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Cross-Cultural Validation of a Revised Environmental Identity Scale

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Abstract: The environmental identity (EID) scale, first published in 2003, was developed to measure individual differences in a stable sense of interdependence and connectedness with nature. Since then, it has been reliably correlated with measures of environmental behavior and concern. However, the original scale was developed based on U.S. college students, raising questions about its validity for other types of populations. This study revised the EID scale and tested it in five countries (four continents) with a total sample size of 1717 participants. Results support strong internal consistency across all locations. Importantly, EID was significantly correlated with behavior and with environmental concern. This research gives us greater confidence that the EID construct is meaningful across different cultural contexts. Because the revised EID was designed to be relevant to a wider range of people and experiences, it is recommended as a replacement for the 2003 version.

Keywords: environmental identity; reliability; cross-cultural validity; pro-environmental behavior

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1. Introduction

Individual behavioral choices are important to promoting environmental sustainability [1]. Although any given behavior is likely to be influenced by contextual factors such as framing, nudges, and salient social cues, long-term patterns of behavior are often reflective of stable individual tendencies such as attitudes, values, and identity [2,3]. Some identities, including political identity and place identity, may affect pro-environmental behavior because of the social implications and interpretations associated with particular environmental actions. Other types of identities, linked to sustainability or to the natural environment, are more generally relevant in motivating sustainable behaviors. For those whose identity is linked to the natural environment, environmental issues are likely to have greater emotional resonance, and pro-environmental behaviors are likely to be positively evaluated [4]. These implications for motivation and behavior make it useful to assess individuals' level of environmental identity.

The concept of self-identity refers to a socially-motivated attributional tendency, whereby people use self-descriptive items to indicate the social groups they belong, or aspire to belong, to [5]. Applied to the sustainable behavioral domain, a pro-environmental self-identity may be reflected in self-views such as "I have an environmentally-friendly

lifestyle", and "I am an environmentally-friendly consumer" [6]. A closely related concept is environmentalist identity, referring to affinity with socio-political movements that strive for the global well-being of eco-systems [7]. With such identities, people are locating themselves within a network of social groups.

Another type of identity, environmental identity (EID), describes a person's self-understanding as an integrated component of the natural environment, and thus has the potential to influence any behavior that an individual perceives as environmentally relevant or having environmental impact. The self-definitional perspective of EID is somewhat different from the socially-oriented perspectives described above. While the latter emphasize the social identity of a person and how group belonging may foster personal behaviors that are aligned with the group's norms, the former stresses one's individual self-view and focuses on the processes that may lead people to view themselves in relation to a higher-order, non-social entity represented by the natural environment. Recent research has attempted to unify these different perspectives under the overarching framework of ecological identity and supports the assertion that both individual and social components of environmental identity contribute to engagement in pro-environmental behaviors [8].

The Environmental Identity scale (EID) was developed to assess people's felt relationship to the natural world, including both cognitive and emotional components [9]. Like other aspects of identity, the relationship with nature is fairly stable, and may be rooted in early experiences and upbringing [10,11]. People with a strong environmental identity feel a sense of connection to, and interdependence with, the natural world that affects the way they think about nature, as well as the way they think about themselves, and that makes nature emotionally significant to them. Thus environmental issues are likely to be less psychologically distant, and attract greater attention from people with a strong EID.

Interest in the study of human interaction with nature arose in different scientific directions simultaneously; the result was an abundance of terms that partially overlap. We distinguish between a class of concepts that describe attachment to nature, and a class of concepts describing the person's relationship with nature.

Connectedness to nature describes people's involvement in ecosystem processes (e.g., landscapes, the spectrum of habitats, nature artifacts) and their emotional attachment to the elements in these environments [12]. This term is correlated with, but does not include, beliefs, values, attitudes, behaviors, and experiences with and about nature [13]. It may be a measure of a temporary state or in other cases incorporate a more stable tendency. Some concepts focus on the single components of connection to nature. So, emotional affinity towards nature [14], similar to connectivity with nature [15], studies the emotional aspect, while commitment to nature reflects people's felt obligations to nature, e.g., behavioral attitudes [16]. Some measures are multidimensional: nature relatedness [17] has affective, cognitive, and experiential aspects. Attachment to the plant world reflects people's attitudes to the flora as a specific part of nature [18].

