence behavior [9]. By examining how individuals categorize themselves in response to different social contexts and norms, this approach offers insights into how individuals' identification with larger, more inclusive groups (e.g., global or environmental movements) can drive behaviors that serve collective interests [12,24]. This framework is particularly useful for analyzing behaviors, such as PEBs, that are inherently linked to shared social goals and benefits across communities and regions [12,29].

2.2. Social Identity and Pro-Environmental Behaviors

PEBs are not just individual preferences; they often reflect group identity [31]. Individuals who identify with groups that prioritize environmental responsibility (e.g., community organizations, national bodies, or global citizens) tend to engage in behaviors that are consistent with the environmental standards of these groups [32]. The SIA posits that the stronger an individual perceives their group's value of sustainability, the more likely they are to adopt PEBs in accordance with these norms [33]. This relationship is especially evident when considering the influence of superordinate identities [28]. The extant literature demonstrates that individuals who identify with broader social groups, such as national or global communities, tend to prioritize actions that benefit the wider collective [15]. For instance, employees who identify with a multinational or global organization are frequently more active in PEBs because they perceive their actions as contributing to a shared global mission [29,30]. Similarly, individuals who view themselves as part of a larger environmental movement or as "global citizens" may be more likely to engage in PEBs, motivated by a sense of responsibility to protect global resources and ecosystems [15]. This alignment between identity and behavior suggests that individuals with a stronger sense of global identity may adopt PEBs with greater consistency, reflecting the values they associate with these inclusive groups [9,33]. Therefore, the following hypothesis was proposed:

H1. *World identity is much more conducive to engagement in PEBs than city identity, regional identity, and national identity.*

2.3. The Mediating Role of Green Orientation

Green orientation, defined as an individual's predisposition to prioritize environmental values and sustainable practices, may be an important mediator in the association between social identity and PEBs [15]. The extant literature indicates that individuals with a strong green orientation are more likely to engage in behaviors that support environmental sustainability, viewing their actions as part of a broader commitment to ecological well-being [34,35]. This orientation is often reinforced through social identity processes, where identifying with environmentally conscious groups enhances one's commitment to environmental values [9]. For instance, individuals who align themselves with communities or organizations dedicated to sustainability are likely to cultivate a green orientation, which

in turn motivates them to adopt PEBs [15]. Jang et al. [36] indicated that an individual's propensity to promote environmental sustainability is positively correlated with their level of green orientation. Prior research has demonstrated that prioritizing environmental issues over economic concerns is a critical factor in motivating individuals to engage in supportive environmental actions [35,37].

Furthermore, the findings of the research indicated that the role of world identity is more evident in this context. Individuals who identify with a broader social category, such as humanity or the global society, tend to develop a stronger green orientation [15,32]. This broader identity encourages individuals to view their environmental actions as part of a collective effort toward global sustainability, thereby strengthening their commitment to environmental impact [38,39]. Research has indicated that when individuals feel a sense of belonging to a larger group, they are more likely to engage in PEBs, driven by a sense of responsibility to contribute to the common good [40,41]. In contrast, local identities (e.g., city, region, or country identities) may also exert an influence on green orientation, but they may not always elicit the same level of commitment to global environmental issues [28,42]. While local identities can motivate community-specific actions, they may lead to a more limited perspective on sustainability, often focusing on immediate surroundings rather than the broader implications of individual actions [29,43]. A study in Chile, for example, shows a disconnect between public policy and environmental conservation in Chile. Most environmental conflicts in Chile are caused by energy production and mining [44]. When people identify with a national identity, they may emphasize the economy at the expense of the environment. This distinction suggests that world identity may foster a more comprehensive understanding of environmental sustainability, promoting behaviors that align with global goals. Therefore, we hypothesized the following:

H2. *World identity is much more conducive to an individual's green orientation, and thus to their involvement in PEBs, than city, regional, and national identities.*

2.4. The Moderating Role of Cultural Long-Term Versus Short-Term Orientations

The long-term and short-term orientations of a society may play a pivotal role in moderating the relationship between green orientation and PEBs. These orientations are deeply embedded in cultural values that shape how individuals prioritize their actions and goals, exerting a significant influence on their engagement in sustainable practices [22].

Long-term-oriented cultures emphasize future planning, perseverance, and the importance of sustainable development [45]. These cultural values align with the principles of green orientation, making it easier for individuals to translate their environmental values into consistent PEBs [46]. In such cultures, individuals are more likely to prioritize environmental sustainability over immediate gratification, as their values align with long-term ecological benefits [47]. Research conducted by Hofstede [48] indicated that long-term-oriented societies demonstrate a heightened commitment to sustainability and environmental stewardship, as their cultural norms strongly endorse pro-environmental values. For instance, individuals in these cultures frequently report a stronger sense of interconnectedness and responsibility towards global environmental concerns [46]. This perspective is rooted in the understanding that sustainable practices benefit both their immediate communities and future generations, making these individuals more inclined to engage in PEBs.

