

Article

The Prosocial Driver of Ecological Behavior: The Need for an Integrated Approach to Prosocial and Environmental Education

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Citation: Neaman, A.; Pensini, P.; Zabel, S.; Otto, S.; Ermakov, D.S.; Dovletyarova, E.A.; Burnham, E.; Castro, M.; Navarro-Villaruel, C. The Prosocial Driver of Ecological Behavior: The Need for an Integrated Approach to Prosocial and Environmental Education. *Sustainability* **2022**, *14*, 4202. <https://doi.org/10.3390/su14074202>

Academic Editor: Changwoo Ahn

Received: 24 February 2022

Accepted: 26 March 2022

Published: 1 April 2022

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Abstract: Although both altruistic and ecological behaviors can be considered prosocially driven behaviors, our psychological understanding of what motivates action in either the human or ecological domains is still in its infancy. We aimed to assess connection to nature and connection to humans as mediators of the relationship between prosocial propensity and prosocial behaviors in both the ecological and human domains. This study used empathy as an indicator of an individual's prosocial propensity. The data for the study was collected through surveys in Russian (841 participants) and Spanish (418 participants). The study demonstrated that an individual's prosocial propensity can be actioned into ecological (nature-related) behavior through connection to nature. Similarly, an individual's prosocial propensity can be actioned into altruistic (human-related) behavior through connection to humans. However, the present study also demonstrates that an individual's prosocial propensity can be directed to humans through a connection to nature. Thus, altruistic and ecological behaviors are two related classes of behavior, driven by the same prosocial propensity of the individual. This study is an important step towards generating scientific support for the claim that traditionally separate teaching of prosocial and environmental subjects should be combined into a single educational approach. An integrated approach will contribute to a multidisciplinary and interdisciplinary effort to create a society that is both ecologically and socially sustainable.

Keywords: connectedness to nature; connectedness to humanity; pro-environmental behavior; prosocial behavior; sustainable behavior; altruism

1. Opening

Understanding the foundations of prosocial behavior is clearly important, as the world faces an uncertain humanitarian and ecological future. In general, previous psychological research has examined human-related prosocial behavior (hereafter, altruistic behavior) and nature-related prosocial behavior (hereafter, ecological behavior) as separate types of

prosocial behavior (hereafter, prosocial behavior will be used to refer to both altruistic and ecological behaviors). This has led to a disjointed educational approach that treats these behaviors as distinct. Several more recent studies conceptualized altruistic and ecological behaviors as two instances of the same class of behavior. Building on this, we explore the foundations of these two forms of prosocial behavior, taking into account individual differences in empathy, connection with nature, and connection with other humans. We suggest that, indeed, prosocial behavior, broadly encompassing altruistic and ecological behavior, is conditioned by an individual's propensity for prosocial behavior, such as individual differences in empathy. Further, for these individual differences to actualize behavior, a sense of connection to nature or other humans is needed to prompt action. Finally, we emphasize the educational implications for how prosocial behavior can be encouraged in both ecological and human domains.

2. Rationale

Human and Ecological Domains of Prosocial Behavior

Prosocial behaviors are defined as behaviors that are intended to benefit others [1,2]. Especially in psychology, "others" in this definition usually include only humans. As a few examples, this encompasses behaviors such as sharing, volunteering, comforting, or donating to human-centered causes [3,4]. The consideration of nature as "the other" has only recently become explicit in psychology.

In turn, ecological behavior is defined as behavior that directly (e.g., saving energy at home) or indirectly (e.g., supporting campaigns that promote the use of renewable energy) affects humanity's impact on the natural environment, and behavior that aims to raise awareness of environmental problems (e.g., pointing out environmental damage to others) [5]. Many researchers have suggested that ecological behavior can be conceptualized as a type of prosocial behavior [6,7], driven by the same general propensity as prosocial behavior benefitting human others. This propensity is referred to as "prosocial propensity" and is defined as an individual's willingness to act prosocially regardless of the domain in which this behavior may be enacted [8].