Many terms are also used in research regarding personality in relation to nature. Nature connectedness is a personal trait responsible for the extent to which individuals include nature as part of their self-definition [17]. *Inclusion of nature in self* [19], similar to an Allo-inclusive identity [20] focuses on the cognitive component of closeness to nature, whereas Sense of Oneness [21] is a global belief in the interconnectedness of people with the natural and social world. Environmental identity [9] incorporates emotional, behavioral, and cognitive aspects of a person's perceived relationship to the natural world.

Each of the concepts listed above is supported by the relevant tool. A recent review examined 26 different tools used to measure connection to nature [13] and recommended eight that might be useful to practitioners, including Environmental Identity (EID) [9], Connectedness to Nature (CTN) [22], Nature Relatedness (NR) [17], and the Inclusion of Nature in Self (INS) [19]. Not surprisingly, most of these measures have been found to be positively correlated with each other. Several comparisons, however, have found the EID

to be a stronger predictor of behavior, or more reliable, than some of the other measures [23, 24, 25]. EID scores are strongly correlated with environmental concerns, values, and activities [9, 24, 25, 26, 27, 28]. One study found that EID was positively correlated with several scales related to gardening, including pro-environmental gardening behavior, engagement with natural processes, and an overall sense of gardening identity [29].

Identities are linked to values, and biospheric values are part of people's worldview in which people evaluate events and facts based on costs/benefits to the biosphere or its parts [30]. People high in EID tend to accord greater moral standing to nature and to animals, to endorse biospheric values, and to have an egalitarian, nonhierarchical worldview that acknowledges their own interdependence with the natural world rather than dominance over it [9, 31].

From a broader theoretical point of view, the conceptualization and relevant measurement of environmental identity proposed by Clayton [9] reflects the notion of identity centrality in identity theories [32, 33]. If an identity is more (vs. less) central to a person, it means that the relevant aspects that define that identity will play a more important role in self-definition. Similarly, environmental identity is defined as "a belief that the environment is important to us and an important part of who we are" [9, p. 45–46]. Thus, the concept of environmental identity is well validated as a predictor of behavior, attitudes, and values, as well as being linked to more general theory about identity.

Interest in evaluating, enhancing, and assessing human relationships with nature has become increasingly apparent. A survey of the listserv subscribers of the North American Association for Environmental Education (NAAEE) and the Children & Nature Network (C&NN) in summer 2018, with 1038 participants, found that 83% were involved in studies or programs that incorporated the idea of connections to nature [34]. A search of the Psychology and Behavioral Sciences collection on EBSCO Host (on December 14, 2020) looking for "environmental identity" or "connect* to nature" returned 6665 results. With a large body of research focused on the human relationship with the natural world and the implications of this relationship for physical and mental health, the utility of relevant, validated measures is clear.

Research attests to high internal reliability as well as validity of the EID scale, both in its original 24-item form and in a shortened, 11-item version. EID scores have been found to correlate with both environmental concern and pro-environmental behavior [25, 35]. However, although the EID has been used in a number of countries [11, 25, 36, 37, 38], it was developed and validated using U.S. college students. For this reason, the items might have been too closely targeted to a WEIRD (Western, educated, industrialized, rich, democratic) sample and failed to adequately capture the perceptions of different groups.

Attitudes toward nature are likely to vary cross-culturally, due to cultural differences such as individualism/collectivism [39, 40]. Several studies have examined environmental attitudes across different countries and found that they vary significantly in tandem with particular cultural variables. Individualistic cultures tend to manifest stronger pro-environmental values, as well as stronger links between environmental attitudes and behavior. Power distance and indulgence, other dimensions of cultural difference, have also been linked to pro-environmental attitudes [41]. Not only attitudes, but also more fundamental ways of conceptualizing the natural world and people's place in it, vary across cultures [42]. Patterns of behavior associated with different geography and occupation are also likely to affect the ways in which people think about their relationship with the natural world; even within a country, ways of experiencing nature will vary across different social contexts [43, 44].