In contrast, short-term-oriented cultures tend to focus on immediate rewards and tangible benefits over long-term sustainability [23]. This focus on the present can weaken the link between green orientation and PEBs, as individuals may find it challenging to act on their environmental values when faced with competing short-term incentives [20]. To illustrate, the pursuit of PEBs may be perceived as a potential conflict with current pleasures, such as the additional expense of purchasing green products or lifestyle changes like eating less meat [49,50]. In cultures where a short-term orientation is prevalent, these immediate sacrifices may lead to a reduction in motivation to adopt sustainable behaviors [22]. The

cultural context in these societies may not provide sufficient reinforcement for long-term ecological commitments, leading to inconsistencies between individuals' green orientation and their PEBs [51,52].

The relationship between green orientation and PEBs may be moderated by social orientation. Long-term-oriented cultures encourage individuals to consistently translate green orientation into concrete actions, whereas short-term-oriented cultures often inhibit this relationship due to competing short-term incentives. In long-term-oriented societies, green orientation becomes a stronger predictor of PEBs due to the synergy between individual values and cultural norms [52,53]. Conversely, in short-term-oriented societies, the potential of green orientation to drive PEBs is diminished, necessitating targeted interventions that address immediate motivators while still emphasizing environmental sustainability. Therefore, the following hypothesis was proposed:

H3. *The societal long-term versus short-term orientations moderate the relationship between green orientation and PEBs. The positive effect of green orientation on PEBs is more pronounced in long-term (versus short-term) oriented societies.*

The specific research framework is shown in Figure 1.

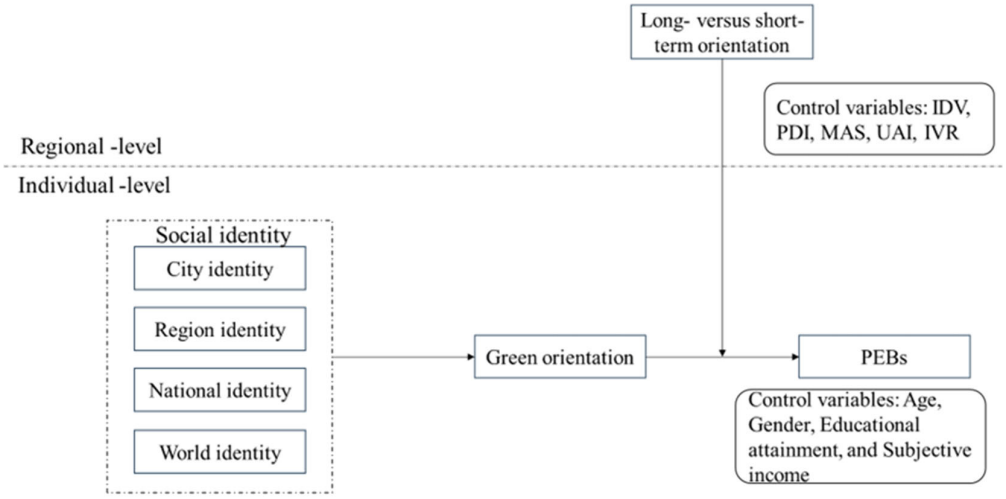

Figure 1. Research frame.

3. Method

3.1. Dataset

The data for this study are sourced from the World Values Survey (WVS), a global survey initiative that collects representative data from approximately 100 nations to explore the values, beliefs, and social norms of individuals [54]. We utilized the 7th wave of the WVS, which encompasses the years from 2017 to 2022 [54]. The dataset is instrumental in examining the relationships between social identity, PEBs, and cultural orientations across diverse contexts. The WVS's broad geographic scope and rigorous methodology ensure that our findings are both relevant and representative of contemporary global trends. The regions included in the analysis were chosen according to the accessibility of both individual-level and region-level data. After the exclusion of regions with missing values on the relevant items, the final dataset comprised 60,557 individuals across 48 regions. This procedure ensures the robustness and reliability of the data while maintaining the integrity of the cross-regional comparison. Appendix A provides details on the number of individuals surveyed in each region. These 48 regions cover approximately 60 percent of the global population, ensuring that the results are broadly representative and highly generalizable.

3.2. Individual-Level Variables

Social identity was measured using four items from the WVS, each of which assessed how respondents perceived themselves in relation to different social identities. The question asked, "How close do you feel to your city (or region, country, world)?" Answers were recorded on a four-point scale (1 = very close to 4 = not at all close). To ensure consistency, items were reverse-coded so that higher scores indicated a greater degree of identity with the respective social community.

Following previous studies [15], green orientation was gauged by a question that assessed respondents' prioritization of profit-driven growth versus the preservation of the natural environment. This question asked, "Which of the statements comes closer to your own point of view?" Responses prioritizing environmental protection were scored as 1, while those prioritizing economic growth were scored as 2. This item was reverse-coded so that higher scores indicated a stronger preference for green orientation.

