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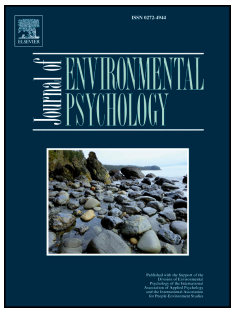

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Why do cosmopolitan individuals tend to be more pro-environmentally committed? The mediating pathways via knowledge acquisition and emotional affinity toward Nature

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The mediating pathways via knowledge acquisition and emotional affinity toward Nature

Abstract

Past research offered evidence that cosmopolitan individuals behave more pro-environmentally. The current study systematically examined two mechanisms explaining why. One the one hand, cosmopolitan individuals acquire knowledge about global challenges concerning environmental crises and become aware of mitigating strategies. On the other hand, cosmopolitan individuals extend their prosociality beyond humankind and develop an emotional affinity toward the natural environment. We set out to provide the first empirical support for these cognitive and emotive pathways accounting for why cosmopolitan individuals tend to be more environmentally friendly. We recruited a total of 1,159 participants to systematically investigate the simultaneous mediation of cognitive and emotive characteristics of cosmopolitan individuals on their commitment to and engagement in pro-environmental behaviors (PEBs). The results from both the large community study (a Singaporean sample; $N = 959$) and the replication study (an American sample; $N = 200$) revealed that cosmopolitan orientation fostered both the acquisition of knowledge and emotional affinity toward nature, while emotional affinity was a stronger predictor for commitment to and frequency of PEBs. Theoretical and practical implications for a nuanced understanding of the motivational value of the cognitive and emotive pathways on PEBs are discussed.

Keywords: cosmopolitan orientation, pro-environmentalism, knowledge acquisition, emotional affinity toward Nature, commitment to pro-environmental behavior, frequency of pro-environmental behavior

1. Introduction

The environment and natural landscape we are embedded in comprise an important part of our culture (Gorman-Murray, 2010; Yung & Chan, 2015). Recent research has examined how individuals' orientation toward cosmopolitanism – a tendency to embrace cultural openness and respect – predicts their pro-environmental consciousness (Leung, Koh, & Tam, 2015). In their investigation, Leung and colleagues (2015) developed and validated the Cosmopolitan Orientation Scale (COS) to measure the three core attributes of being a cosmopolitan. Cosmopolitan individuals show *cultural openness* with high receptivity to learn from divergent cultural experiences (Brett & Moran, 2011; Lizardo, 2005; Szerszynski & Urry, 2002) and display a sense of *global prosociality* by upholding universal affiliation with humankind and protecting basic rights (Kant, 1991; Varsamopoulou, 2009; Yeĝenoĝlu, 2005). Embracing *cultural diversity*, cosmopolitans find "delight in difference" (Hannerz, 1990) and aspire to preserve authentic cultures (Hannerz, 1996). With unprecedented global environmental challenges arising, there are growing calls for global solidarity to address and manage these challenges. In this light, the present research timely investigates in what ways cosmopolitan orientation serves as an important psychological resource to motivate people's commitment to and engagement in pro-environmental causes. We propose that the cognitive and emotive processes, by fostering knowledge acquisition and emotional affinity toward Nature, respectively, could account for the positive relationship between cosmopolitan orientation and pro-environmentalism.

1.1. Cognitive and Emotive pathways linking cosmopolitan orientation to pro-environmentalism

From a social identity perspective, a cosmopolitan orientation can be conceived as an identity that emphasizes receptivity to and connectedness with the global community (Leung et

al., 2015). Environmental problems transcend national and cultural boundaries. As pro-environmental efforts can improve or mitigate the aversive environmental conditions faced by people across the globe, these efforts are congruent with the values embodied by a cosmopolitan identity. Research also showed that valued social identities could drive identity-consistent beliefs and behaviors (Brick, Sherman, & Kim, 2017). Therefore, we argue that cosmopolitan individuals are more likely to engage in efforts that benefit and minimize harm to humankind such as contributing to environmental conservation initiatives. Prior research has lent support for this proposition by showing that global identification or global belongingness predicts environmentally sustainable behaviors (Der-Karabetian, Cao, & Alfaro, 2014), prosocial values of environmental sustainability and a felt responsibility to act for the betterment of the world (Reysen & Katzarska-Miller, 2013), and intrinsic motivation to engage in environmental protection (Assis, Reysen, & Katzarska-Miller, 2017). Nevertheless, the specific psychological mechanisms through which cosmopolitan orientation nurtures pro-environmentalism were not systematically investigated. The present research sets out to fill this gap.

Although not directly tested, Leung et al. (2015) theorized that cosmopolitan individuals tend to be more committed to pro-environmental behaviors (PEBs), given the acquisition of more knowledge about global environmental crises and environmental protection strategies. Embedded in the larger global community, such individuals have greater access to knowledge that raises their awareness of anthropogenic climate change and propels them to readily engage in mitigation and adaptation actions (Rohrschneider & Dalton, 2002). Awareness of environmental problems tends to spur individuals to engage in PEBs. For example, tourists who are aware of the seriousness of environmental damage express greater willingness to stay at environmentally friendly hotels despite some inconveniences such as reusing towels and using

recycled products (Kim & Han, 2010). Similary, people who realize the contributions of environmentally responsible energy use to achieving their abstract goal (e.g., being a good citizen or neighbor, frugality, or looking after our children's future) are likely to sign a pro-environmental petition or use public transport to save energy (Unsworth & McNeill, 2017). Based on these findings, the present research aims to test this mediating knowledge acquisition pathway to explain why cosmopolitan orientation is positively associated with pro-environmentalism.

