Beliefs and Social Norms as Precursors of Environmental Support: The Joint Influence of Collectivism and Socioeconomic Status

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Abstract

The present research investigates how the cultural value of collectivism interacts with socioeconomic status (SES) to influence the basis of action. Using a U.S. national sample (N = 2,538), the research examines how these sociocultural factors jointly moderate the strength of two precursors of environmental support: beliefs about climate change and perceived descriptive norms. SES and collectivism interacted with climate change beliefs such that beliefs predicted environmental support (i.e., proenvironmental behaviors and policy support) more strongly for those who were high in SES and low in collectivism than for all other groups. This interaction was explained, in part, by sense of control. For descriptive norms, SES and collectivism did not interact but rather norms predicted action most strongly for those high in collectivism and high in SES. These findings demonstrate the theoretical and applied importance of examining multiple sociocultural characteristics together to understand the factors that drive action.

"Nobody on this planet is going to be untouched by the impacts of climate change."

—Rajendra K. Pachauri (2014), Chairman, Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.

Regardless of country, class, culture, color, or creed, everyone has to face climate change. And yet, the consequences of climate change are diverse, with some groups facing more systematic and damaging impacts than others (Weir et al., 2017). There is also great diversity in how people perceive and respond to the threat of climate change. The study of this diversity in human responses to climate change has become an increasingly important project in psychology, and in the social, behavioral, and biological sciences more generally (Hornsey et al., 2016; Pearson & Schuldt, 2018). Heeding this call, a number of research programs have examined how sociocultural characteristics such as culture (Eom et al., 2016; Tam & Chan, 2017), socioeconomic status (SES; Ballew et al., 2020; Eom et al., 2018), religion (Eom et al., 2020; Schuldt et al., 2017), and race (Schuldt & Pearson, 2016) affect climate change beliefs and sustainability behaviors (see Eom et al., 2019 for review).

Despite the increasing consideration of how sociocultural factors influence proenvironmental actions, these different lines of research have examined one focal characteristic, value orientation, or demographic factor in isolation without examining the interaction of multiple sociocultural characteristics. Ample evidence demonstrates that these sociocultural factors are associated with their own psychological tendencies and processes (e.g., Cohen, 2009). Yet, little is known about how different sociocultural factors jointly influence psychological processes. Given that all humans are a conglomeration of multiple sociocultural dimensions,

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understanding how different sociocultural factors interact within each individual is an important but understudied issue. The present research examines how two of the most studied factors in social and cultural psychology—cultural values (of collectivism and individualism) and SES—jointly influence what psychological factors motivate individuals' support for proenvironmental actions. In addition, the present research aims to identify a shared psychological mechanism underlying the influence of both cultural values and SES.

Sociocultural Diversity in the Link Between Beliefs, Norms, and Behavior

Models of behavior, such as the theory of planned behavior (Ajzen, 1991), posit that behaviors are driven by three factors: attitudes, social norms, and perceived behavioral control. Correlational studies have demonstrated the relevance and applicability of the theory of planned behavior to understand proenvironmental behavior across many different domains (e.g., De Groot & Steg, 2007; Greaves et al., 2013). However, recent research has found that the relative importance of these factors—environmental beliefs and norms in particular—vary across countries with different values of collectivism and individualism (e.g., Eom et al., 2016; Tam & Chan, 2017) and across SES (e.g., Ballew et al., 2020; Eom et al., 2018). Theoretically, both cultural values and SES are thought to influence how people generally prioritize their personal goals in high personal agency contexts (individualistic, high SES) or their social goals in high communal agency contexts (collectivistic, lower SES; Kim & Lawrie, 2019). This goal prioritization manifests in the relative importance of one's own internal processes—volition, attitudes, beliefs, and feelings—in driving action. Below, we briefly summarize separate findings about how individualism-collectivism and SES moderate the link between beliefs, norms, and action.

Collectivism and Individualism

The dimension of collectivism is defined as the degree to which a culture and its members place priority on the goals of collectives (as opposed to the goals of individual persons), whereas individualism is defined as the degree to which a culture and its members place priority on personal goals (as opposed to the goals of collectives) (Triandis et al., 1988). We focus on the cultural values of collectivism and individualism because cross-national research suggests that these cultural values can affect the extent to which people are more oriented toward internal factors such as their beliefs or attitudes, or external factors, such as social norms, in determining their behaviors (e.g., Kashima et al., 1992; Savani et al., 2008; Shteynberg et al., 2009).

Furthermore, recent empirical evidence shows that people's environmental actions are driven by different factors as a function of their collectivistic and individualistic orientations (Eom et al., 2016). A study of 47 countries found that in more individualistic countries, there was a stronger positive correlation between individuals' environmental concern and their support for proenvironmental policy than in less individualistic countries (Eom et al., 2016, Study 1). A similar pattern of findings was observed in a study of 32 countries, where there was a stronger link between environmental concern and behavior in countries that were higher in individualism and cultural "looseness" (Tam & Chan, 2017). In addition, beliefs predicted consumer choices more strongly for Americans whereas perceived social norms predicted consumer choices more strongly for Japanese (Eom et al., 2016, Study 2), and this finding is consistent with a larger body of research on culture, conformity, and adherence to social norms (Ando et al., 2007; Bond & Smith, 1996; Kim & Markus, 1999).

SES

SES is a multifaceted dimension that incorporates both social status (e.g., educational attainment) and economic status (e.g., income) (Dutton & Levine, 1989). In higher SES contexts, due to their greater social and economic resources, people do not need to rely on others or be constrained by external forces, as compared to those in lower SES contexts (Snibbe & Markus, 2005). Thus, those in higher SES contexts tend to engage in more direct expression of their internal attributes and characteristics than those in lower SES contexts (Kraus et al., 2009).

Research shows that the belief-action link is stronger among those from higher SES contexts than among those from lower SES contexts. Across a range of outcome variables including support for proenvironmental policy, self-reported environmental behavior, and financial donations to proenvironmental organizations, belief in climate change was a stronger predictor of environmental action among people from higher SES backgrounds than among people from lower SES backgrounds (Eom et al., 2018). Moreover, for students from lower SES backgrounds, descriptive norms (i.e., the perceived prevalence of proenvironmental behavior among family and friends) predicted their environmental action (donating to a campus environmental cause) more strongly than for students from higher SES backgrounds.

Taken together, these two lines of research suggest that both individualism-collectivism and SES can systematically orient people toward either their individual beliefs or perceived norms in driving action (Eom et al., 2019). The question we address in this study is how these two factors exert their influence jointly on the process of linking environmental beliefs, perceived norms, and proenvironmental action.

Interaction of Culture and SES

Research examining multiple sociocultural characteristics simultaneously has illustrated how the meaning of different psychological factors varies as a function of what other

categories are being considered. For example, research has found that although higher SES was associated with greater orientation to the self in both a collectivistic culture (i.e., Japan) and in an individualistic culture (i.e., the United States), higher SES was also associated with greater orientation toward others in Japan, but not in the United States (Miyamoto et al., 2018).