In line with previous studies [55], PEBs were gauged based on respondents' voluntary involvement in environmental organizations. Respondents were queried on their membership status in environmental organizations and, if applicable, whether they were inactive or active members. Responses were coded as 0 (not a member), 1 (inactive member), and 2 (active member). Prior research [15,56,57] has indicated that single-item measures can be an effective method of assessment and are not inherently worse than multiple-item measures, particularly if the construction is tightly defined with a high degree of clarity.

At the individual level, a series of control variables were employed, including age, gender, educational attainment, and subjective income level.

3.3. Region-Level Variables

Individual-level data were matched with regional long-term orientation (LTO) scores obtained from Geert Hofstede's website to test the moderating effect of societal long-term versus short-term orientation (https://www.hofstede-insights.com/product/compare-countries/ (accessed on 16 October 2024)). The researchers [58] proposed a framework that identifies six principal dimensions of societal culture broadly used in previous studies [59,60]. To control for potential confounding variables, the remaining five cultural constructs, individualism (IDV), power distance index (PDI), motivation towards achievement and success (MAS), uncertainty avoidance index (UAI), and indulgence (IVR), were considered at the regional level as control variables for broader cultural influences that may affect the relationship between social identity and PEBs. This ensures that the observed relationships are not confounded by other cultural factors.

3.4. Hierarchical Linear Modeling Method

Hierarchical linear modeling (HLM) is an appropriate statistical approach for this study because it accounts for the nested structure of the data, where individual-level variables (e.g., social identity, green orientation, PEBs) are nested within regional-level contexts characterized by cultural dimensions such as LTO [61]. It is possible that traditional regression models may not adequately address the dependencies among individuals within the same region, which could result in biased estimates. In contrast, HLM permits the simultaneous examination of individual- and regional-level predictors while accounting for between-region variability [61,62]. This multilevel approach is especially valuable for investigating cross-level interactions, such as the moderating effect of LTO on the relationship between world identity, green orientation, and PEBs (see Figure 1). This ensures robust and accurate inferences in a multilevel framework. The statistical analysis of the data was conducted using Stata 15.

4. Results

4.1. Correlation Analysis

As shown in Table 1, city ($r = -0.003$), regional ($r = -0.020$, $p \leq 0.01$), national ($r = -0.018$, $p \leq 0.01$), and world identity ($r = 0.069$, $p \leq 0.01$) were all correlated with PEBs, but at relatively

low levels. Green orientation ($r = 0.057$, $p \leq 0.01$) also exhibited a positive association with PEBs. The results suggest that world identity is a more effective predictor of PEBs compared to other identities. Among control variables, age ($r = -0.037$, $p \leq 0.01$), gender ($r = -0.021$, $p \leq 0.01$), and education ($r = 0.008$) displayed weaker associations.

Table 1. Descriptive statistics and correlation analysis.

First-Level	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 City identity	3.368	0.735	1									
2 Region identity	3.192	0.807	0.647 **	1								
3 National identity	3.272	0.793	0.457 **	0.571 **	1							
4 World identity	2.496	0.976	0.210 **	0.303 **	0.395 **	1						
5 PEBs	0.200	0.524	−0.003	−0.020 **	−0.018 **	0.069 **	1					
6 Green orientation	1.604	0.489	−0.026 **	−0.036 **	−0.003	0.031 **	0.057 **	1				
7 Gender	1.518	0.499	−0.007	−0.010 **	−0.025 **	−0.008 *	−0.021 **	0.021 **	1			
8 Age	43.551	16.422	0.027 **	0.035 **	0.080 **	−0.025 **	−0.037 **	−0.022 **	−0.030 **	1		
9 Income	4.951	2.072	0.022 **	0.025 **	0.026 **	0.050 **	0.007	−0.001	−0.028 **	−0.080 **	1	
10 Education	3.622	2.008	−0.058 **	−0.032 **	0.004	0.022 **	0.008	0.084 **	−0.023 **	−0.090 **	0.282 **	1
Second-Level	**Mean**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**				
1 IDV	40.370	23.881	1									
2 PDI	66.369	21.323	−0.527 **	1								
3 MAS	51.370	15.713	0.090 **	0.168 **	1							
4 UAI	62.724	22.011	0.124	0.313 **	−0.017 **	1						
5 LTO	42.069	22.283	0.551 **	−0.153 **	0.110 **	−0.168 **	1					
6 IVR	48.447	23.274	0.271 **	−0.225 **	0.302 **	−0.008	−0.190 **	1				

Note: ** $p \leq 0.01$; PEBs = pro-environmental behaviors; LTO = long-term orientation; PDI = power distance index; IDV = individualism; MAS = motivation towards achievement and success; UAI = uncertainty avoidance index; IVR = indulgence.

At the regional level, LTO demonstrated significant positive correlations with IDV ($r = 0.551$, $p \leq 0.01$) and MAS ($r = 0.110$, $p \leq 0.01$), while showing negative correlations with PDI ($r = -0.153$, $p \leq 0.01$) and IVR ($r = -0.190$, $p \leq 0.01$).