As environmentally responsible behaviors are not only rooted in rationality but are also "flanked and motivated by emotions" (Kals et al., 1999, p. 179), we propose an additional emotive mediating pathway underlying the positive relationship between cosmopolitan orientation and pro-environmentalism. Empirical studies document the possibility of emotions in affecting environment-related evaluations at the implicit (e.g., Korpela, Klemettilä, & Hietanen, 2002) and deliberate level (e.g., Hine, Marks, Nachreiner, Gifford, & Heath, 2007). Such findings illuminate the "motivational power of emotions," such as self-blame, fear, and guilt, in encouraging people's PEBs (Kals, 1996; Kals, Schumacher, & Montada, 1999). For instance, the expected positive emotional states (e.g., pride) arising from acting pro-environmentally lead individuals to make more environmentally friendly decisions in the future as compared to those who expected negative emotional states (e.g., guilt) arising from their failure to act pro-environmentally (Schneider, Zaval, Weber & Markowitz, 2017). General trait affect is also related to PEBs to the extent that positive affect broadens individuals' perspective, which makes them more motivated to take a proactive approach to resolve environmental problems and to engage in environment-protective behaviors (Coelho, Pereira, Cruz, Simões & Barata, 2017).

Building on these insights, the current research also examines the *emotive* pathway attesting to people's emotional affinity toward Nature (Kals et al., 1999) in addition to the *cognitive* pathway attesting to their knowledge acquisition. In particular, we focused on emotional affinity toward Nature, a concept encompassing different emotional inclinations for building strong emotional bonds with the environment and motivating nature-protective behaviors (Kals et al., 1999*).* We postulate that the sense of global affiliation and prosociality valorized by cosmopolitan individuals can foster their emotional affinity with the natural environment.

To elaborate, a cosmopolitan worldview engenders a morally rooted sense of global interconnectedness that could transcend the emotional attachment toward humankind and foster emotional attachment toward the natural environment. Consonant with this idea, other suggestive evidence revealed that identification with humankind is positively associated with feelings of belongingness to the natural world (Lee, Ashton, Choi, & Zachariassen, 2015). It has been argued that emotional connectedness toward the humanity and emotional connectedness toward Nature are positively related because these notions conceptually share a sense of unity, albeit to different entities, namely humanity and nature (Lee et al., 2015). In other words, the positive link underlying cosmopolitan individuals' feeling of being emotionally connected to humanity and the natural world could be fostered by their value that upholds the transcendence of the boundary between the human and non-human beings. Cosmopolitan individuals are more likely to recognize the intricate web of interdependencies among human and non-human living things. To them, nature is rendered a higher value and meaning as a broader eco-landscape that nurtures both human and non-human beings alike in an interactive and dynamic system.

In this light, enhancing a sense of emotional affinity toward Nature is conducive to incubating a belief that upholds environmental justice among people (Leung et al., 2015). Consistent with attitude change research, we contend that framing climate change as a global environmental challenge holds greater personal relevance to cosmopolitan individuals and thus enhances their motivation to act on the message (Maio & Haddock, 2007). With the increasingly common discourse of construing environmental issues as threatening the global natural ecosystems, cosmopolitan individuals' stronger sense of emotional attachment with Nature could provide an important impetus for their climate change mitigation actions.

This contention finds support in the empathy-sustainability hypothesis that positions empathy as a pre-requisite for sustainable biospheric activities through processes of perspective-taking and emotional attachment (Brown, Adger, Devine-Wright, Anderies, Barr, Bousquet, Butler, Evans, Marshall, & Quinn, 2019). Empathy as an emotional state can contribute to environmental sustainability because it touches on "conceptions of place, community, and identity beyond those based directly on kinship and immediate locality" (Brown et al., 2019, p.13). Akin to the belief that empathy forms part of people's emotional affinity toward Nature, cosmopolitan individuals' empathetic responses toward environmental damages could transcend geographic boundaries to motivate effective pro-environmental initiatives.

Notably, we acknowledge that there could be other factors that account for the relationship between cosmopolitanism and pro-environmentalism. As one of the early efforts to examine this timely topic, the current research sets out to focus on the cognitive (knowledge acquisition) and emotive (emotional affinity toward Nature) processes. As discussed, the study of these factors was motivated by the theoretical and empirical rationales that support the positive link between cosmopolitan orientation and pro-environmentalism. Extant research has

also offered suggestive evidence for the dual explanatory pathways through cognitive and emotive factors to explain PEBs. For example, research revealed that children who received environmental education at an institution that is close to nature tended to report high acquisition of environmental knowledge, emotional connectedness to nature, and PEBs (Collado, Staats, & Corraliza, 2013; Otto & Pensini, 2017). Similar cognitive and emotive factors also predict the intention to engage with the natural environment among young adults who grew up in rural areas (Hinds & Sparks, 2008). The current large-sample studies depart from previous studies' focus on specific environmental determinants for PEBs. We aim to advance the study of the dual pathway model by providing the first empirical evidence of the role of individuals' cosmopolitan orientation, which encompasses domain-general beliefs about the world culture that is not environment-specific, in motivating pro-environmental commitment and actions through knowledge acquisition and emotional affinity toward Nature.