Looking at the nature of such interactions more closely, researchers find different patterns for how multiple sociocultural factors interact (see Ishii & Eisen, 2020 for review). For example, research examined cognitive tendencies as a function of social class in the United States (a more independent society) and Russia (a more interdependent society; Grossmann & Varnum, 2011). These two factors were found to be additive, such that more interdependent culture and lower-class backgrounds contributed independently to fostering more holistic cognitive responses. Yet, another study found an interactive relationship such that, among European Americans, working-class people were more influenced in their judgments by others than middle-class people, but among Asian Americans, this SES difference was not found (Na et al., 2016).

Broadly building on these studies examining multiple sociocultural characteristics, the present research investigates how individualism-collectivism and SES interact to influence the psychological bases of decision-making and behavior. Research examining moderators of the relationship between predictors and action has typically focused on one sociocultural characteristic in isolation, such as individualism (Eom et al., 2016; Tam & Chan, 2017) or SES (Eom et al., 2018). However, given that every individual has both of these two distinct influences on their personal identity (individualism-collectivism and SES), knowing the role of one characteristic alone does not necessarily help in predicting the actions and decisions of a given person. It is necessary to examine multiple characteristics simultaneously to understand how a whole person actually thinks and decides. We address the question about how these two factors co-influence individuals' psychology either additively, interactively, or even counteractively in understanding the links among personal climate change beliefs, perceived social norms, and proenvironmental support. Beyond investigating the pattern of the interaction, we propose a theoretical integration by seeking a shared psychological mechanism—sense of control.

Sociocultural Variation in Sense of Control

Prior theorizing has proposed that there exists sociocultural variation in how agency is viewed (Markus & Kitayama, 1994). Both individualism-collectivism and SES influence the extent to which people feel a sense of personal control over their outcomes (Eom et al., 2018; Morling et al., 2003; Snibbe & Markus, 2005). In contexts of greater personal

agency (i.e., higher SES, less collectivistic, and more individualistic), people view their actions as freely chosen according to their own preferences and volitions, compared to contexts of greater communal agency (i.e., lower SES, more collectivistic, and less individualistic). The sense of control (Lachman & Weaver, 1998) is the belief that individuals have control over their environments, akin to the well-known concepts of internal locus of control (Rotter, 1966; see Giefer et al., 2019 in the environmental context) or primary control (Rothbaum et al., 1982). The sense of control is a concept used to examine social class differences. High sense of control is characterized by high personal mastery and low perceived constraints (Lachman & Weaver, 1998). It is contrasted with fit-focused secondary control—adjusting the self and accepting situational circumstances—that has been shown to vary cross-culturally (Morling & Evered, 2006).[1] The sense of control was also shown to mediate the effect of SES as a moderator of the link between environmental beliefs and support for actions (Eom et al., 2018). Given these findings, we examine the role of the sense of control as a psychological mechanism to potentially explain the greater importance of individual beliefs in determining action among those from higher SES and less collectivistic (or more individualistic) backgrounds.

The Current Study

We conducted a study with a large sample of Americans chosen to match national demographic characteristics to examine how individualistic orientation, collectivistic orientation, and SES influence the relative importance of beliefs and social norms in predicting proenvironmental actions. In so doing, we examine multiple, convergent outcome measures of environmental support including proenvironmental behavior, support for proenvironmental policies, and personal time donation to environmental organizations. Moreover, we examine whether the sense of control serves as a shared psychological mechanism for the influence of the sociocultural factors (see Figure 1 for the theoretical model).

To clarify, our research questions focus on sociocultural diversity in how different psychological factors predict proenvironmental actions and decision-making. It does not focus on whether those who are higher (vs. lower) on collectivism or individualism, or those who are higher (vs. lower) on SES engage in more (or fewer) proenvironmental actions (see Pearson et al., 2018 for discussion on the association between SES and proenvironmental tendencies).[2] Thus, it is important to keep in mind that when beliefs or social norms predict action, it means that antienvironmental beliefs (or antienvironmental social norms) are associated with the failure to perform environmental actions as much as proenvironmental beliefs (or proenvironmental social norms) are associated with the willingness to perform environmental actions.
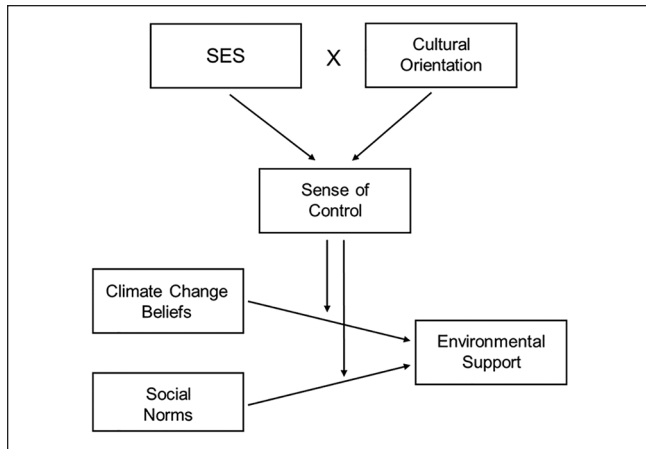
Figure 1. Conceptual model.
Note. SES = socioeconomic status.

We operationalized individualism-collectivism orientation as an individual-level value orientation, extending prior research that has examined the role of nation-level individualism (Eom et al., 2016) to investigate whether value orientation as an individual difference factor within the same nation plays the same role. Although individualism and collectivism form a unidimensional factor at the national level (e.g., Hofstede et al., 2010), empirical evidence has shown that these dimensions are orthogonal at the individual level (e.g., Kim et al., 2016; Singelis, 1994). Thus, this individual difference approach allowed us to examine the role of individualism and collectivism independently. We operationalized SES as objective SES based on income and educational level, consistent with closely related prior research (Eom et al., 2018).

We hypothesized that environmental beliefs would be a stronger predictor of proenvironmental support among people who have high personal agency characteristics—that is, those who are more individualistic, less collectivistic, and come from a higher SES background—as compared to people who have high communal agency characteristics—that is, those who are less individualistic, more collectivistic, and come from a lower SES background. We also hypothesized that perceived social norms would be a stronger predictor of proenvironmental actions among those with high communal agency characteristics.

In terms of how cultural values orientation and SES would work jointly, we considered three possibilities. One possibility is that they contribute relatively independently and additively to the impact of environmental beliefs and perceived social norms on actions, showing that possessing a greater number of high personal agency characteristics leads to greater prioritization of personal beliefs and lower prioritization of social norms. A second possibility is that people who are high in individualism/low in collectivism *and* high SES would prioritize their beliefs in their actions more strongly

(and prioritize social norms less strongly), showing that having both high personal agency characteristics is necessary. A third possibility is that people with one of the two high personal agency characteristics would prioritize their personal beliefs in action (and prioritize social norms in action less), showing that having just one high personal agency characteristic is sufficient to prioritize beliefs or deprioritize social norms. Finally, we examined whether the interplay between the sociocultural factors (cultural orientation and SES) and the different predictors of action is accounted for by sense of control.