4.2. Hypothesis Testing

The HLM analysis was conducted with individual-level variables (social identity forms, green orientation, and PEBs) and control variables (gender, age, income, and education) at the first level and regional-level variables (LTO, PDI, IDV, MAS, IVR and UAI) at the second level.

Table 2 presents the HLM results, starting with Model 1, where green orientation was entered as the dependent variable and control variables were included as predictors. Subsequently, the independent variables (city, regional, national, and world identities) were added in Model 2, followed by the inclusion of regional-level cultural dimensions (LTO, PDI, IDV, UAI, IVR, and MAS) in Model 3. The same stepwise approach was applied to PEBs. In Model 4, control variables were entered as predictors, followed by the independent variables in Model 5. Green orientation and regional-level cultural dimensions were then added in Model 6, and cross-level interactions (green orientation × LTO) were tested in Model 7. This systematic approach ensured that the mediating and moderating effects were evaluated in a clear and incremental manner. In HLM, the Akaike information criterion (AIC) is employed to assess the relative fit of competing models. Lower AIC values indicate superior model fit. For the dependent variable PEBs, Model 7 exhibits the lowest AIC, thereby indicating that it provides the optimal fit among the tested models.

The HLM results (Table 2) show that world identity significantly predicted PEBs (Model 5: $\beta = 0.038$, $p < 0.001$; Model 7: $\beta = 0.036$, $p < 0.001$). In contrast, national identity had a significant negative effect on PEBs (Model 5: $\beta = -0.011$, $p < 0.01$; Model 7: $\beta = -0.010$, $p < 0.01$), while city and regional identities were non-significant. These findings support Hypothesis 1, indicating that world identity has a stronger positive impact on PEBs compared to other levels of geographic identity.

Table 2. Results of model testing.

	Green Orientation			Pro-Environmental Behaviors			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Constant	1.560 ***	1.560 ***	1.568 ***	0.201 ***	0.209 ***	0.155 ***	0.170 ***
	(0.017)	(0.017)	(0.016)	(0.023)	(0.025)	(0.020)	(0.021)
Control variables							
Gender	0.015 **	0.014 **	0.015 **	−0.018 **	−0.018 **	−0.018 **	−0.019 **
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)
Age	−0.010 *	−0.010 *	−0.011 *	−0.005	−0.005	−0.004	−0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Education	0.051 ***	0.049 ***	0.049 ***	0.018 **	0.017 **	0.016 *	0.016 **
	(0.005)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)
Income	−0.010 **	−0.011 **	−0.011 **	0.009 *	0.007	0.009 *	0.007
	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Independent variables							
City identity		0.002	0.002		0.007		0.007
		(0.004)	(0.004)		(0.004)		(0.004)
Region identity		−0.003	−0.003		−0.004		−0.004
		(0.004)	(0.004)		(0.004)		(0.005)
National identity		0.010 *	0.010 *		−0.011 **		−0.010 **
		(0.004)	(0.004)		(0.004)		(0.004)
World identity		0.018 ***	0.018 ***		0.038 ***		0.036 ***
		(0.005)	(0.005)		(0.007)		(0.006)
Green orientation						0.027 **	0.027 **
						(0.010)	(0.010)
Regional culture							
LTO			0.026			−0.007	0.005
			(0.020)			(0.025)	(0.027)
PDI			0.003			0.068 **	0.061 *
			(0.018)			(0.023)	(0.024)
IDV			0.010			−0.081 **	−0.094 **
			(0.023)			(0.029)	(0.030)
MAS			−0.013			−0.022	−0.027
			(0.015)			(0.019)	(0.020)
UAI			−0.028			−0.027	−0.030
			(0.017)			(0.022)	(0.023)
IVR			0.036 *			0.059 **	0.068 **
			(0.017)			(0.021)	(0.022)
Green orientation × LTO							0.022 **
							(0.010)
AIC	81,668.64	81,321.91	81,323.39	88,184.05	87,442.08	87,960.24	87,252.38

Note: Standard errors in parentheses; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; LTO = long-term orientation; PDI = power distance index; IDV = individualism; MAS = motivation towards achievement and success; UAI = uncertainty avoidance index; IVR = indulgence; AIC = Akaike information criterion.

Green orientation significantly predicted PEBs (Model 6: $\beta = 0.027$, $p < 0.01$), confirming its mediating role. Additionally, world identity had a significant positive effect on green orientation (Model 2: $\beta = 0.018$, $p < 0.001$; Model 3: $\beta = 0.019$, $p < 0.001$), while national identity had a smaller positive effect (Model 2: $\beta = 0.010$, $p < 0.05$). City and regional identities were not significant predictors of green orientation. These results support Hypothesis 2, demonstrating that green orientation mediates the association between world identity and PEBs.

The interaction term between green orientation and LTO was significant (Model 7: $\beta = 0.022$, $p < 0.01$), indicating that the effect of green orientation on PEBs is moderated by societal long-term versus short-term orientations (see Figure 2). Specifically, the relationship was stronger in long-term-oriented societies. This supports Hypothesis 3, confirming the moderating effect of LTO on the green orientation and PEBs relationship.