Many studies have conceptualized pro-environmentalism as the willingness to engage in pro-environmental behaviors (Knussen, Yule, MacKenzie, & Wells, 2004; Mayerl & Best, 2019; Wan, Shen, & Yu, 2015). In the present research, we measured pro-environmentalism in terms of willingness for pro-environmental commitments and frequency of engaging in specific pro-environmental behaviors. Whereas the frequency measure assesses specific pro-environmental acts (e.g., taking a shorter shower), the commitment measure assesses willingness for continued commitment to pro-environmental causes that encompass more than singular behavioral episodes or acts (e.g., getting involved with an initiative aiming at the protection of the local wildlife; Montada, Kals, & Becker, 2007). These measurement scales complement each other to measure pro-environmentalism by tapping onto individuals' engagement in specific pro-environmental behaviors and their continued commitment to engaging in a range of pro-environmental actions.

2. Study 1

2.1. Participants and Procedures

As part of a larger study on PEBs, we recruited 959 Singaporeans in collaboration with a marketing company in Singapore. Sample size is based on effect size = 0.1, alpha = 0.05, and power (1-beta) = 0.80 for the two-tailed correlation. We conservatively used the small effect size because Study 1 was the first empirical study examining the hypothesized associations among the variables of interest. G*power showed the required sample size to be 779. We oversampled participants to protect against the loss of data. Participants' age ranged from 13 to 65 years (M = 35.50, SD = 11.73) and gender was equally distributed (female = 50.4%). The sample comprised mostly of full-time (71.8%) and part-time employees (8.9%) and students (11.1%). Participants completed an online questionnaire measuring their cosmopolitan orientation, environmental knowledge, emotional affinity toward Nature, and pro-environmentalism (pro-environmental commitment and frequency of PEBs). As the current study was part of a larger project focusing on recycling attitude and behavior in Singapore, participants also completed measures related to perceptions and subjective norms about recycling behavior (e.g., convenience for recycling, cost of recycling, moral norm on recycling), as well as other individual difference factors (e.g., analytic-holistic thinking scale, independent and interdependent self-construals). These other variables are unrelated to the purpose of the current research.

2.2. Measurements

2.2.1. Cosmopolitan Orientation Scale

The COS is a validated 15-item scale capturing the three core characteristics (cultural openness, global prosociality, and respect for cultural diversity) of cosmopolitan individuals

(Leung et al., 2015). Examples of items for cultural openness, global prosociality, and cultural diversity include, respectively, "I am willing to study or work abroad in another culture," "When people from other countries are in need, I will help them to the best of my abilities," and "We should celebrate cultural differences." Ratings are made on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). To reflect one's overall cosmopolitan orientation, we aggregated the means of each subscale ($r > .67$).

2.2.2. Environmental knowledge

Sixteen validated multiple-choice questions (Tan, Road, Lee, & Chuan, 1998) measuring environmental knowledge related to land, air, water, noise, nature conservation, and global concerns ($M = 8.42$, $SD = 2.88$; range = 0–14) were used. Two sample questions include "What is the major air pollutant discharged by motor vehicles?" (correct answer: carbon monoxide) and "Why does the decaying waste thrown into bodies of water kill fish?" (correct answer: using up oxygen needed by fishes in respiration). Participants selected answers among four options. The percentage of participants who incorrectly answered all questions was 1% (or 10 out of 959 participants).

2.2.3. Emotional affinity toward Nature

A validated 10-item scale was adapted (Müller, Kals, & Pansa, 2009) to capture one's attachment toward Nature. In particular, the items measure love of Nature (e.g., "I feel relaxed and have a pleasant feeling of intimacy when spending time in Nature"), feelings of freedom in Nature (e.g., "When I spend time in Nature I feel free and easy"), feelings of security in Nature (e.g., "When surrounded by Nature I get calmer and I feel at home"), and feelings of openness in Nature (e.g., "By getting in touch with Nature today I have the feeling of the same origin").

Participants rated their agreement on a 6-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*).

2.2.4. Pro-environmentalism

2.2.4.1. Willingness for pro-environmental commitment

A validated 8-item scale measured participants' willingness to behave pro-environmentally (Kals, Schumacher, & Montada, 1999; Müller et al., 2009). This measure assesses PEBs that are non-activist behaviors in the private sphere (Stern, 2000). For example, participants were asked to rate their willingness "to make regular donations (even small amounts of money) to associations that take charge of the protection of natural resources" or "to get involved with an initiative aiming at the protection of the local wildlife" on a 6-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*).

2.2.4.2. Frequency of PEBs

A validated 11-item scale was adopted (Tan et al., 1998) to measure the frequency of PEBs such as turning off the lights in unused rooms, taking shorter showers, or littering when nobody is watching (reverse item). Participants rated the frequency of each behavior as "never," "seldom," "sometimes," or "always."