Method

Power Analysis and Determination of Sample Size

We obtained effect size estimates of the moderation of the beliefs—outcomes relationship by Kim et al. (2016), assessing interactions between individualism-collectivism at the individual level (collectivism: $r = -.07$; individualism: $r = .05$). This was consistent with the moderation effects we estimated from the interaction between nation-level collectivism and beliefs in predicting environmental intentions by Eom et al. (2016) ($\sim r = .05$). We used the *R* package *simsem* (Pornprasertmanit et al., 2016) for Monte Carlo simulations of power and sample size for structural equation and mediated moderation path models. Simulations indicated that with power = .80 and $\alpha = .05$, a sample of at least 2,000 would be sufficiently large to detect a moderation effect of $r = .06$ and allow $>.80$ power to detect significant mediation when one or more of the mediation paths are small (Fritz & MacKinnon, 2007).

Participants and Design

Participants were recruited for an online research study. We employed the survey research firm TurkPrime (now named Cloud Research) to obtain a sample targeted to match national demographics on participant sex, race/ethnicity, region of country, and education level. The firm uses a sample matching technique to model representative samples of the U.S. population. We set a quota of at least 2,000 individuals and the study was conducted from May 1 through May 10, 2019. The firm collected a greater number of participants to ensure adequate coverage of all different demographic groups. Around 3,185 individuals completed the study, and 645 individuals were excluded for unsatisfactory responses based on TurkPrime data control criteria (i.e., suspicious IP addresses). The remaining sample consisted of 2,540 participants. We preregistered the exclusion rule of omitting participants who complete the survey in less than 3 minutes; this resulted in two participants being excluded from the primary analyses, leaving a final sample of 2,538. Participant

Table 1. Participant Demographics.

Characteristic	Target quota (%)	Target N	Number of participants collected	% of total
Gender				
Male	49	986	1,152	45
Female	51	1,014	1,388	55
Hispanic origin				
Non-Hispanic	84	1,677	2,183	86
Hispanic	16	323	348	14
Race				
White	79	1,572	1,911	76
Black	13	261	318	13
American Indian or Alaska Native	1	24	57	2
Asian	5	98	96	4
Other	2	45	140	6
Region				
Northeast	17	344	426	17
Midwest	21	418	471	19
West	24	476	618	24
South	38	762	1,025	40
Education				
Less than high school	11	216	326	13
High school graduate	29	578	754	30
Some college	18	362	429	17
Associate's degree	10	198	240	10
Bachelor's degree	21	410	453	18
Master's	9	176	186	7
Doctorate	1	34	51	2
Other post-high school vocational training	1	26	51	2

Note. N = 2,540 and sampling target proportions based on U.S. national demographics.

demographics are presented in Table 1 which shows the target quota based on U.S. demographics and the actual sample.[3]

Preregistration

We preregistered two protocols at aspredicted.org: one on cultural orientation (22,611) and one on SES (22,613), available on OSF at https://osf.io/wjz3v. The interaction analysis between cultural orientation and SES is preregistered under both preregistrations as an exploratory analysis. All additional variables not described below, as well as data and code, are reported in OSF and supplemental online materials (SOMs). The preregistration also includes plans for analyses of state-level variables which may be the subject of another manuscript.

Procedure

Participants were invited to complete a study on the "Public Perception of Current Issues," the purpose of which was described as investigating "how Americans view social issues and engage in social behaviors." Participants completed the survey on Qualtrics.

Measures

Individualism-collectivism. Participants responded to a scale of six individualism (e.g., "It is better for me to follow my own ideas than to follow those of anyone else.") and eight collectivism items (e.g., "Learning about the traditions, customs, values, and beliefs of my family is important to me.") (1 = *Strongly disagree* to 7 = *Strongly agree*) used by Kim et al. (2016) and adapted from Oyserman et al. (2002); (Individualism: $M = 5.56$, $SD = 0.89$, $\alpha = .80$, Collectivism: $M = 4.57$, $SD = 1.11$, $\alpha = .82$).

SES. As with other research in psychology that has examined SES as a multifaceted factor encompassing both economic status and social status, we assessed SES using a combination of income and education (e.g., Eom et al., 2018; Kraus et al., 2009). Educational attainment was measured with six levels: 1 = *Less than high school graduate*, 2 = *High school graduate*, 3 = *Some College*, 4 = *Associate's Degree*, 5 = *Bachelor's Degree*, 6 = *Master's Degree or higher* (Median

= Some College). For income, participants chose between one of eight income categories from "Under $15,000" to "Over $150,000" (Median = $35,001–$50,000). The two measures were correlated r (2,536) = .427, $p < .001$, and were standardized and combined into a measure of SES.

Covariates. We included three covariates in the statistical models: (a) political ideology, assessed using a 7-point scale item ranging from 1 = *Very liberal* to 7 = *Very conservative; M* = 3.99, *SD* = 1.76; (b) age (Median Age = 46); and (c) ethnicity, coded white = 1 (69.4%), non-white = 0 (30.6%).

Environmental beliefs. Environmental beliefs were measured by six items taken from the Belief in Climate Change Scale (Heath & Gifford, 2006) (e.g., "Global warming will bring about some serious negative consequences."). The items were presented with five filler items. Participants responded by indicating agreement on a scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. Environmental beliefs were calculated by averaging the six belief in climate change items, with higher scores indicating greater belief (*M* = 5.07, *SD* = 1.39, α = .88).

Perceived norms about proenvironmental behavior. We measured perceived descriptive norms, which have been shown to motivate environmental behavior (Miller & Prentice, 2016). Following Eom et al. (2016), perceived descriptive norms were measured using three questions, each intended to assess norms regarding behavior, volunteering, and policy preferences, respectively: "What percentage of people in your local community do you think engage in sustainable behaviors such as carpooling, using public transportation, saving water and energy, etc.?," "What percentage of people in your local community do you think support environmental causes by volunteering or donating money?," and "What percentage of people in your local community do you think support pro-environmental policies?." Participants were asked to indicate their answer on a slider scale from 0 to 100. Responses on these three questions were averaged to form a composite of perceived descriptive norms about proenvironmental behavior (*M* = 35.51, *SD* = 20.66, α = .85).

Sense of control. Participants' sense of control was assessed through six items adapted from Lachman and Weaver's (1998) sense of control scale. The scale consists of two components: items assessing personal mastery (e.g., "What happens to me in the future mostly depends on me.") and items assessing perceived constraints (e.g., "What happens in my life is often beyond my control."). Participants indicated agreement on scale ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. The six items were averaged (with perceived constraints reverse coded) to generate a composite, with higher scores indicating a greater sense of control (*M* = 4.68, *SD* = 1.25, α = .79).