In 2018, the Pisces Foundation funded researchers and staff from the University of Florida, Stanford University, the North American Association for Environmental Education (NAAEE), and the Children & Nature Network to collect, evaluate, and organize tools and approaches that measure connection to nature [13]. The primary goal of this project was to create a guidebook that makes the most useful tools more accessible to practitioners. The project began with a literature review to identify the most commonly referenced

and recognized tools that assess constructs related to connection to nature. Based on this core, the project team sought additional tools that used different approaches. The team also identified experts who were developing or using connection to nature assessment tools; these experts were invited to join a learning group in order to discuss and reflect on the selected tools that help us understand and measure connection to nature. In October 2018, 23 researchers and practitioners (22 in person and 1 virtual) met prior to NAAEE's Annual Research Symposium and Conference to participate in a two-day workshop to review, critique, and compare 26 tools that could be used to assess connection to nature, and to explore additional needs and gaps in this work, for both practitioners and researchers.

During the workshop, the group found that many of the existing metrics for people's relationship to nature tend to describe nature using terms that privilege wilderness experiences or frequent encounters with untrammeled nature, and fail to account for the mundane nature encounters, such as leafy trees and gardens, that are more commonly experienced by urban and suburban residents. As such, they may not accurately assess relationship to nature among these populations. As a result, we decided to revisit the Environmental Identity Scale to explore the degree to which it was applicable to urban and cross-cultural populations. The goal of the present research was to reexamine the EID items, update them to be more inclusive of a broad variety of populations and experiences, and test their reliability and validity in a diverse multinational sample.

2. Materials and Methods

2.1. Item Development

We started with informal discussions of the existing measure at the 2018 workshop. We continued these discussions via email and recruited additional colleagues, in order to address two main questions: First, are the items likely to be understood by a diverse population, or do they need to be clarified? Second, are there items that should be added or deleted to more effectively reflect the perspectives of diverse populations? In addition to the authors of this paper, these discussions also benefitted from feedback from a French colleague and from several people who reviewed the items with inner-city youth in the U.S.

We also obtained pilot data from convenience samples using three open-ended questions: 1. What comes to mind when you think of nature? 2. In what ways do you encounter nature in a typical day or week? 3. Some people say they feel a strong connection with nature. What does that mean to you? We examined responses to these questions to look for themes or behaviors that were not included in the original EID. For example, many people indicated that a connection to nature could be expressed either behaviorally or emotionally. We also added two items that reflected the impact of being in nature on one's mental state.

Our main alterations to the original scale were to change some of the item wording to make it clearer and more generalizable. We also emphasized encounters with elements of nature, such as trees or grass, that could occur anywhere, even for urban residents. However, we tried to remain consistent with the intent of the items in the original EID scale and changes were fairly minor. The resulting 14 items of the Revised EID scale, and comparison to the original scale, are presented in Appendix A.

2.2. Main Study

In order to investigate the reliability and validity of the Revised EID scale, seven samples were obtained from five countries. We used our existing networks to include a broad range that included Eastern and Western, Northern, and Southern countries. Our goal was to obtain at least 200 participants in each location, though we still included the sample when it was not possible to reach that sample size. The samples were primarily convenience rather than representative samples, but they were not distinguished by any special relationship to the natural environment or environmental issues except in the case of the U.S. visitors to zoos and other natural leisure settings. Characteristics of the samples can be seen in Table 1.

Table 1. Description of samples.

Sample Description	Compensated?	N	Online?	Age	Gender
A: US residents MTurk sample	$.50	220	online	18–75+	36% F 74% M
B: US visitors to North Carolina zoos and other natural leisure settings	no	484	in person	18–90	58% F 42% M
C: US high school students, Chicago 86% African-American 11% mixed-race	no	45	in person	10–24	62% F 38% M
D: Russian university students Range of education levels and religion	no	310	online	18–75+	80% F 19% M
E: Swiss university students Range of citizenships and Cultural backgrounds	no	343	online	18–41	36% F 64% M
F: Taiwanese undergraduate students A range of majors	small gift	91	online	19.8 (mean)	79% F 21% M
G: Peru 29% farmers/stockbreeders 24% people in tourism 27% urban residents 17% rural residents	small gift	224	in person	17–80	45% F 55% M

Participants were asked to rate 14 items on a 1–7 scale (see Appendix A). In addition to the 14 items on the revised EID scale, most of the samples were also asked to complete one item assessing environmental concern, and to complete a six-item behavior scale asking them to rate the frequency with which they recycled, conserved water or energy at home, worked to improve wildlife habitat, talked to others about environmental issues, voted in support of environmental policy, or signed a petition about an environmental issue. These items were rated on a 5-point scale from "never" to "very often". Some demographic measures concluded the survey (Not all measures were obtained from all samples.).