2.3. Results

We first analyzed the reliability of scales. The reliability was high for the COS (α = .93), the emotional affinity toward Nature scale (α = .89), and the willingness for pro-environmental commitment scale (α = .79). After discarding three items from the environmental knowledge scale and three items from the frequency of PEBs scale that showed an item-total correlation of less than 0.2 (Everitt, 2002), the Cronbach's alpha became .70 and .61[2] for the two scales,

respectively. Item-total statistics showed no further improvement for alpha value by removing an additional item.

We then used the SPSS PROCESS macro (Model 4; Hayes, 2013) to test the hypothesized multiple mediation models (see Table 1 for details). The sampling iterations to estimate bootstrapped standard errors (SEs) and confidence intervals (CIs) were set to 5,000. Predictors were centered around the mean, and participants' age, household income, and the highest education level attained were control variables.

As hypothesized, both environmental knowledge and emotional affinity toward Nature mediated the relationship between COS and the willingness for pro-environmental commitment. The indirect pathways through environmental knowledge (95% CI_{Boot} [.017, .049]) and emotional affinity toward Nature (95% CI_{Boot} [.205, .292]) were both significant (see Figure 1a). Similarly, the relationship between COS and frequency of PEBs was also mediated by environmental knowledge and emotional affinity toward Nature, in that the indirect pathways through environmental knowledge (95% CI_{Boot} [.009, .025]) and emotional affinity toward Nature (95% CI_{Boot} [.055, .095]) were both significant (see Figure 1b). These results support the parallel functions of cosmopolitan orientation in facilitating pro-environmentalism through the cognitive and emotive pathways[3].

3. Study 2

3.1. Participants and Procedures

To replicate and generalize the findings of Study 1, we recruited 220 American Mturk participants (61% female) to complete a preregistered study (https://aspredicted.org/x8d89.pdf). We removed the data from 20 participants who failed to pass an attention check questions. Sample size is based on effect size = 0.2, alpha =0.05, power = 0.80 for the two-tailed

correlation. The effect size was increased from small in Study 1 to small-to-medium in Study 2 after considering the strength of associations among the variables as observed in Study 1. The required sample size calculated by G*power was 150. We oversampled participants to protect against the loss of data. Participants' age ranges from 21 to 67 years (M = 37.81, SD = 11.2). Participants identified themselves as American (65% Caucasian American, 12% African American, 11% Asian American, 5% Hispanic or Latino, and 7% Others). As Study 2 was a replication of Study 1, participants completed only the targeted scales identical to those described in Study 1, which measure the variables of interest in the current research.

3.2. Results

Similar to Study 1, the reliability was high for the COS (α = .93), the emotional affinity toward Nature scale (α = .92), and the willingness for the pro-environmental commitment scale (α = .82). Consistent with Study 1, the reliability of the environmental knowledge and PEB frequency scales was relatively lower. After discarding five items from the environmental knowledge scale and three items from the PEB frequency scale that showed an item-total correlation of less than 0.2 (Everitt, 2002), Cronbach's alpha became .65 and .59 for the two scales, respectively.[2] The decision to remove the scale items was based on the results of the data analysis and therefore not pre-registered.

Next, following the analytical procedure in Study 1, we used the SPSS PROCESS macro (Model 4; Hayes, 2013) to test the hypothesized multiple mediation models (see Table 2 for details). Replicating the results of Study 1, Study 2 likewise indicated that both environmental knowledge and emotional affinity toward Nature mediated the relationship between COS and the willingness for pro-environmental commitment. The indirect pathways through environmental knowledge (95% CI_{Boot} [.002, .049]) and emotional affinity toward Nature (95% CI_{Boot} [.116,

.262]) were both significant (see Figure 2a). Similarly, the relationship between COS and frequency of PEBs was also significantly mediated by environmental knowledge (95% CI_{Boot} [.001, .028]) and emotional affinity toward Nature (95% CI_{Boot} [.043, .115]; see Figure 2b). Overall, the results of Study 2 replicated those of Study 1 with a Western sample, offering consistent support for the value of cosmopolitan orientation in fostering pro-environmentalism through the cognitive and emotive pathways among both Singaporean and American respondents.

4. General Discussion

The current findings provide the first direct evidence supporting both the cognitive and emotive bases that drive cosmopolitan individuals to be more committed to and engage in PEBs. Across two studies with participants from distinct societies, the results reveal a consistent pattern – individuals with higher levels of cosmopolitan orientation tend to acquire environmental knowledge and show stronger emotional affinity toward Nature, which in turn predicted their pro-environmental commitment and engagement in PEBs.

The current research sheds light on two possible pathways through which a cosmopolitan orientation can motivate pro-environmental initiatives. A cosmopolitan orientation encourages individuals to understand, care, and act on behalf of the broader global community. Given the global and trans-boundary mindset of cosmopolitan individuals, they could gain more accessibility and receptivity to environmental knowledge. Their collective pro-social stance could also foster stronger emotional connectedness with Nature. Together, they become more readily committed to and act on environmental causes.