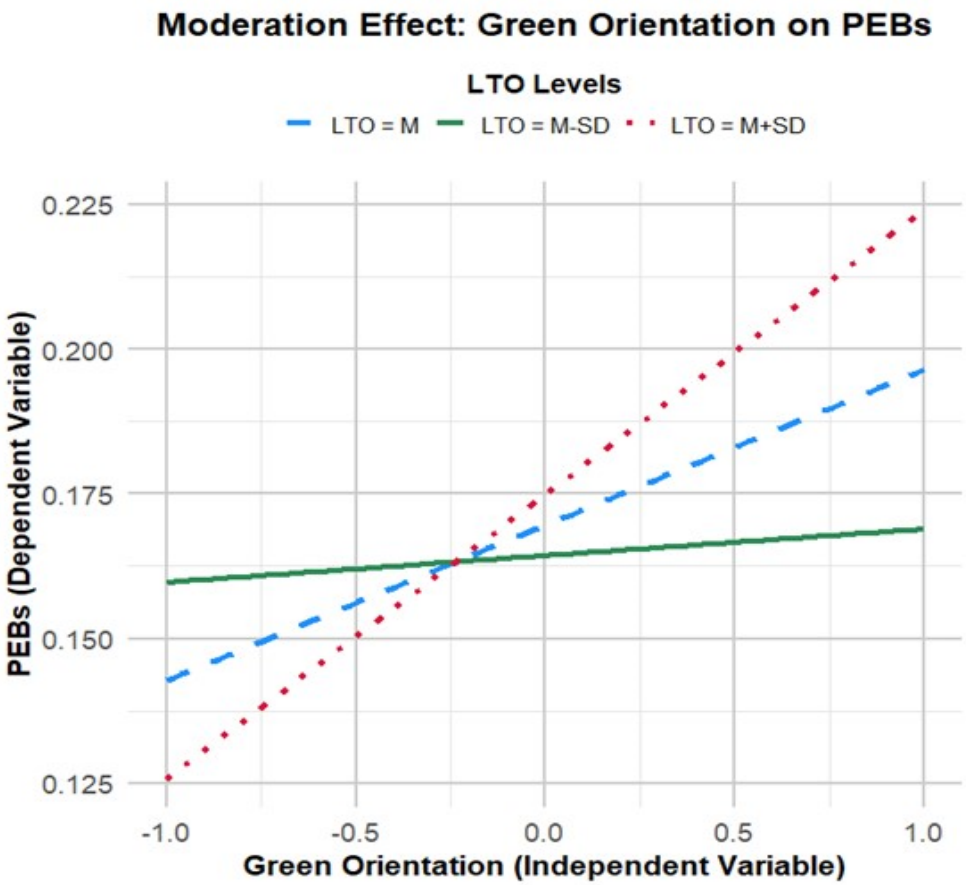

Figure 2. The moderation effect of long-term orientation.

5. Discussion

5.1. General Discussion

This study analyzed data from 60,557 respondents across 48 regions, thereby providing robust evidence for the generalizability of its findings. By employing this comprehensive, cross-cultural dataset, the study offers invaluable insights into the interrelationships between social identity, green orientation, and PEBs, while also underscoring the moderating influence of societal long-term versus short-term orientations. The findings resolve inconsistencies in prior research and provide a more expansive view of the ways in which global and cultural factors influence environmental engagement.

The results indicated that world identity had the most significant positive impact on both green orientation and PEBs compared to city, regional, and national identities. This finding is consistent with prior research indicating that broader, higher-level identities facilitate collective action and enhance a sense of global responsibility [28,29,43]. The positive impact of world identity aligns with the social identity approach, which suggests that higher-level identities, such as global or world identity, encourage individuals to act for the benefit of larger social groups [30]. For example, some studies have shown that individuals who identify with a global identity have a stronger sense of personal responsibility for the environment. Thus, they show greater support for environmentally friendly products and engage in more PEBs [30,43]. These findings also support prior research indicating that global identity is a critical factor in addressing transnational challenges such as climate change because it provides beliefs about environmental justice and motivates individuals to engage in PEBs [29]. In contrast, national identity demonstrated a modest positive effect on green orientation but a negative relationship with PEBs, potentially reflecting conflicts between national priorities and global environmental goals. This finding

is consistent with previous research that has highlighted tensions between local and global commitments [44,63,64].

5.2. Mediating Effect of Green Orientation

The results confirm the mediating role of green orientation. The results demonstrate that world identity has a significant impact on green orientation, which in turn is a strong predictor of PEBs. This mediation highlights the importance of fostering environmental values that could shape individuals' understanding of the environmental implications of their actions, as individuals who prioritize environmental concerns over economic ones are more likely to engage in PEBs [51]. When individuals identify with global environmental values, they may internalize specific guidelines or norms that inform their behavior [6]. Previous studies have similarly noted the importance of value-based frameworks in linking identity to environmental action [42,52]. Our findings extend this line of research by demonstrating that global identification fosters these environmental values, highlighting the importance of world identity in shaping PEBs.