Although both altruistic and ecological behavior can be considered prosocially driven behaviors, our understanding of what motivates action in either the human or ecological domain is still in its infancy. This motivates the present study to explore the foundations of two forms of prosocial behavior, i.e., altruistic and ecological behavior. It is also worth noting that ecological and altruistic behaviors can, together, be considered sustainable behaviors, as collectively they refer to actions that protect the natural and human (social and economic) environments [9,10]. Indeed, while topics such as sustainability have wide interdisciplinary and transdisciplinary application, and there are informative discussions around the roles of, for example, norms and values on conceptualizations of sustainability [11], our work aligns with work on sustainable development in its broadest sense in psychology [12].

3. Research Hypothesis and Goal

The research of [8] showed that connection to nature partially mediated the positive relationship between prosocial propensity and ecological behavior. Further, connection to other humans has been shown to predict not only altruistic behavior [13] but also ecological behavior [14,15]. Furthermore, according to [9], altruistic behavior and ecological behavior differ only in terms of the "recipient": other humans or all living beings and inanimate nature. This argument about the recipient is consistent with a broader theory of egoistic, altruistic, and biospheric values of environmental concern [16,17]. For instance, Ref. [16] suggested referring to the latter two values as biospheric-altruistic. Likewise, the role of social values for the sake of nature conservation is discussed in other disciplines [18].

Based on this evidence, we hypothesized that one's prosocial propensity can be enacted as prosocial behavior (ecological or altruistic) through connection to either nature or humans (Figure 1). Thus, we aimed to assess connection to nature and connection

to humans as mediators of the relationship between prosocial propensity and prosocial behaviors in both the ecological and human domains.

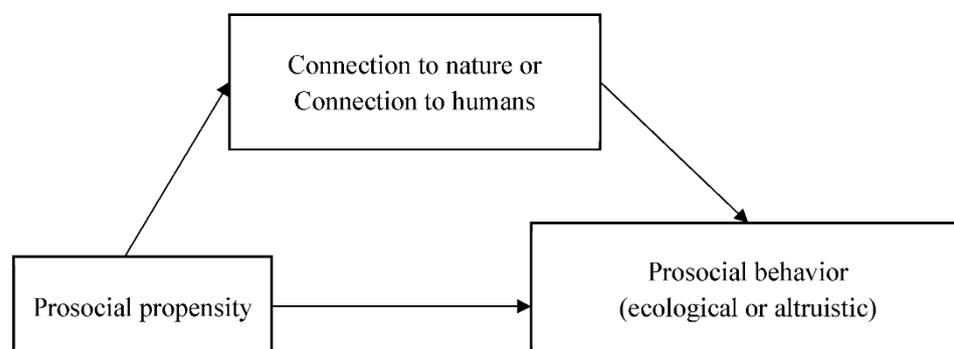


Figure 1. The hypothetical relationship between prosocial propensity and prosocial behaviors (ecological or altruistic), mediated by connection to either nature or humans.

To lend weight to the universality of our proposed model, our research examined populations in two geographical locations. Indeed, several publications have documented country-level differences in attitudes toward environmental issues [19,20]. In the present study, we focus on Russia and South America, for convenience.

4. Method

4.1. Indicator of Prosocial Propensity

At present, there is no explicit measurement tool for prosocial propensity. As mentioned above, the honesty–humility domain of the HEXACO personality inventory [21] was used in research by [8] as an indicator of prosocial propensity. In the present study, we investigate another promising personality indicator of prosocial propensity, namely sentimentality. According to the HEXACO model of personality, sentimentality refers to the strength of emotional bonds with others and individual differences in empathic sensitivity [22]. Thus, higher scorers correspond to greater empathic sensitivity to the feelings of others (www.hexaco.org, accessed on 23 February 2022). For these reasons, we are confident that the sentimentality scale of the emotionality domain of the HEXACO personality inventory [21] is a good indicator of prosocial propensity, because this scale represents empathy, which is a pre-requisite for altruistic behavior [23,24] as well as ecological behavior [25].