Some studies have suggested that environmental knowledge can promote more positive emotional responses to Nature (e.g., Kim, Kim, & Thapa, 2018). The current findings add to the

literature by showing that environmental knowledge and emotional affinity toward Nature are positively but not strongly correlated with each other (Study 1: r = .21; Study 2: r = .17). The findings suggest that knowledge about environmental issues may not necessarily drive emotional connectedness with Nature or vice versa. In other words, both the cognitive and emotive pathways can demonstrate unique explanatory power that independently contributes to pro-environmental efforts.

Interestingly, while there is compelling evidence that a cosmopolitan outlook is equally effective in promoting both emotional ties with Nature (Study 1: b = .57; Study 2: b = .46) and cognitive understanding of environmental issues (Study 1: b = .68; Study 2: b = .44), the effects of emotional affinity toward Nature on both commitment to and frequency of PEBs were stronger than those of environmental knowledge (Study 1: b = .43 vs. .04 and b = .13 vs. .02, respectively; Study 2: b = .40 vs. .05 and b = .17 vs. .02, respectively). Prior research revealed that emotional connections with Nature are more likely to be developed through direct encounters with Nature, coupled with the sharing of such experiences with significant others or supporting family norms (Finger, 1994; Kals, Schumacher, & Montada, 1999). Therefore, one reason as to why emotional affinity toward Nature is a stronger predictor of PEBs might be that the associated intimate personal encounters and shared social experiences with Nature may serve as a more powerful motivational drive for pro-environmental acts compared to acquiring environmental knowledge, which may not require direct contact with Nature.

Relatedly, another recent research found that the endorsement of biospheric values plays a more important role than environmental knowledge in motivating eco-driving intentions (Ünal, Steg, & Gorsira, 2018). The identification with biospheric values such as showing respect for the earth and unity with nature captures a sense of self-transcendence (Jakovcevic & Steg, 2013),

thus sharing conceptual similarities with an emotional affinity toward Nature. It is reasonable to speculate that the acquisition of environmental knowledge may fall short of elevating similar levels of motivational drive toward pro-environmental efforts as compared to emotional attachment with Nature that is more value-laden. It is also evident in earlier research that whereas cognitive motivation cannot sufficiently explain nature-protective behaviors, emotional affinity toward nature emerged to be an important explanatory mechanism (Kals et al., 1999).

Taken together, the current research explicates the explanatory mechanisms for why a cosmopolitan orientation can predict PEBs. Cosmopolitanism provides two valuable motivational sources – the acquisition of more environmental knowledge and emotional affinity with Nature – to promote commitment to and frequency of engaging in pro-environmental initiatives.

4.1. Theoretical and Practical Contributions

The current research bears theoretical and practical importance in understanding the psychology of environmental protection. On the theoretical front, one important way the findings advance the environmental psychology literature is by accentuating the value of endorsing domain-general beliefs in fostering pro-environmentalism. Many studies have identified pro-environmental beliefs as characterized by specific identities or orientations (e.g., green self-identity, see Whitmarsh & O'Niell, 2010) as antecedents to PEBs. Through embracing domain-general beliefs such as upholding global justice and responsibility and endorsing an inclusive identity, a cosmopolitan perspective offers a unique vantage point that advances understanding of pro-environmentalism through complementary cognitive and emotive processes.

Despite the pivotal role of globalization in facilitating interconnectedness and integration

among people across the globe, globalization has often been blamed for creating and exacerbating a plethora of environmental degradation problems (Christoff & Eckersley, 2013). In light of this unfavorable link between globalization and environmental sustainability, the current research offers a more positive and novel reinterpretation. Through greater global interconnectedness, globalization brings people from different cultures together and fosters the emergence of cosmopolitanism (Leung et al., 2015). By extension, the present research reappraises the value of globalization in encouraging global-level collective actions to ameliorate global environmental problems via a cosmopolitan outlook.

On the practical front, the current research not only reaffirms the need for environmental campaigns to promote the greater acquisition of environmental knowledge but also highlights the advantages accrued to emotional appeal (Bamberg & Möser, 2007) through cultivating an emotional attachment with Nature. While environmental knowledge is conceived as an indispensable component of environmental education (Liobikienė & Poškus, 2019), the current studies revealed that emotional connectedness with Nature could also be a strong predictor of pro-environmentalism. In this light, environmental education can also incorporate efforts to help people develop a sense of emotional attachment to Nature (Liefländer, Fröhlich, Bogner, & Schultz, 2013). For instance, environmental education program or campaign might explore possibilities to promote emotional affinity toward Nature through engaging people in multi-sensory experiences with the natural environment in virtual reality (e.g., encountering the virtual experience of freshwater depletion or water pollution in a society). More broadly, the current research also attests to the importance of inculcating a cosmopolitan perspective in the curriculum of environmental education. By fostering a cosmopolitan mindset and an identification with the humankind (Tye, 2014), environmental education or intervention program

can reap important motivational benefits in mitigating global environmental challenges.

4.2. Study Limitations

Although the current research offers numerous insights into the pro-environmental benefits of endorsing a cosmopolitan orientation, the studies are not without limitations. Addressing these research shortcomings would open up fruitful avenues for future research.