As necessary, the questionnaire was translated into the local language using a back-translation design [45, 46]. In Peru, each item was independently translated into Spanish by two translators with proficiency in both Spanish and English, both of whom were trained in the basic psychometric aspects of item construction and were experts in the field of environmental psychology. The two translations were compared and discussed until a consensus version of each item was obtained. In some items, modifications were made in order to have a better adaptation to the cultural setting, for example: Item 1, I like to spend

time in natural settings (such as woods, local parks, lake or beachfront, or a leafy yard or garden), Item 1, Spanish version, (Me gusta pasar el tiempo en entornos naturales como bosques, parques locales, lagos o la playa, o un jardín o un patio amplio, ríos, pastizales, montañas). Item 1 included rivers and grasslands, which are common places where people in Peru spend time. In order to obtain empirical data on the functioning of the instrument, a pilot study was carried out with the voluntary participation of 20 people, all residents of the city of Cusco, Peru.

In Russia, the original items were translated separately by two independent Russian researchers; they discussed edited items and came to a consensus. Some wordings were feminized. This version was sent to a bilingual Russian psychologist who had been working in a UK University for more than seven years for back-translation. The statements that were different from the original ones after the back-translation were edited in Russian and re-translated into English. There were several such iterations until the optimal translation was obtained.

The Swiss sample received the scale in English.

In Taiwan, each item of the EID scale was translated into Mandarin Chinese by the Taiwanese author of this article and then reviewed by another Taiwanese scholar with a PhD in environmental resources and education. In discussion, both agreed to adjust the wordings of some items to better adapt to the Taiwanese cultural setting. For example, the Chinese translation of "who I am" in item 6 (Behaving responsibly toward nature -- living a sustainable lifestyle -- is important to who I am) is hard to translate in Taiwanese context. Therefore, we adopted the term "myself" to replace the original sentence of "who I am." In Chinese, these two terms have very similar meaning. But the term "myself" is more simplified and understandable to Taiwanese undergraduates. Another example is the word "setting" in item 1 and 14. In Chinese, "setting" and "environment" have very similar meanings. Hence, the wording was unified by using "environment" to replace "setting". To ensure face validity, the translated Chinese EID scale was sent to the professors who would help to deliver the survey at three universities to check the readability for their undergraduates.

Institutional review approval was obtained for each sample, and ethical guidelines were followed.

2.3. Analyses

Data were screened for missing values. Cases exhibiting missing values for more than 50% of items, for the factor environmental identity, were removed. A total of two cases were removed. Data were screened for univariate and multivariate outliers following Tabachnick, Fidell, and Ullman [47]. One univariate outlier (+/- 3 SD) was detected. A total of 104 cases were removed for exceeding the criterion Mahalanobis Distance value (c^2 (14) = 36.12, $p < 0.001$). The final sample size was $n = 1623$. Scale reliability checks and confirmatory factor analyses were used to determine if and how each item related to the latent construct of environmental identity. Confirmatory factor analysis (CFA) was performed consistent with recommended practice [48, 49].

3. Results

3.1. Descriptives

Means were high, above the midpoint of the scale for all samples, suggesting a broad tendency to endorse the scale items (Table 2). They were particularly high in the Peruvian sample.

Table 2. Descriptives, reliability, and validity for the Environmental Identity Scale (EID) scale in each sample.