5.3. Moderating Effect of Long-Term Orientation

The findings support the hypothesis that societal orientations serve as a moderating influence. Long-term orientation served to accentuate the positive correlation between green orientation and PEBs, thereby underscoring the pivotal role of future-oriented cultural values in reinforcing environmental commitment [23]. In long-term-oriented societies, individuals are more likely to internalize green orientation and act upon it because their cultural norms already reinforce future-focused, sustainable thinking [22,47]. In contrast, this relationship was weaker in short-term-oriented societies, which prioritize immediate benefits and are less likely to emphasize sustainability [22]. These results align with those of previous studies on cultural dimensions, which suggest that long-term-oriented societies provide a supportive context for pro-environmental values and behaviors [45–47]. Our study contributes to this literature by bridging these cultural perspectives with the social identity framework, offering a more comprehensive view of the role of cultural context. It is also essential to consider factors such as educational attainment and policy frameworks when analyzing PEBs across different regions. Higher education levels often correlate with increased environmental awareness, which may amplify the effects of green orientation on PEBs [65,66]. Furthermore, policy frameworks that support sustainability initiatives, such as environmental regulations and incentives, can influence PEBs by providing the necessary infrastructure and incentives for sustainable behavior. The relationship between cultural orientation and these factors may be complex. Education and policy frameworks have the potential to enhance the effects of long-term orientation. In contrast, in short-term-oriented cultures, immediate, tangible incentives may be more effective in driving environmental behaviors [46,67].

5.4. Theoretical Implications

This study makes several contributions to the literature on the social identity approach, environmental psychology, and cross-cultural research.

First, this study presents significant evidence for the influence of social identity on PEBs through the utilization of a substantial and diverse cross-cultural dataset, comprising over 60,000 respondents across 48 regions. While prior research has highlighted the motivational power of global and superordinate identities in fostering collective action [30,43], this study confirms the distinct role of world identity in promoting PEBs, compared to city and regional identities, across diverse cultural contexts. These findings align with the social identity approach, which emphasizes that identification with larger, inclusive groups fosters behaviors that prioritize collective benefits [9]. Additionally, our results demonstrate that world identity resonates strongly in cross-cultural settings, providing further evidence of its broad applicability and representativeness for understanding global environmental engagement.

Second, this study provides valuable insight into the impact of social identity on PEBs, demonstrating the mediating role of green orientation. Specifically, world identity fosters a value-driven framework, green orientation, that prioritizes environmental protection over competing considerations, such as economic growth. This, in turn, significantly predicts PEBs, suggesting that green orientation acts as a complementary pathway linking identity to behavior. By highlighting this mediating role, the study provides a nuanced perspective on the identity–behavior link, reinforcing the importance of fostering environmental values alongside global identification to maximize behavioral outcomes [8,28].

Third, this study incorporates societal long-term orientation as a cultural moderator, thereby providing a cross-cultural perspective on the manner in which societal values shape individual behavior. The significant interaction between green orientation and long-term orientation demonstrates that cultural context strengthens or weakens the link between environmental values and behavior. This finding contributes to the growing recognition of the interplay between individual and cultural factors, offering a nuanced perspective that integrates identity, values, and societal orientations [45].

5.5. Practical Implications

The findings provide actionable insights for policymakers, organizations, and environmental advocates. The influence of world identity indicates that global environmental campaigns should prioritize shared challenges and collective responsibilities [68]. Therefore, messages should be structured around the concepts of global citizenship and the interconnectivity of environmental issues [28]. This approach can foster a sense of world identity and motivate individuals to engage in collective action. For example, international campaigns, such as those conducted by countries or global non-profit organizations, can utilize visuals and narratives that emphasize the global impact of local actions, such as reducing carbon footprints or participating in PEBs [69,70].

The mediating role of green orientation highlights the significance of fostering environmental values in conjunction with global identification. Educational institutions, such as schools and universities, can integrate sustainability-focused curricula that link global challenges with personal responsibilities, thereby fostering both world identity and green orientation from an early age [65,66]. In the context of the workplace, organizations can implement sustainability programs that encourage employees to align their personal and professional values with environmental goals, thereby promoting green orientation in professional settings [71,72].

The moderating effect of societal long-term versus short-term orientations highlights the necessity for culturally tailored strategies. In long-term-oriented societies, campaigns and interventions should prioritize aligning future-oriented values with sustainable behaviors [22]. For example, these societies may respond favorably to messages that emphasize the long-term benefits of environmental actions, such as ensuring resources for future generations or mitigating climate risks [46]. In contrast, in societies with a short-term orientation, where the focus is on immediate rewards, interventions should prioritize tangible, short-term incentives to encourage PEBs. For instance, cost savings from energy-efficient appliances or subsidies for renewable energy installations provide immediate financial benefits, while discounts on environmentally friendly products or services can drive short-term consumer behavior changes in order to overcome immediate barriers to PEBs [20,67].