As in most studies in environmental psychology, the current research relied on self-report measures of PEBs (Steg & Vlek, 2009) rather than actual PEBs. Notwithstanding the advantages afforded by self-report methodology, self-report measures may raise concerns about social desirability bias and over-reported PEBs (Barr, 2007). Nevertheless, a recent meta-analysis showed a positive and strong association between self-report and objective PEB measures (Kormos & Gifford, 2014). Further, the current research aimed to reduce the potential for social desirability bias by conducting the two studies anonymously (Kormos & Gifford, 2014). Regarding validity concerns about self-reports, future research can include behavioral checks on self-report measures or more objective measures of PEBs. For example, actual energy consumption can be measured by utility records (Warriner, McDougall, & Claxto, 1984).

Due to the correlational nature of the current cross-sectional design, it should be noted that no causal inferences can be made about the studied variables based on the present findings. Indeed, additional analyses supported the possibility of reverse causation or reciprocal causation (see Endnote 3). It is conceivable that reciprocal relationships exist among cosmopolitan orientation and emotional affinity toward Nature, as well as between cosmopolitan orientation and environmental knowledge acquisition. For example, the rising prominence of global environmental issues within the mainstream media might contribute to gaining environmental knowledge and a cosmopolitan worldview at the same time. Increased acquisition of

environmental knowledge and a cosmopolitan outlook can feedback to and reinforce each other. Future studies could employ an experimental or longitudinal design to better establish causality. For example, researchers could experimentally induce higher levels of cosmopolitan orientation or have participants go through an intervention program that inculcates a cosmopolitan worldview and then observe longitudinally its prolonged effects on environmental knowledge acquisition and emotional affinity toward the environment over time. Although not establishing the causality, the current research adds new knowledge to the prior literature about the positive association between cosmopolitan orientation and pro-environmentalism by identifying that such a positive association can be contributed by higher levels of emotional affinity toward Nature and environmental knowledge. These correlational findings await future research to confirm their directionality of relationships.

5. Conclusion

Set against the realities of pressing global environmental challenges that call for solidarity across borders, the current research addresses the timely question: How might the growing interconnectedness of the world be leveraged to further this global agenda? Towards this end, we present two studies offering consistent evidence on how a global perspective inspired by cosmopolitanism can strengthen commitment and inspire action toward pro-environmentalism. By increasing individuals' receptivity to acquiring environmental knowledge and building an emotional bond with Nature, a cosmopolitan worldview might fortify their pro-environmental commitment and compel climate change mitigation actions.

Endnotes

1. This project was approved by the Institutional Review Board at the first author's institution (IRB-2017-05-032-01).
2. One explanation for the relatively lower reliability of the PEB frequency scale is that such a frequency scale presents a diverse set of behaviors that people can act on to show their pro-environmental consciousness. Although all of these are pro-environmental behaviors, chances are people may not have engaged in such behaviors with the same magnitude, thus explaining the lower internal consistency across items. For example, it is reasonable to argue that people who frequently take shorter showers may not also frequently avoid excessive packaging, frequently avoid using air-conditioners while sleeping, and frequently choose products with green labels. If we compare Person A who is more pro-environmental than Person B, the overall frequency of engaging in the PEBs would be higher for Person A than for Person B, but Person A may not have engaged in all the PEBs with the same magnitude because the scale taps into a diverse array of pro-environmental acts. Due to this inherent nature of the frequency measure, its inter-item consistency is reasonably lower than the convention of acceptable alpha of .70. It is important to interpret alpha in the context of the measured construct and not adhere simply to the conventional cut-off value (Schmitt, 1996).
3. We also reversed the IV and the two mediators to test the mediating role of COS in the relationship between environmental knowledge and pro-environmentalism and between emotional affinity toward Nature and pro-environmentalism and found that all indirect effects were significant, as indicated by 95% CIs excluding zero. These results suggest the possibility that cosmopolitan orientation and emotionally affinity toward Nature, as well as cosmopolitan orientation and acquisition of environmental knowledge could be reciprocally

reinforcing each other. Nevertheless, the current research adds new knowledge to the prior finding on the positive association between cosmopolitan orientation and pro-environmentalism by explicating that such a positive association can be contributed by higher levels of emotional affinity toward Nature and environmental knowledge.

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Tables

Table 1. Correlations among Cosmopolitanism Orientation, Environmental Knowledge, Emotional Affinity toward Nature, Willingness for Pro-environmental Commitment, and Frequency of PEBs in Study 1.

Variables	1	2	3	4	5
1. COS	–				
2. Environmental Knowledge	.18***	–			
3. Emotional Affinity toward Nature	.48***	.21*	–		
4. Willingness for Pro-environmental Commitment	.54***	.28***	.64***	–	
5. Frequency for PEBs	.32***	.25***	.41***	.46***	–
M(SD)	4.50 (.77)	7.79 (2.89)	4.42 (.86)	4.53 (.79)	3.11 (.39)
α	.94	.70	.89	.88	.61

Note. COS =Cosmopolitan orientation Scale, PEBs = Pro-environmental behaviors

*$p < .05$; **$p < .01$; ***$p < .001$

Table 2. Means, Standard Deviations, Regression Coefficients, Standard Errors, 95% CI, Cohen's *d* and Model Summary for the Effect of Cosmopolitan Orientation on Willingness for Pro-Environmental Commitment and Frequency of PEBs via Environmental Knowledge and Emotional Affinity toward Nature in Study 1.