Sample	Mean	SD	Reliability	*r* Concern	*r* Behavior
US Mturk	5.28	1.19	0.94	0.72	0.57
US zoos	6.02	0.86	0.94	0.63	--

US highschool	4.91	0.99	0.82	0.67	0.56
Russian	5.73	0.76	0.86	0.46	0.45
Swiss	5.36	0.83	0.87	0.52	0.39
Taiwanese	4.81	1.06	0.94	0.38	0.44
Peru	6.13	0.7	0.87	--	--
Overall	5.7	0.94	0.89	0.54	0.40

3.2. Reliability and Criterion Validity

An overall Cronbach's alpha score was generated for environmental identity using all 14 items (see Table 2). The Cronbach's alpha score was 0.92 (n = 1510). Minor improvement was suggested by the removal of item 5 and 10, but the Cronbach's alpha score for the 12-item scale (i.e., excluding items 5 and 10) was 0.92 (n = 1514). As there was no improvement to the Cronbach's alpha score, all items were retained. In each of the seven samples, reliability was also high. Cronbach's alpha ranged between 0.82 (for the smallest sample, the Chicago students) and 0.94 (for the other American samples).

Not all of the samples were able to collect information about environmental behavior or concern. Among the ones that did, the correlation with behavior ranged from 0.36 (in Taiwan) to 0.57 (in a U.S. MTurk sample). Correlations with environmental concern ranged from 0.38 to 0.72 (see Table 2). When all the data were combined, EID was correlated with behavior at r = 0.40 and with concern at r = 0.54. All correlations were significant at at least p < 0.01.

3.3. Confirmatory Factor Analysis

A preliminary measurement model (n = 1559) consisted of all 14 items for environmental identity. Fit indices were as follows: chi-square 888.47 (77), p < 0.05; *CFI* = 0.90; *SRMR* = 0.049; *RMSEA* = 0.082. Factor loadings for items 5 and 10 (see Table 3) were deemed low and the model was run with items 5 and 10 removed. Fit indices for the 12-item CFA (n = 1559) were as follows: chi-square 610.74 (54), p < 0.05; *CFI* = 0.92; *SRMR* = 0.044; *RMSEA* = 0.081. As removal of items 5 and 10 did not show a meaningful improvement to fit indices and factor loadings (see Table 3), all items were retained. The preliminary measurement model was deemed to be acceptable and treated as the final measurement model.

Table 3. CFA model item means, factor loadings, and fit indices.

Item	Mean (*SD*)	λ * (14-Item Scale)	λ* (12-Item Scale)
I like to spend time outdoors in natural settings (such as woods, mountains, rivers, fields, local parks, lake or beach, or a leafy yard or garden)	6.10 (1.15)	0.74	0.75
I think of myself as a part of nature, not separate from it.	5.43 (1.42)	0.70	0.69
If I had enough resources such as time or money, I would spend some of them to protect the natural environment.	5.64 (1.34)	0.61	0.60
When I am upset or stressed, I can feel better by spending some time outdoors surrounded by nature.	5.90 (1.30)	0.77	0.76
I feel that I have a lot in common with wild animals.	4.47 (1.71)	0.47	N/A
Behaving responsibly toward nature—living a sustainable lifestyle—is important to who I am.	5.63 (1.24)	0.65	0.64
Learning about the natural world should be part of everyone's upbringing.	6.14 (1.10)	0.70	0.70

If I could choose, I would prefer to live where I can have a view of the natural environment, such as trees or fields.	6.10 (1.22)	0.68	0.68
An important part of my life would be missing if I was not able to get outside and enjoy nature from time to time.	6.11 (1.14)	0.75	0.76
I think elements of the natural world are more beautiful than any work of art.	5.75 (1.37)	0.54	N/A
I feel refreshed when I spend time in nature.	6.12 (1.06)	0.81	0.81
I consider myself a steward of our natural resources.	5.16 (1.41)	0.64	0.63
I feel comfortable out in nature.	6.12 (1.09)	0.76	0.76
I enjoy encountering elements of nature, like trees or grass, even when I am in a city setting.	6.22 (1.06)	0.70	0.70
Fit Indices [a]			
Chi-square (*df*)		888.47 (*77*)	610.74 (*54*)
CFI		0.90	0.92
SRMR		0.049	0.044
RMSEA		0.082	0.081

Notes. * Rated on agreement on a 7-point scale (1 = not at all true of me; 7 = completely true of me); L = standardized factor loading; [a] robust statistics; *df* = degrees of freedom; *CFI* = Comparative Fit Index; *SRMR* = Standardized Root Mean Squared Residual; *RMSEA* = Root Mean Square Error of Approximation.