5.6. Research Limitations and Future Perspectives

Although this study offers valuable findings regarding the relationships between social identity, green orientation, and PEBs, it also presents limitations that require acknowledgment and suggest potential avenues for future study. First, this study employed single-item measures for several key constructs. Although single-item measures are beneficial for large-scale studies and ensure comparability across diverse regions, they may not fully capture the complexity of these constructs. The study's large sample size and cross-cultural scope provide high external validity, but internal validity may be limited due

to the correlational nature of the data. To address these limitations, future research could employ multi-item scales to measure social identity and other constructs. Furthermore, future research could utilize experimental designs to manipulate variables such as green identity, thereby providing stronger causal evidence of the relationships between social identity and PEBs [73]. Additionally, longitudinal studies could track changes in identity and green orientation over time to better establish causal sequences and assess the long-term effects of these factors on PEBs. This would enable stronger causal inferences and a more precise understanding of the mechanisms driving PEBs.

Second, this study employs a cross-cultural sample of 48 regions, thereby ensuring generalizability but potentially overlooking within-culture variations in identity and environmental engagement. Future studies could integrate big data analytics to explore intra-national differences and uncover more nuanced patterns. For instance, regional or demographic subgroups within countries could be examined to gain insight into how local cultural norms and socio-economic factors interact with identity and green orientation.

Third, this study focused exclusively on geographic social identities (city, regional, national, and world). Extending this framework to encompass other identity dimensions, such as professional or organizational identities, could provide further insight into the links between identity and PEBs.

Finally, this study focuses on the moderating effect of long-term orientation on the relationship between social identity and PEBs. Previous research has suggested that other cultural dimensions, such as individualism, power distance, and uncertainty avoidance, may also influence PEBs [16,17]. Future research could explore the interactions between these dimensions and key variables to provide a more comprehensive understanding of the cultural factors that shape PEBs.

6. Conclusions

By integrating the social identity approach with cross-cultural perspectives, this research presents compelling evidence for the generalizability of its findings. The present study, based on data from 60,577 respondents across 48 regions, highlights the critical influence of world identity, green orientation, and cultural values in fostering PEBs. The findings indicate that world identity is a more powerful predictor of PEBs than city, regional, and national identities. Moreover, the relationship between world identity and PEBs is mediated by green orientation. Furthermore, the study corroborates the moderating impact of societal long-term versus short-term orientations. In long-term-oriented societies, green orientation exerts a more pronounced positive effect on PEBs. The study advances theoretical understanding and offers practical insights for designing culturally sensitive strategies to promote sustainability.

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Data Availability Statement: The data utilized in this study are accessible via the World Values Survey (http://www.worldvaluessurvey.org (accessed on 16 October 2024)) and Geert Hofstede's website (https://www.hofstede-insights.com/product/compare-countries/ (accessed on 16 October 2024)).

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Descriptive statistics.