Outcomes		Environmental knowledge (M_1)			Emotional affinity toward Nature (M_2)			Willingness for pro-environmental commitment (Y_1)			Frequency of PEBs (Y_2)		
Predictors	*M* (*SD*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)
Constant	—	3.69	.66	< .001	1.60	.18	< .001	1.56	.12	< .001	2.31	.09	< .001
Cosmopolitanism orientation (X)	4.50 (0.76)	.68 (.44, .92)	.12	< .001 (.36)	.57 (.51, .63)	.03	< .001 (1.14)	.30 (.24, .35)	.02	< .001 (.68)	.08 (.05, .12)	.02	< .001 (.32)
Environmental knowledge (M_1)	7.79 (2.89)	—	—	—	—	—	—	.04 (.02, .05)	.01	< .001 (.36)	.02 (.02, .03)	.004	< .001 (.39)
Emotional affinity toward Nature (M_2)	4.41 (0.86)	—	—	—	—	—	—	.43 (.39, .48)	.02	< .001 (1.14)	.13 (.10, .16)	.02	<.001 (.56)
Control													
Age	—	−.002	.01	.78	.01	.002	< .001	−.001	.001	.47	.003	.001	.001
Household income	—	−.004	.04	.93	−.03	.01	.01	−.008	.01	.43	−.01	.01	.28
Educational attainment	—	.18	.05	< .001	−.002	.01	.87	.004	.01	.74	−.02	.01	<.001
		R^2 = .048 F(4, 948) = 11.862, p < .001			R^2 = .255 F(4, 948) =81.200, p < .001			R^2 = .495 F(6, 946) = 154.690, p < .001			R^2 = .229 F(6, 946) = 46.857, p < .001		

Table 3. Correlations among Cosmopolitanism Orientation, Environmental Knowledge, Emotional Affinity toward Nature, Willingness for Pro-environmental Commitment, and Frequency of PEBs in Study 2.

Variables	1	2	3	4	5
1. COS	–				
2. Environmental Knowledge	.15*	–			
3. Emotional Affinity toward Nature	.38***	.17*	–		
4. Willingness for Pro-environmental Commitment	.55***	.27***	.60***	–	
5. Frequency for PEBs	.22**	.25***	.46***	.48***	–
M(SD)	4.84 (.86)	7.09 (2.36)	4.79 (.97)	4.61 (.87)	2.97 (.40)
α	.93	.65	.92	.82	.59

Note. COS =Cosmopolitan orientation Scale, PEBs = Pro-environmental behaviors

*$p < .05$; **$p < .01$; ***$p < .001$

Table 4. Means, Standard Deviations, Regression Coefficients, Standard Errors, 95% CI, Cohen's *d* and Model Summary for the Effect of Cosmopolitan Orientation on Willingness for Pro-Environmental Commitment and Frequency of PEBs via Environmental Knowledge and Emotional Affinity toward Nature in Study 2.

Outcomes		Environmental knowledge (M_1)			Emotional affinity toward Nature (M_2)			Willingness for pro-environmental commitment (Y_1)			Frequency of PEBs (Y_2)		
Predictors	*M* (*SD*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)	*b* (*CI*)	*SE*	*p* (*d*)
Constant	—	4.44	1.51	.004	2.65	.57	< .001	.60	.43	.16	1.77	.24	< .001
Cosmopolitanism orientation (X)	4.84 (0.86)	.44 (.05, .82)	.19	.03 (.32)	.46 (.32, .61)	.07	< .001 (.91)	.37 (.26, .48)	.06	< .001 (.92)	.02 (−.04, .09)	.03	.43 (.11)
Environmental knowledge (M_1)	7.09 (2.38)	—	—	—	—	—	—	.05 (.01, .09)	.02	.007 (.39)	.03 (.004, .05)	.01	.02 (.34)
Emotional affinity toward Nature (M_2)	4.79 (0.97)	—	—	—	—	—	—	.40 (.30, .50)	.05	< .001 (1.12)	.17 (.11, .22)	.03	<.001 (.83)
Control													
Age	—	.03	.02	.09	.01	.006	.02	−.004	.004	.39	.005	.002	.04
Household income	—	.08	.10	.40	.02	.02	.23	.007	.01	.57	−.01	.007	.14
Educational attainment	—	.08	.10	.40	−.07	.03	.04	.007	.02	79	<.001	.01	.998
		R^2 = .039 F(4, 195) = 1.958, p = .10			R^2 = .193 F(4, 195) =11.624, p < .001			R^2 = .503 F(6, 193) = 32.509, p < .001			R^2 = .265 F(6, 193) = 11.613, p < .001		

Figures

Figure 1. Multiple mediation analysis for the effect of cosmopolitan orientation on willingness for pro-environmental commitment (Figure 1a) and frequency of PEBs (Figure 1b) via participants' environmental knowledge and emotional affinity toward Nature. *** $p < .001$

Figure 1a.