3.4. Group Differences

Significant gender differences were found only in the sample from Peru (M[men] = 6.0, sd = 0.81; M[women] = 6.3, sd = 0.48; t (197) = 3.4, p = 0.001; 95% CI for difference = 0.13 – 0.48). There were small positive correlations with age in the Russian sample (r = 0.14, p = 0.017) and in the MTurk sample (r = 0.22, p = 0.002). There was a positive correlation with education level in the Peruvian sample (r = 0.17, p = 0.012). In the Swiss sample, scores were significantly higher among people who grew up in a rural area (M = 5.6, SD = 0.75, 95% CI [5.45–5.75]) than those who grew up in an urban area (M = 5.2, SD = 0.85, 95% CI [5.04–5.33]), with those who had a suburban childhood falling between the other groups (M = 5.3, SD = 0.87, 95% CI [5.2–5.5]) (F [2, 340] = 6.08, p = 0.003, eta^2 = 0.035).

We did not attempt to assess significant differences among the samples, because they could be attributed to differences in the method of collecting data and/or to subtle differences in language rather than to actual differences in felt environmental identity. However, within the U.S., the mean was higher among the visitors to natural settings and zoos than among the general MTurk sample, as would be expected. It is also worth noting that overall, the mean was lowest in the Taiwanese sample, and within the U.S., the mean score among the Chicago sample was lowest. See Table 2 for further details. It may be significant that these two samples were collected in the most urban settings (Taichung City has a population of about 2.8 million; Chicago has about 2.7 million residents), which is consistent with previous research showing a positive relationship between a rural upbringing and the EID score [11]. However, these samples also differed in other ways. It would be valuable for future researchers to further examine within-country demographic differences.

3.5. Comparison with Original Scale

In order to confirm that the revised scale was consistent with the original one, a MTurk sample of 411 United States residents was recruited to complete both the old and new versions of the scale. They also responded to four items from the Short Form of the Balanced Inventory of Desirable Responding [50], the six-item behavior scale used in the

research described above (beh1 in Table 4), and the 12-item behavior scale used by Tam [25]. (beh2 in Table 4). Participants were compensated $.40. Measures were presented in random order. The two scales performed nearly identically, and were strongly correlated, as seen in Table 4. All correlations were significant at at least $p < 0.01$. Thus, our increased confidence in the cross-cultural validity of the measure has not reduced the reliability or validity of the scale in the U.S. context, which suggests that results based on research using the first version of the scale are still relevant to the revised scale.

Table 4. Comparison of original and revised EID scales.

	Reliability	Concern	beh1	beh2	Social Desirability	New Scale
Original (11-item) scale	0.92	0.56	0.63	0.66	0.37	0.93
Revised (14-item) scale N = 411	0.94	0.55	0.60	0.62	0.32	-

4. Discussion

Overall, the revised Environmental Identity Scale performed well and met standards for acceptability [51, 52]. The confirmatory factor analyses results support the scale as an acceptable representation of the construct. Although fit indices and factor loadings are within acceptable bounds, there is a general trend toward the lower limits. This may be due in part to the overall length of the scale (14 items). Another factor to consider is scale response length (i.e., 1–7). All item means were above the neutral midpoint ("neither true nor untrue"). Thus, the current scale response format may have been insufficient to sufficiently capture response variation. Performance might be improved by expanding scale response length to nine points and/or compressing the scale [53].