Index of self-reported proenvironmental behavior. We assessed proenvironmental behavior adapting items from the Recurring Environmental Behavior Scale (REBS) (Brick et al., 2017). We measured proenvironmental behaviors using two different formats to create an index of whether and how frequently individuals perform a list of diverse behaviors that are proenvironmental. Six items measured frequency of performance. Participants reported their frequency of performing proenvironmental behaviors (e.g., "How often do you turn your personal electronics off or in low-power mode when not in use?") on scales ranging from 1 = *Never* to 5 = *Always* (*M* = 3.25, *SD* = 0.84). Six items measured whether the behavior was performed or not. Participants responded to the prompt, "In the last week, did you engage in the following behavior?" Participants were asked about six proenvironmental behaviors (e.g., "I walked, bicycled, carpooled, or took public transportation instead of driving a vehicle by myself.") and indicated on a binary scale (1 = *No*, 2 = *Yes*) whether or not they engaged in that behavior in the last week with higher scores indicating more proenvironmental behavior in the last week (*M* = 1.32, *SD* = 0.25). The continuous and dichotomous measures were correlated, r (2,536) = .370, $p < .001$, standardized and averaged into a measure of self-reported environmental behavior.

Support for climate policy. We assessed individuals' support for proenvironmental policy using three items adapted from the American National Election Studies (2016): (a) "Do you think the federal government should be doing more about rising temperatures, should be doing less, or is it currently doing the right amount?" (1 = *Should be doing a great deal less* to 7 = *Should be doing a great deal more; M* = 5.22, *SD* = 1.69), (b) "When you consider the issue of environmental regulation, where would you place yourself on this scale?" (1 = *No regulation because it will not work and it will cost jobs* to 7 = *Regulate business to protect the environment and create jobs; M* = 4.90, *SD* = 1.74), (c) "Do you favor, oppose, or neither favor nor oppose fracking in the U.S.?" (1 = *Favor* to 7 = *Oppose; M* = 4.66, *SD* = 1.62) and two items from World Values Survey (2014): (a) "I would give a part of my income if I were certain that the money would be used to prevent environmental pollution." (1 = *Strongly disagree* to 7 = S*trongly agree; M* = 3.85, *SD* = 1.89), and (b) "I would agree to an increase in taxes if the extra money were used to prevent environmental pollution." (1 = *Strongly disagree* to 7 = *Strongly agree; M* = 3.99, *SD* = 1.95). We averaged scores on these five items to create a composite (*M* = 4.52, *SD* = 1.37, α = .83). These five items have been used in prior research that has examined the relationship of environmental beliefs to policy preferences (Eom et al., 2018 for ANES; Eom et al., 2016 for World Values Survey).

Issue priority for the 2020 election. Participants' issue priority for the 2020 election was measured by asking individuals to

Table 2. Means, Standard Deviations, and Correlations of Key Variables.

Variable	M	SD	1	2	3	4	5	6	7
1. Individualism	5.56	0.89							
2. Collectivism	4.57	1.11	.32**						
3. SES (z-score)	0	0.84	.01	.06**					
4. Descriptive norms	35.50	20.66	.06**	.19**	.09**				
5. Climate change beliefs	5.07	1.39	.13**	−.11**	.07**	.06**			
6. Sense of control	4.68	1.25	.18**	.01	.14**	−.04*	−.07**		
7. Environmental support (factor score)	0	0.93	.11**	.01	.09**	.25**	.71**	−.14**	

Note. M and *SD* are used to represent mean and standard deviation, respectively. SES = socioeconomic status.
*p < .05. **p < .01.

rank nine issues in order of personal importance in their 2020 presidential election decisions from 1 (*Most important*) to 9 (*Least important*). The nine issues were: (a) Campaign Finance, (b) Civil Rights, (c) Climate Change, (d) Economy, (e) Gun Control, (f) Health care, (g) Immigration, (h) Income Inequality, and (i) National Security. We reverse scored the ranking so that higher ranking of climate change as an issue of personal importance reflected greater proenvironmental support, *M* = 4.95, *SD* = 2.51.

Donating time. A word search game served as a behavioral measure of voluntarily donating time for a proenvironmental cause. Participants were informed at the seeming conclusion of the study that they could also play a word search game (Boggle) where they view a grid of letters and make as many words as possible. Participants were informed that for each word they made, the researchers would make a donation of 5 cents to an environmental advocacy organization, but participants could stop any time they wanted. Participants' (a) decision to play (37.4% indicated *Yes*, 62.6% indicated *No*) and (b) number of words generated (*M* = 13.68, *SD* = 10.72) were scored to assess proenvironmental volunteering behavior.[4]

Results

Creation of Latent Variable

We conducted a confirmatory factor analysis of the four environmental outcomes (re-occurring environmental behaviors, climate policy, issue priority, and dichotomous volunteering choice), to examine whether the four indicators would load onto a single factor of Environmental Support. The fit of this single-factor solution was acceptable (χ^2 = 8.84; root mean-square error of approximation [RMSEA] = .037; comparative fit index [CFI] = .996; standardized root mean square residual [SRMR] = .014), as well as the reliability of the latent factor (Roykov's ρ = .705; see SOM for factor loadings and further details on construction of latent variable, as well as for results of the four outcomes examined individually).

Zero-Order Correlations and Descriptive Statistics

Table 2 reports the means, standard deviations, and correlations among the moderator variables (individualism, collectivism, and SES), the predictor variables (descriptive norms and climate change beliefs), the mediating variable (sense of control), and the outcome variable (the environmental support latent factor). Individualism and collectivism were positively correlated (r = .32) and weakly correlated with SES (r = .01 between individualism and SES and r = .06 between collectivism and SES, respectively).

Cultural Orientation, SES, Beliefs, and Norms as Predictors of Environmental Support

We conducted structural equation model (SEM) analyses to examine how cultural orientation and SES moderated the relationship between the two predictors—beliefs and perceived norms—and the outcome of environmental support (with the covariates mentioned above). We conducted separate analyses for beliefs and norms (see SOM for full analyses).

Individualism, Collectivism, and SES as Moderators of Beliefs—Environmental Support Link

We first examined whether individualism, collectivism, and SES moderated the relationship between beliefs and the latent factor of environmental support with an SEM and further, whether there were three-way interactions (SES × collectivism × beliefs or SES × individualism × beliefs) in predicting environmental support. This model had adequate fit to the data, χ^2 (44) = 370.469, CFI = .93, RMSEA = .054, SRMR = .024, (see Supplemental Table 2 for full results). There were significant two-way interactions between climate change beliefs and collectivism, and between climate change beliefs and SES. Furthermore, there was a three-way interaction among collectivism, SES, and beliefs. The only significant result with individualism was a significant two-way interaction between SES and individualism (i.e., not involving

Table 3. Environmental Support as a Function of Climate Change Beliefs, Collectivism, SES, and their Interactions.