4.2. Measures

The data were collected through surveys, which consisted of the following five scales:

1. The sentimentality scale of the HEXACO personality inventory [21] in the emotionality domain was used as an indicator of empathy. We used Russian and Spanish versions of the scale, consisting of 4 items, provided at www.hexaco.org. The items were either identical to the original scales or amended to optimize their linguistic fluency in Russian and Spanish (Table A1).
2. The Kaiser and Wilson [26] scale measured ecological behavior, which includes a wide range of activities aimed at protecting the natural environment. Some items of this scale were adapted to the Russian and Latin American context (Table A2).
3. The Rushton et al. [27] scale measured altruistic behavior. Items on this scale required self-reporting altruistic behavior and were thus conceptually similar to the items on the ecological behavior scale. A small number of items on the scale were modified to better reflect Russian and Latin American culture and geography (Table A3).
4. Connection to humans was measured with the scale specified in [13]. We used the “People in my community” option of the original scale, while the other two options

(“Americans” and “People all over the world”) were dropped because we considered them too broad for the purpose of the study.

5. Connection to nature was measured via an additional response option added to the McFarland et al. (2012) scale. Specifically, we used the additional option “Natural surroundings” to complement the original scale option “People in my community”. Assessing connection to nature with this type of measure allowed us to evaluate connection to various domains using the same question stems, thus enabling better comparisons between them. The items in scales (4) and (5) were either identical to the original scale of [13] or amended to optimize their linguistic fluency in Russian and Spanish (Table A4).

4.3. Sample Population

The data were collected in Russian and Spanish languages. Sociodemographic data of the participants are shown in Table 1. The survey was answered by 841 and 418 Russian- and Spanish-speaking participants (hereafter, Russian and Spanish samples, respectively). The 841 Russian participants completed the study online, while the Spanish sample completed the study as either pencil-and-paper or online. In the Spanish sample, 277 and 49 participants respectively responded to the paper-and-pencil survey in Chile and Mexico, while 92 participants responded to the online survey, which did not ask for country of residence. For the paper-and-pencil survey, participants were recruited personally on the beach. Our previous study demonstrated that people on the beach are in a relaxed mood and have time to respond to surveys [28]. Indeed, the response rate to the paper-and-pencil survey was excellent, above 90%. For the online survey, participants were recruited through social networks for both the Russian and Spanish samples, making it difficult to estimate the response rate.

Table 1. Sociodemographic data of participants in the Russian and Spanish samples.

Variable	Russian Sample	Spanish Sample
Age		
Mean ± SD	31.2 ± 13.7	33.5 ± 13.2
Range	16–80	12–80
Gender		
Female (%)	71	59
Male (%)	28	37
Prefer not to specify (%)	1	4
Family income		
We are perfectly comfortable with our income (%)	1	9
Our income is quite sufficient (%)	8	24
We can manage on our income (%)	63	48
It is pretty hard to live on our income (%)	21	13
It is extremely tough to live on our income (%)	7	6
Educational level		
Incomplete high school (%)	1	14
High school (%)	5	27
Technical/vocational or 2-year degree (%)	3	23
University degree or undergraduate student (%)	52	29
Postgraduate (%)	39	7
Nationality		
Russia (%)	89	-
Kazakhstan (%)	2	-
Chile (%)	-	50
Mexico (%)	-	10
Guatemala (%)	-	6
Other * (%)	9	34

Note. * Other nationalities (<1% each) or did not wish to specify.

4.4. Data Analysis

Classical test theory based on sum scores was used for scales (1), (4), and (5). A Rasch-type model was used to calculate individual scores for scales (2) and (3), with infit mean square (*MS*) values less than or equal to (\leq) 1.2 considered good, and *MS* values \leq 1.3 considered acceptable [29]. In scales (2) and (3), preference was given to a Rasch-type model over classical test theory because scale design under classical test theory frequently results in a narrow range of item difficulty, making it hard to recognize people with disparate levels of the measured variable. Rasch models, on the other hand, support a wider range of item difficulties. In the present study, both scales displayed a wide range of item difficulties, as was our intention, thus allowing us to recognize people with varying levels of altruistic and ecological behaviors.