Identity is important in understanding the factors that inform environmental attitudes and encourage individuals to engage in pro-environmental behavior. The EID scale [9](Clayton, 2003) has been a reliable measure of an individual's stable sense of interdependence with, and connection to, nature. The version described here has been slightly revised to reflect a broader view of human-nature relationships, one that encompasses representations based on nature experiences in both rural and city surroundings. The new scale enables increased confidence in its intercultural validity, both across different cultural groups within the U.S. and across different countries. The set of countries in which it was tested includes Western and Eastern, Northern, and Southern countries and a range of ethnicities or subcultures within many of these countries. The countries were chosen to represent a variety of different cultural values as well as levels of socioeconomic development. Although there are possible associations between gender, age, and/or education and EID within each country, these were not strong or consistent, suggesting that any such relationships are likely to be constructed within a specific culture rather than reflecting fundamental associations between, e.g., education and EID. We conclude that the revised EID scale is a useful tool for assessing individuals' perceived relationship with nature that can be confidently used in a broader set of contexts than the original scale.

For research purposes, the revised scale has a variety of uses. It could be used to measure pre-existing differences among individuals in order to enable greater statistical sensitivity to assessing the effects of an experience or intervention, or in designing targeted messaging to groups with high or low EID. It can also be used to further explore differences among different social or cultural groups in the ways in which they think about their relationship to the natural world. Finally, the scale's relationship to other individual characteristics (such as values, demographics, or reaction time) can be studied in order to better understand the psychological meaning of an individual's relationship with nature.

The research presented here does suffer from several limitations. Most importantly, our sample is limited to five countries, and within each country the samples were not representative and in some cases were smaller than desirable. Further research is necessary to explore differences in EID between countries, as well as differences between geographic locations (rural vs. urban, for example) or between demographic groups within a country.

The results of this study contribute to the substantial evidence that identity can predict pro-environmental behavior. Both as researchers and as societies, we need to give more attention to the cultural context. Experiences in both familial and educational settings could work to promulgate not only explicit norms of environmental sustainability, but also conceptions of human-nature connectivity [54]. Working to promote cultures that enable these experiences could help to facilitate a stronger sense of environmental identity.

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Appendix A

Revised Environmental Identity Scale (EID-R), compared to the original

Please indicate the extent to which each of the following statements describes you by using the appropriate number from the scale below.

1	*2*	*3*	*4*	*5*	*6*	*7*
Not at all true of me			*neither true nor untrue*			*completely true of me*

_____ 1. I like to spend time outdoors in natural settings (such as woods, mountains, rivers, fields, local parks, lake or beach, or a leafy yard or garden)

Original: I spend a lot of time in natural settings (woods, mountains, desert, lakes, ocean). Not all people have equal ability to do this, so we changed the item to measure preference rather than behavior.

_____ 2. I think of myself as a part of nature, not separate from it. *Unchanged*

_____ 3. If I had enough resources such as time or money, I would spend some of them to protect the natural environment.

Original: If I had enough time or money, I would certainly devote some of it to working to protect the environment.

_____ 4. When I am upset or stressed, I can feel better by spending some time outdoors surrounded by nature.

Original: When I am upset or stressed, I can feel better by spending some time outdoors "communing with nature".

_____ 5. I feel that I have a lot in common with wild animals.

Original: I feel that I have a lot in common with other species.

_____ 6. Behaving responsibly toward nature -- living a sustainable lifestyle -- is important to who I am.

Original: Behaving responsibly toward the earth -- living a sustainable lifestyle -- is part of my moral code.

_____ 7. Learning about the natural world should be part of everyone's upbringing.

Original: Learning about the natural world should be an important part of every child's upbringing.

_____ 8. If I could choose, I would prefer to live where I can have a view of the natural environment, such as trees or fields.

Original: I would rather live in a small room or house with a nice view than a bigger room or house with a view of other buildings.

_____ 9. An important part of my life would be missing if I was not able to get outside and enjoy nature from time to time.

Original: I would feel that an important part of my life was missing if I was not able to get out and enjoy nature from time to time.

_____ 10. I think elements of the natural world are more beautiful than any work of art.

Original: I have never seen a work of art that is as beautiful as a work of nature, like a sunset or a mountain range.

_____ 11. I feel refreshed when I spend time in nature.

Original: I feel that I receive spiritual sustenance from experiences with nature.

_____ 12. I consider myself a steward of our natural resources. *New*

_____ 13. I feel comfortable out in nature. *New*

_____ 14. I enjoy encountering elements of nature, like trees or grass, even when I am in a city setting. *New*

Note: those interested in using the scale in one of the other languages should contact the relevant author.

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