Predictor	Unstandardized B	SE	z	p	95% CI Lower	95% CI Upper	Standardized B
Age	−0.02	0.006	−2.82	.005	−0.03	−0.01	−0.04
Ethnicity	0.002	0.006	0.44	.66	−0.01	0.02	0.01
Liberal-Conservative	−0.11	0.008	−13.59	.000	−0.13	−0.10	−0.26
Climate change beliefs	0.28	0.012	23.65	.000	0.26	0.30	0.66
Collectivism	0.06	0.007	9.12	.000	0.05	0.07	0.14
SES	0.01	0.006	1.88	.06	0.00	0.02	0.03
Collectivism × SES	0.004	0.006	0.72	.47	−0.01	0.02	0.01
Belief × Collectivism	−0.02	0.006	−4.05	.000	−0.04	−0.01	−0.06
Belief × SES	0.02	0.006	3.07	.002	0.01	0.03	0.04
Belief × Collectivism × SES	−0.02	0.006	−3.38	.001	−0.03	−0.01	−0.05

Note. SES = socioeconomic status; CI = confidence interval.

beliefs) that was not relevant to the focal question of the moderation of the beliefs-environmental support link. Thus, to simplify analyses, we removed individualism from the model in the subsequent analysis (but see SOM for the full results with individualism).

Collectivism, SES, and Beliefs Predicting Environmental Support

We examined whether collectivism and SES moderated the relationship between beliefs and the latent factor of environmental support using SEM, and further, whether there was a three-way interaction among SES, collectivism, and beliefs in predicting environmental behavior (see Table 3 for full details). This model had adequate fit to the data, $\chi^2 (32) = 309.692$, CFI = .94, RMSEA = .059, SRMR = .027. We report standardized coefficients of main effects and interactions to provide estimates of the magnitude of such effects, and provide unstandardized coefficients of simple slopes and contrasts when decomposing significant interactions to correspond to the resulting figures (which present raw values). Climate change beliefs significantly predicted environmental support (unstandardized $B = .28$, $SE = .012$, confidence interval [CI] = [.26, .30], standardized $B = .66$, $p < .001$). There were significant two-way interactions such that the relationship between beliefs and environmental support was moderated by both collectivism (unstandardized $B = −.02$, $SE = .006$, CI = [−.04, −.01], standardized $B = −.06$, $p < .001$) and SES (unstandardized $B = .02$, $SE = .006$, CI = [.01, .03], standardized $B = .04$, $p = .002$). The relationship between beliefs and environmental support was stronger for low collectivists (unstandardized $B = .22$, $SE = .010$, CI = [.20, .24]) than high collectivists (unstandardized $B = .18$, $SE = .009$, CI = [.17, .20]) and was stronger for higher SES (unstandardized $B = .22$, $SE = .010$, CI = [.20, .23]) than lower SES participants (unstandardized $B = .19$, $SE = .009$, CI = [.17, .21]) replicating previous findings (e.g., Eom et al., 2016, 2018). Importantly, there was also a significant three-way interaction among SES, collectivism, and beliefs

(unstandardized $B = −.02$, $SE = .006$, CI = [−.01, −.03], standardized $B = −.05$, $p = .001$; see Figure 2).

There was a significantly stronger relationship between beliefs and environmental support among high SES (+1 SD), low collectivist (−1 SD) participants (unstandardized $B = .25$, $SE = .01$, CI = [.22, .27]), as compared to those at mean values of SES and collectivism (unstandardized $B_{diff} = .05$, $SE = .008$, $p < .001$, CI = [.03, .06]). The low SES/high collectivist (unstandardized $B = .19$, $SE = .01$, CI = [.16, .21]), low SES/low collectivist (unstandardized $B = .19$, $SE = .01$, CI = [.17, .21]), and high SES/high collectivists (unstandardized $B = .18$, $SE = .01$, CI = [.16, .20]) indicated similar (weaker) relationships between beliefs and environmental support, and these relationships were all similar or significantly weaker in relation to those at mean values of SES and collectivism (p's ranging from .01 to .12). Excluding covariates from the model did not meaningfully change the results (see SOM). Put simply, the only people to show a markedly stronger relationship between climate change beliefs and environmental support were those with greater resources (high SES), *and* with less strong psychological ties to others (low collectivism).

Sense of Control as a Mediator

Next, we examined whether sense of control served as a psychological mediator of the effects observed above using a mediated moderation SEM. In the model, we tested (a) whether the interaction between SES and collectivism predicted sense of control, (b) whether sense of control in turn moderated the association between climate change beliefs and environmental support, and (c) whether the collectivism × SES × beliefs interaction on environmental support was attenuated by the addition of the sense of control × beliefs interaction. This analytic approach allowed us to test whether individual differences (in sense of control) associated with particular sociocultural factors (collectivism and SES) are psychological mechanisms underlying the influence of social contexts (see Kim & Sherman, 2007 for similar approach).
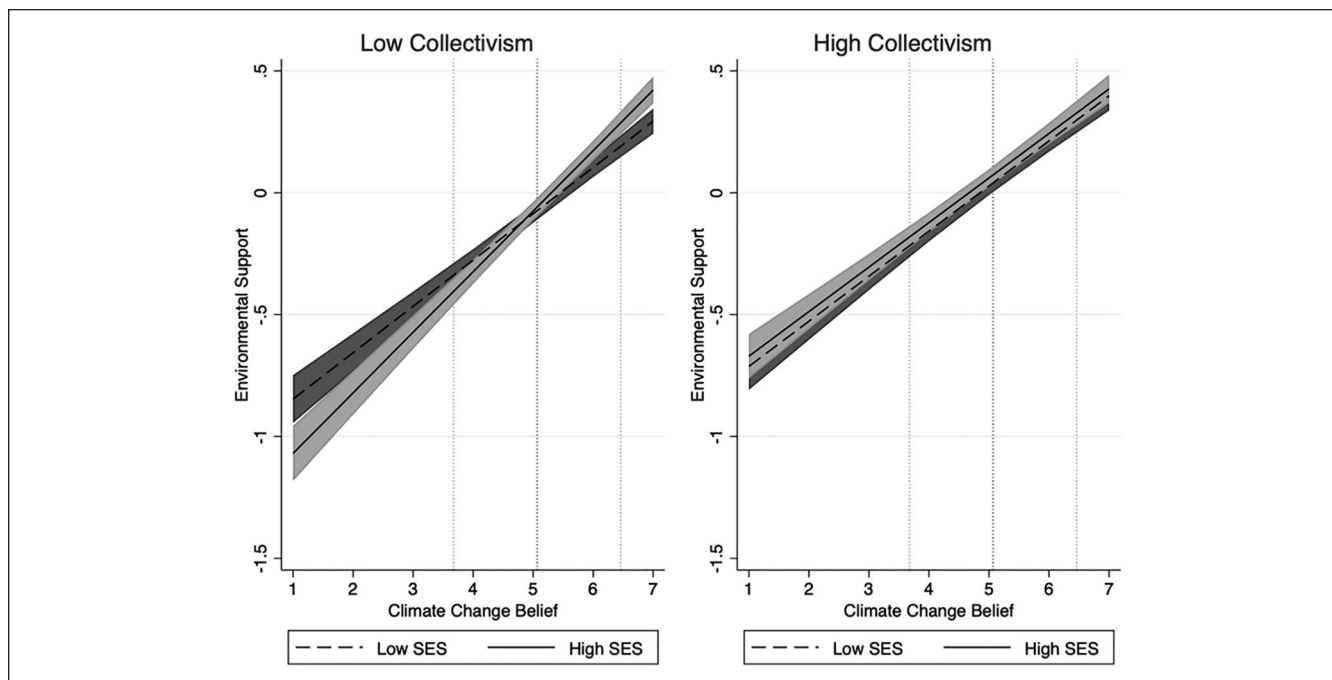
Figure 2. Environmental support as a function of climate change beliefs and socioeconomic status for those with low collectivism (left) and high collectivism (right).