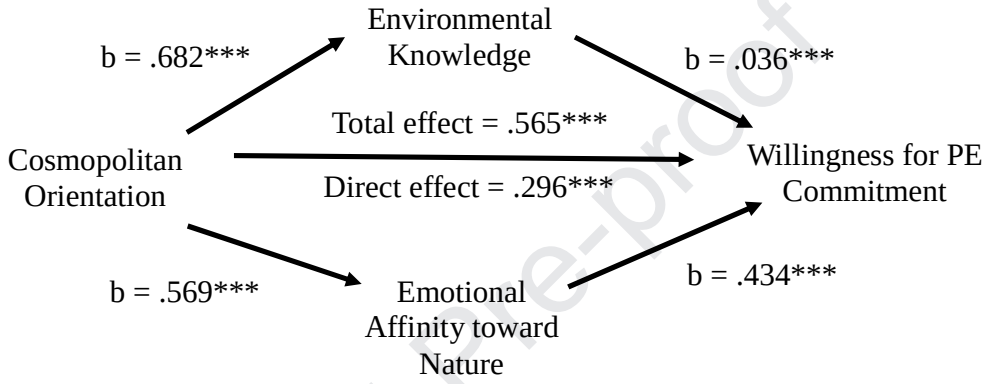
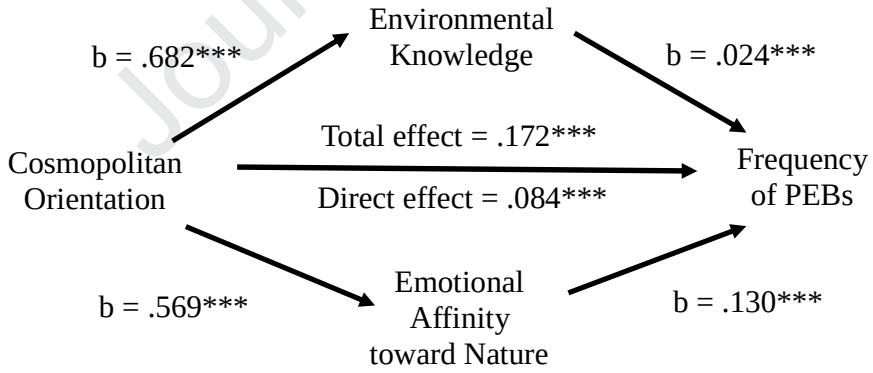


Figure 1b.



Figures

Figure 2. Multiple mediation analysis for the effect of cosmopolitan orientation on willingness for pro-environmental commitment (Figure 2a) and frequency of PEBs (Figure 1b) via participants' environmental knowledge and emotional affinity toward Nature. * p <.10, ** p <.01, *** p <.001

Figure 2a.

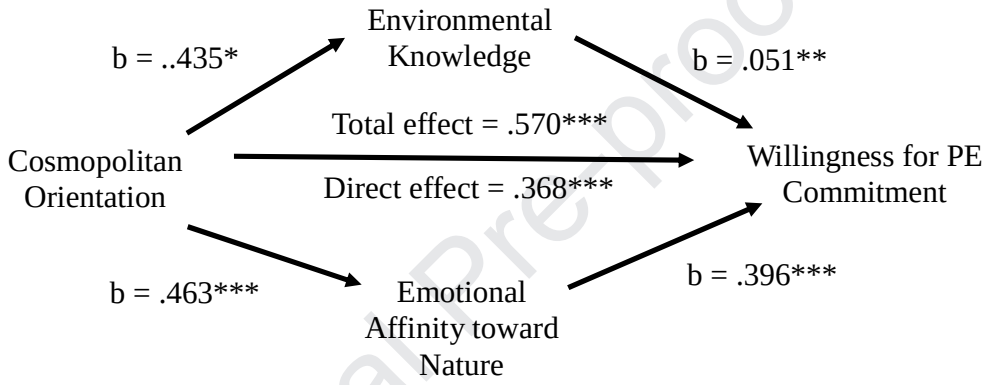
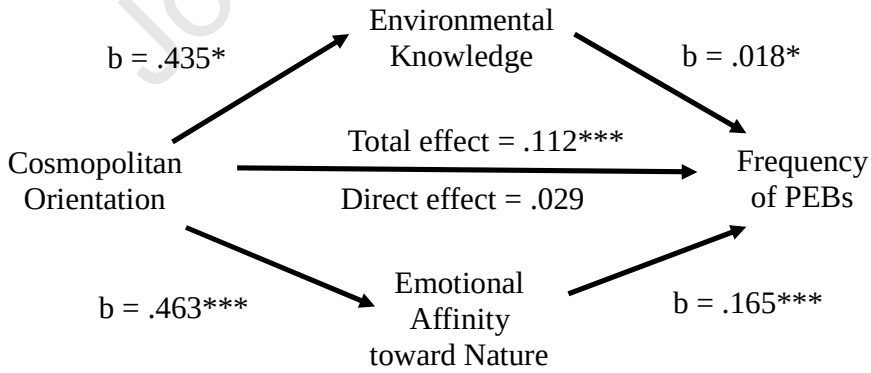


Figure 2b.



Highlights

- Individuals' cosmopolitan orientation is positively associated with their commitment to and frequency of pro-environmental behaviors.
- Cosmopolitan individuals' environmental knowledge and emotional affinity toward Nature simultaneously mediates the associations between cosmopolitanism orientation and their commitment to and frequency of pro-environmental behaviors.
- Emotional affinity toward Nature impacted pro-environmental commitment more than environmental knowledge.
- The same pattern of results was observed in the U.S. and Singapore.