			City Identity		Regional Identity		National Identity		World Identity		Green Orientation		PEBs	
	Region	N	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Argentina	670	3.387	0.643	3.269	0.689	3.125	0.759	2.484	0.901	1.504	0.500	0.101	0.373
2	Australia	1590	3.179	0.722	3.077	0.737	3.367	0.697	2.407	0.835	1.680	0.467	0.224	0.551
3	Bangladesh	930	3.818	0.457	3.537	0.606	3.328	0.704	2.128	0.917	1.469	0.499	0.086	0.390
4	Armenia	945	3.618	0.592	3.374	0.687	3.533	0.585	2.334	0.907	1.515	0.500	0.125	0.416
5	Bolivia	1788	3.510	0.714	3.356	0.819	3.379	0.820	2.701	1.108	1.754	0.431	0.246	0.600
6	Brazil	1138	2.960	0.817	2.695	0.910	2.655	0.933	2.185	0.957	1.671	0.470	0.059	0.307
7	Canada	3997	3.176	0.755	3.095	0.765	3.266	0.768	2.539	0.756	1.614	0.487	0.204	0.518
8	Chile	838	3.556	0.702	3.438	0.768	3.567	0.679	2.456	1.004	1.587	0.493	0.186	0.444
9	China	2751	3.177	0.681	2.995	0.643	3.263	0.659	2.309	0.843	1.725	0.447	0.053	0.282
10	Taiwan	1188	3.123	0.575	2.981	0.598	3.053	0.595	2.142	0.719	1.645	0.479	0.224	0.542
11	Colombia	1479	3.256	0.874	3.209	0.784	3.168	0.823	2.561	1.031	1.703	0.457	0.452	0.686
12	Czechia	1075	3.532	0.637	3.414	0.707	3.295	0.743	2.475	0.912	1.486	0.500	0.037	0.229
13	Ethiopia	1007	3.384	0.836	3.248	0.847	3.006	0.873	2.195	1.024	1.461	0.499	0.371	0.700
14	Germany	1258	3.312	0.706	3.297	0.703	3.346	0.636	2.715	0.797	1.700	0.459	0.202	0.562
15	Greece	976	3.696	0.553	3.569	0.646	3.591	0.589	2.462	0.957	1.601	0.490	0.046	0.254
16	Indonesia	2917	3.187	0.780	2.634	0.845	3.012	0.902	2.378	1.024	1.778	0.416	0.577	0.831
17	Iran	1350	3.660	0.644	3.440	0.793	3.767	0.560	3.041	0.916	1.686	0.464	0.210	0.554
18	Iraq	981	3.750	0.604	3.677	0.670	3.590	0.846	2.892	1.079	1.441	0.497	0.152	0.461
19	Japan	551	3.314	0.717	3.111	0.683	3.296	0.645	1.906	0.740	1.601	0.490	0.022	0.169
20	Kazakhstan	823	3.465	0.666	3.270	0.735	3.262	0.767	2.497	0.990	1.492	0.500	0.05	0.249
21	Jordan	801	3.914	0.322	3.893	0.369	3.941	0.283	3.516	0.779	1.504	0.500	0.054	0.289
22	South Korea	1244	3.309	0.629	3.252	0.664	3.241	0.671	2.127	0.696	1.575	0.495	0.067	0.307
23	Lebanon	1138	3.709	0.638	3.657	0.683	3.698	0.674	2.778	1.037	1.387	0.487	0.062	0.302
24	Libya	874	3.872	0.422	3.808	0.492	3.939	0.313	3.110	0.966	1.516	0.500	0.344	0.640
25	Malaysia	1244	3.311	0.712	3.140	0.737	2.987	0.846	2.149	0.902	1.635	0.482	0.342	0.615
26	Maldives	960	3.615	0.640	3.247	0.781	3.229	0.787	2.533	1.013	1.436	0.496	0.079	0.326
27	Mexico	1607	3.439	0.760	3.353	0.796	3.427	0.815	2.464	1.175	1.566	0.496	0.205	0.510
28	Mongolia	1400	3.267	0.715	3.172	0.780	3.060	0.870	2.396	0.952	1.577	0.494	0.450	0.694
29	Morocco	1115	3.636	0.629	3.448	0.790	3.452	0.887	3.170	1.057	1.552	0.497	0.265	0.528
30	Netherlands	1336	3.129	0.750	2.695	0.778	2.996	0.712	2.209	0.849	1.742	0.438	0.151	0.402
31	New Zealand	618	3.126	0.695	2.956	0.791	3.371	0.683	2.424	0.810	1.710	0.454	0.275	0.580
32	Nigeria	1132	3.575	0.700	3.569	0.673	3.465	0.661	3	0.912	1.415	0.493	0.302	0.630
33	Peru	1223	3.518	0.666	3.372	0.750	3.490	0.735	2.693	0.994	1.604	0.489	0.072	0.336
34	Philippines	1188	3.258	0.674	3.333	0.631	3.301	0.649	3.017	0.843	1.682	0.466	0.282	0.649
35	Puerto RICO	989	3.395	0.744	3.326	0.764	3.464	0.709	2.666	1.010	1.726	0.446	0.231	0.563
36	Romania	847	3.368	0.697	3.231	0.784	3.314	0.723	2.659	0.948	1.431	0.495	0.066	0.284
37	Russia	1260	3.311	0.714	3.059	0.799	3.023	0.831	2.068	0.916	1.495	0.500	0.03	0.213
38	Serbia	811	3.363	0.714	3.196	0.737	3.131	0.770	2.078	0.900	1.509	0.500	0.075	0.311
39	Slovakia	978	3.575	0.596	3.512	0.606	3.462	0.626	2.537	0.898	1.547	0.498	0.103	0.345
40	Vietnam	1138	3.526	0.582	3.185	0.645	3.215	0.649	2.275	0.807	1.727	0.446	0.061	0.321
41	Thailand	1061	3.374	0.785	2.813	0.930	2.542	0.959	1.888	1.007	1.579	0.494	0.573	0.757
42	Turkey	2065	3.393	0.680	3.146	0.794	3.225	0.753	2.250	0.867	1.577	0.494	0.062	0.271
43	Ukraine	787	3.459	0.639	3.198	0.727	3.224	0.745	2.297	1.014	1.526	0.500	0.132	0.388
44	Egypt	595	3.859	0.438	3.855	0.429	3.936	0.311	3.050	0.994	1.430	0.496	0.012	0.136
45	Great Britain	1766	3.007	0.746	2.617	0.935	2.881	0.807	2.364	0.821	1.699	0.459	0.212	0.536
46	United States	2189	2.903	0.807	2.782	0.840	2.965	0.830	2.403	0.857	1.599	0.490	0.254	0.558
47	Uruguay	796	3.362	0.778	3.348	0.778	3.573	0.641	2.747	0.988	1.742	0.438	0.289	0.646
48	Venezuela	1143	3.510	0.671	3.397	0.767	3.417	0.739	3.010	0.968	1.395	0.489	0.085	0.338

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