Note. The steepest slope, representing the strongest relationship between beliefs and environmental support is for those with high SES and low collectivism. Vertical dotted lines represent values of climate change beliefs at −1, 0 and +1 *SD* from the mean. Error bands are continuous 95% CIs. SES = socioeconomic status; CI = confidence interval.

Following this analytic strategy, we first tested whether collectivism and SES predicted sense of control. The regression model included sense of control as the outcome, and included the predictors of SES, collectivism, and their interaction, while also including ethnicity, age, and liberal-conservative ideology as covariates. Higher SES (unstandardized $B = .41$, $SE = .10$, CI = [.21, .62], $p < .001$; standardized $B = .13$) and lower collectivism (unstandardized $B = −.05$, $SE = .02$, CI = [−.09, −.01], $p = .027$; standardized $B = −.04$) were related to greater sense of control. Moreover, there was an SES × collectivism interaction (unstandardized $B = −.06$, $SE = .02$, CI = [−.10, −.01], $p = .011$; standardized $B = −.05$). Figure 3 (left) plots points at ± 1 *SD* on the moderating variable (i.e., SES). The greatest levels of sense of control were reported by those high in SES and low in collectivism ($M = 4.96$, $SE = .05$, CI = [4.86, 5.06]), followed by those high in SES and high in collectivism ($M = 4.73$, $SE = .05$, CI = [4.64, 4.82]), and finally with similar levels of sense of control reported by low SES individuals of both low ($M = 4.52$, $SE = .05$, CI = [4.43, 4.61]) and high ($M = 4.53$, $SE = .05$, CI = [4.44, 4.63]) collectivism. Those high in SES and low in collectivism were the only individuals to show a sense of control significantly greater than those at mean SES and collectivism ($M_{diff} = .28$, $SE = .04$, $p < .001$, CI = [.19, .36]). Those low in SES, either with low collectivism or high collectivism, showed levels of sense of control lower than those at mean SES and collectivism (p's < .001),

and those at high SES and high collectivism were not significantly different than those at mean SES and collectivism ($M_{diff} = .04$, $SE = .04$, $p = .31$, CI = [−.04, .12]).

Next, we tested whether sense of control moderated the association between climate change beliefs and environmental support. There was a significant sense of control × climate change beliefs interaction (standardized $B = .06$, $SE = .015$, CI = [.03, .09], $p < .001$). The relationship between beliefs and environmental support was stronger for those with higher sense of control (unstandardized $B = .21$, $SE = .009$, CI = [.19, .23], $p < .001$) than those with lower in sense of control (unstandardized $B = .18$, $SE = .009$, CI = [.16, .20], $p < .001$, see Figure 3, right).

Then, we tested whether there was a significant indirect path from the interaction between SES and collectivism to environmental support through sense of control. Statistically, we tested whether the product of two coefficients—(a) SES × collectivism on sense of control and (b) climate change beliefs × sense of control on environmental support—was significant. Results showed that the indirect effect was significant (unstandardized $B = −.0008$, $SE = .0003$, CI = [−.0014, −.0001], $p = .03$). See Figure 4.

Taken together, these findings suggest that people who are low in collectivism and high in SES have greater sense of control than other groups, that greater sense of control was associated with stronger relations between beliefs and environmental support, and that higher sense of control perceived
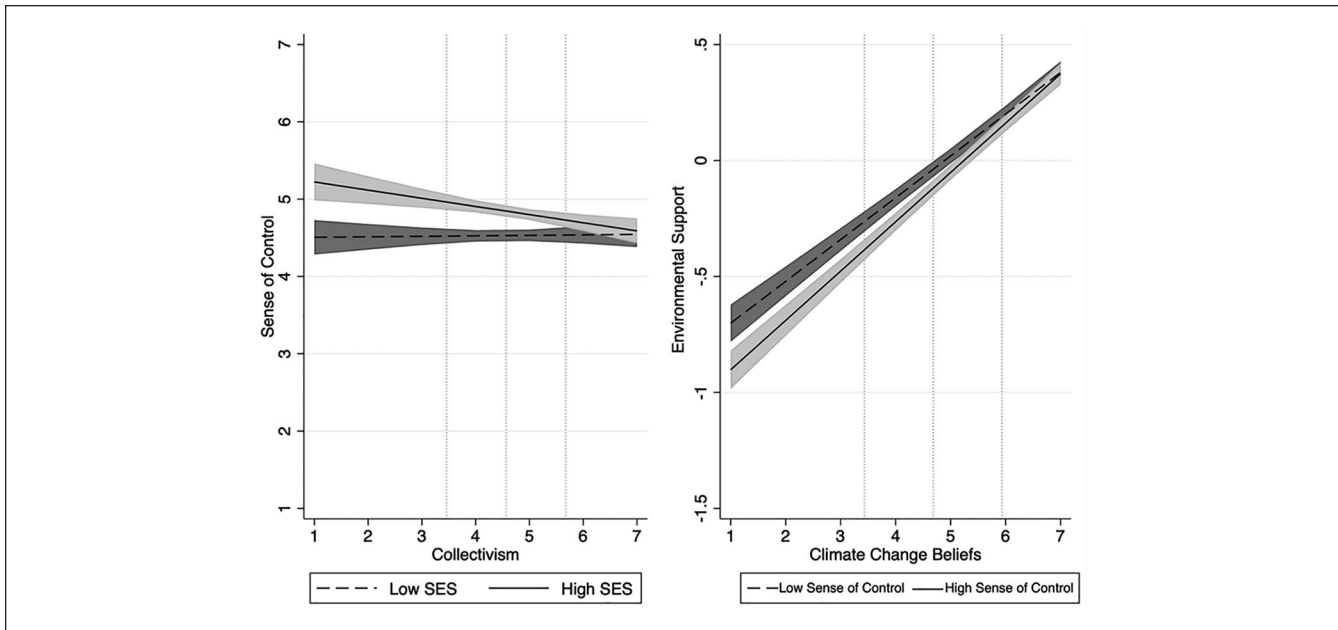
Figure 3. Sense of control as a function of collectivism and socioeconomic status (left) and environmental support as a function of climate change beliefs and sense of control (right).
Note. The figures illustrate that sense of control was highest for those who were high in SES and low in collectivism (left) and that high sense of control was associated with a stronger relationship between beliefs and environmental support (right). Vertical dotted lines represent values at +1, 0, and +1 *SD* from mean. Error bands are continuous 95% CIs. SES = socioeconomic status; CI = confidence interval.
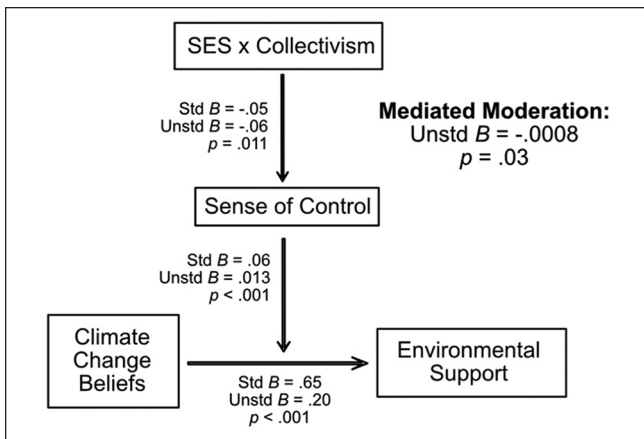

Figure 4. Mediated moderation model with sense of control as a mediator.
Note. SES = socioeconomic status.

by low collectivism/high SES individuals explains at least in part why their beliefs are strongly associated with their pro-environmental support. However, with the sense of control × beliefs interaction in the model, the original SES × collectivism × beliefs interaction did not attenuate and remained significant (standardized $B = -.05$, $SE = .014$, CI = $[-.08, -.02]$, $p < .001$), suggesting that sense of control did not fully account for this effect. That is, the results indicate that sense of control does not serve as the sole psychological mediator to explain the three-way interaction.

Collectivism, SES, and Perceived Norms Predicting Environmental Support

We conducted an analogous SEM to examine whether collectivism and/or SES moderated the relationship between perceived norms and environmental support (see Supplemental Table 3 for the analysis of individualism, collectivism, and SES as moderators for the relationship between norms and environmental support). First, there was a main effect such that higher norms predicted greater environmental support (unstandardized $B = .086$, $SE = .009$, CI = $[.067, .104]$, $p < .001$, standardized $B = .19$). Conceptually replicating previous findings (Eom et al., 2016), there was a significant interaction between collectivism and perceived norms (unstandardized $B = .016$, $SE = .007$, CI = $[.002, .031]$, $p = .03$, standardized $B = .04$) such that there was a stronger relationship between norms and environmental support at higher levels of collectivism (unstandardized $B = .102$, $SE = .011$, CI = $[.080, .125]$) than at lower levels of collectivism (unstandardized $B = .070$, $SE = .013$, CI = $[.046, .095]$). There was also a significant SES × norms interaction, although this was in the direction opposite to predictions (unstandardized $B = .027$, $SE = .008$, CI = $[.011, .044]$, $p = .001$, standardized $B = .06$) such that there was a stronger relationship between norms and environmental support at higher levels of SES (unstandardized $B = .114$, $SE = .013$, CI = $[.088, .139]$) than at lower levels of SES (unstandardized $B = .059$, $SE = .012$, CI = $[.035, .082]$). The three-way SES × collectivism × norms interaction was not

significant (unstandardized $B = .003$, $SE = .007$, $p = .664$, standardized $B = .008$). We return to this finding in the discussion.

Discussion

A recent article in *American Psychologist* on how psychology can help limit climate change posited that "We need theory and methods that can incorporate both individual agency and social structure and culture, and the interplay among them (Nielsen et al., 2021, p. 138)." The present research presents and tests a theoretical model to understand the interplay of these factors. Examining collectivism and SES independently, this study replicated and extended the prior research on environmental beliefs as a predictor of environmental support. First, we found that beliefs predicted environmental support more strongly among people who were low in collectivism than among people who were high in collectivism as shown in Eom et al. (2016). The present findings thus build on the cross-cultural comparisons made in prior research by showing that the cultural orientation of collectivism (and not individualism) at the individual level influences the relative impact of beliefs on environmental support in a similar manner. Second, the current findings are consistent with the research by Eom et al. (2018), who found that higher SES individuals had a stronger link between beliefs and environmental support. More importantly, the three-way interaction observed among collectivism, SES, and beliefs in predicting a wide range of proenvironmental actions suggest that these factors work interactively and not additively. That is, those people who have *both* social characteristics high in personal agency (i.e., those who are higher SES *and* lower in collectivism) showed particularly strong reliance on internal beliefs. In contrast, people who had only one or no social characteristic high in personal agency were less driven by their internal beliefs about climate change to a similar degree, a point we return to shortly.

Moreover, we found that people who were higher SES and lower in collectivism had a higher sense of control, and there was a significant indirect effect such that those who felt the strongest sense of personal control had the strongest relationship between their beliefs and actions. Given that sense of control was not the sole psychological mediator of the three-way interaction among SES, collectivism, and beliefs on environmental action, we infer that another psychological variable may explain why the strength of belief-behavior consistency is varied among people with different sociocultural characteristics. A reasonable candidate, consistent with the theory of planned behavior (Ajzen, 1991), is perceived behavioral control about engaging in proenvironmental actions, or the belief that one is able to perform specific proenvironmental actions (Geiger et al., 2017). That is, in the present study, we measured a broad sense of personal agency about life in general, and while this plays some mediational role, it is possible that the factor that explains additional variance in why those who are higher in SES and lower in collectivism are more reliant on their beliefs is a more domain-specific sense of control.

Limitations and Future Directions

There are some limitations and unexpected pattern of results that warrant discussion. First, it should be noted that the overall magnitude of the effect size of the interaction effects was relatively small although of a similar magnitude as other research examining such higher-order interactions (e.g., Ballew et al., 2020; Tam & Chan, 2017). Including the key moderators accounted for a relatively small amount of additional variance in environmental support above and beyond environmental beliefs, which accounted for a large amount of variance. That environmental beliefs matter for all participants in predicting their environmental support should not be surprising given that the study was conducted in the United States, a culture very high on the individualism dimension (Eom et al., 2016). Nevertheless, it is important to recognize that the present data set represents a great degree of diversity in terms of ethnicity, region, and religiosity among many other factors that also affect environmental support. Amid the very noisy and disparate worlds inhabited by the over 2,500 American participants in this study, the moderating role of sociocultural factors was clearly detectible in a by-and-large predicted pattern.

We found an unexpected pattern of results regarding perceived norms. Prior work has identified that the perceived norm of environmental support is a stronger predictor of proenvironmental behaviors for more collectivistic and lower SES groups. Consistent with the cross-cultural findings that people from a collectivistic culture (Japan) were more reliant on norms than those from an individualistic culture (the U.S.; Eom et al., 2016), this study found that norms were more predictive of environmental support among high collectivists than among low collectivists. The role of SES as a moderator of perceived descriptive norms, however, did not support predictions. In this study, we found the opposite pattern from the findings of a previous study (Eom et al., 2018): rather than lower SES people, it was higher SES people for whom perceived norms were more predictive of environmental support. One explanation for this finding is that environmentalism may be seen as a concern primarily for higher SES people. In a nationally representative survey, both higher- and lower-income respondents were more likely to associate the term environmentalist with those who were more highly educated, despite the fact that the actual degree of environmental concern did not generally differ between among higher or lower SES groups (Pearson et al., 2018; see also Baldassare & Katz, 1992; Eom et al., 2018).

Given these stereotypes about environmentalism, higher SES people may view the perceived norm to be an in-group norm, whereas lower SES people may view the perceived norm to be an outgroup norm. The influence of norms is

stronger when the norms are associated with self-relevant groups (e.g., Goldstein et al., 2008). Thus, this differential self-relevance of the perceived norm may explain why higher SES people conform to the perceived norm more than lower SES people. The previous study that found that perceived environmental norms were more predictive of proenvironmental behavior among lower SES individuals than among higher SES individuals (Eom et al., 2018) was conducted with college students, and the measure of norms was more specific about shared dimensions that more commonly serves as a basis of identity (e.g., school membership or family). By contrast, "people in my local community" is inherently more open to interpretation (e.g., from one's neighborhood to one's city). Thus, whereas local community could very well be a basis of shared identity for some people, we suspect that it has more diffuse group boundaries compared to university or family identity. Other research also shows that lower SES individuals tend to make more similar choices to close others than higher SES individuals do when they know of those others' preferences (Na et al., 2016; Stephens et al., 2007). The current findings raise questions for future research about the nature of the reference group in relation to how social class affects the influence of perceived norms on action.

The present research suggests initial answers to the question regarding how sociocultural influences of multiple sources may shape individual psychological tendencies. One question is whether influences from any particular sociocultural characteristic are more dominant than other characteristics? For example, a person may be individualistic in their cultural orientation but, at the same time, be from a lower SES context; contrarily, a person who is collectivistic can also be from a higher SES context. The present research suggests that the influence of a communal agency characteristic may override the influence of a personal agency characteristic. Those people with *only* high personal agency characteristics (i.e., low collectivism and high SES) differed from the rest of the sample in the extent to which they relied on their internal thoughts to guide their judgments and behaviors. That is, being "sensitized" to the social context by even one aspect of one's environment may be sufficient to temper a sense of personal agency and the tendency to rely on one's own volition and conviction (see Na et al., 2016 for consistent findings). Given the fundamental importance of sociality for humans, it is reasonable to assume that human minds have a natural predisposition toward sociality, and it takes a truly WEIRD mind (i.e., western, educated, industrial, rich, from a democratic country; Henrich et al., 2010) to be predominantly self-reliant in how one chooses to behave. This study offers a theoretical framework for future investigations on the complexity in how different sociocultural factors influence human behaviors.

The theoretical value of identifying one sociocultural moderator in isolation (e.g., SES, cultural orientation, or religion) is clear, but such knowledge does not necessarily help in devising an effective intervention with humans who, inevitably, hold different sets of sociocultural characteristics that exert unique influences on beliefs and behavior. Our research shows that the combination of different sociocultural dimensions is not necessarily additive, and thus, should give pause to an intervention based on one sociocultural characteristic. This research merely uses two sociocultural characteristics, and we fully recognize that there are many more, even an overwhelming number, within each person. Future research should develop a way to systematically incorporate multiple aspects of individuals' sociocultural makeup. Nevertheless, these research findings demonstrate how multiple sociocultural characteristics often interact with one another to yield unexpected findings.

Conclusion

Social scientists have noted an urgent need to understand demographic and cultural diversity in what drives environmental behavior (Nielsen et al., 2021; Pearson & Schuldt, 2018). Addressing this need can lead to both applied and theoretical benefits. For application, changing beliefs has been one major focus of environmental research, and the present results show both the promise and the limitation of using this lever. To the extent that climate change beliefs are malleable, the biggest potential gain is from those people who are focused inward on their beliefs: higher SES and less collectivistic individuals. In this regard, it is interesting to note that one of the bigger contributors to individual carbon emissions is global tourism (Lenzen et al., 2018), which is an act that may be disproportionately engaged in by this higher SES, less collectivistic group. It suggests that strategies that focus on this group's beliefs—both changing beliefs among those who do not believe in climate change and showing how particular actions such as restricting travel are belief-concordant for strong climate change believers—may be particularly effective approaches toward facilitating environmental action. Theoretically, this research illustrates the importance of understanding sociological and cultural psychological constructs that have typically been studied in isolation but yield broader insight when integrated to understand the basic question of what drives action.

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. We include additional analyses examining the role of harmony control, an operationalization of fit-focused secondary control, as an alternative mediator to explain the potential impact of social norms on environmental support in the supplemental online materials.
2. Previous research shows that individualism, collectivism, and SES themselves are not reliably associated with proenvironmental attitudes or actions (Eom et al., 2016, 2018; Pearson et al., 2018).
3. Table 1 lists the demographic data based on the variables collected by the survey research firm to meet representative targets. Racial and ethnic categories were determined by the firm, modeled after the U.S. Census, via two questions that appear in this table (race: American Indian /Alaska Native; Asian; Black or African American; Prefer not to answer; Some other race; white; and Hispanic origin: Hispanic or non-Hispanic). Participants also completed a question that we included for the present survey that included the following categories: Asian, Asian-American (3.6%); black, African American (12.1%); Hispanic, Latino American (10.3%); Native American (1.9%); Native Pacific Islander (0.04%); white, Caucasian–American (69.4%); Other (0.7%); multiracial (1.9%). For analyses, we recoded this variable into white (69.4%) and not white (30.6%).
4. During debriefing, participants were informed that we were not actually donating the money to the environmental charity, and those who volunteered were given a bonus for their extra time. Also, as described in SOM, the dichotomous choice to participate in the word search task was more strongly correlated with the other environmental support measures than the number of words produced in the Boggle task, suggesting that the decision to volunteer one's time (or not) was a clearer measure of environmental support than one's performance or effort on the word search task. Thus, we included decision to play as the time donation measure in the creation of the latent environmental support variable.

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