It should be noted that connection to humans (scale 4) and connection to nature (scale 5) were technically measured by one scale with two options (“People in my community” and “Natural surroundings”). In this regard, the relationship between these two scales may indicate a common methodological bias [30]. Therefore, we decided to conduct parallel mediation analyses to account for the shared variance of connection to nature and humans. With such analysis, the two parallel mediators are in a way “competing” for mediation of the effect. This is especially relevant if they share a substantial amount of variance. The mediation hypothesis was tested in R using the PROCESS 4.0 macro [31]. To ensure that all regressions within a parallel mediation analysis are based on the same data, listwise deletion was used to handle missing values.

4.5. Scale Reliability

The reliability (Cronbach’s alpha) of the empathy scale was $\alpha = 0.60$ for the Russian sample and $\alpha = 0.57$ for the Spanish sample (Table 2). The relatively low reliability can be explained by the small number of items (4 items); however, [21] argued that facets with a reliability of <0.70 are still useful for research purposes. These authors specifically recommended that researchers examining the associations of these scales with external criteria also check item-level associations with these criteria to ensure that facet-level associations are not due to variance in a particular item. In our study, 2–3 of the 4 items of the empathy scale exhibited statistically significant correlations with the other scales (Tables A5 and A6). Thus, the associations between empathy and other variables are not due to variance in a particular item of the empathy scale.

Table 2. Descriptive statistics for the scales used in the Russian and Spanish samples.

Scale	Mean \pm SD	Range	Reliability	Items with $1.2 < MS \leq 1.3$	Items with $MS > 1.3$
Russian sample					
Empathy	3.40 \pm 0.74	1.00–5.00	0.60	N/A	N/A
Connection to nature	3.61 \pm 0.78	1.00–5.00	0.88	N/A	N/A
Connection to humans	4.04 \pm 0.65	1.00–5.00	0.86	N/A	N/A
Ecological behavior	−0.03 \pm 0.90	−2.67–2.72	0.79	4	0
Altruistic behavior	−0.74 \pm 1.40	−4.61–3.62	0.78	2	0
Sustainable behavior	−0.24 \pm 0.83	−2.71–2.88	0.84	4	0
Spanish sample					
Empathy	3.63 \pm 0.72	1.25–5.00	0.57	N/A	N/A
Connection to nature	3.83 \pm 0.76	1.00–5.00	0.88	N/A	N/A
Connection to humans	3.35 \pm 0.82	1.00–5.00	0.89	N/A	N/A
Ecological behavior	0.23 \pm 0.95	−3.73–3.48	0.81	2	0
Altruistic behavior	−0.46 \pm 1.28	−4.30–3.49	0.76	0	1
Sustainable behavior	0.00 \pm 0.79	−3.62–2.17	0.83	0	0

Notes. *MS* stands for mean square. N/A means “not applicable”, because classical test theory was used for these scales. In line with [9], sustainable behavior refers to a combined scale of altruistic and ecological behaviors.

The other scales (Table 2) had good reliability and item fit, except for one item whose fit was poor for the altruistic scale in the Spanish sample. The study of [9] used an approach that combined the altruistic and ecological behavior scales into a single scale. Like Neaman et al. (2018), in this study, the combined scale consisting of altruistic and ecological behavior items showed excellent reliability (0.84 and 0.83 in the Russian and Spanish samples, respectively).

4.6. Scale Validity

The ecological behavior scale has been validated extensively by [32], and Ref. [33] showed that self-reporting using this scale is accurate. The validity of the altruistic behavior scale was demonstrated by its authors [27]. Likewise, the validity of the connection to community scale was demonstrated by its authors [13].

We validated our new measure of connection to nature by comparing Pearson correlations between the studies of [8] and the present study (Table 3). In the study of [8], connection to nature was measured using the scale in [34], whose validity was demonstrated by its authors, whereas in the present study, connection to nature was measured using the modified scale of [13]. Ecological and altruistic behaviors were measured by the same scales in the study of [8] as in the present study. In the present study, we used data from the Spanish sample for a better comparison with the study of [8], since the latter was carried out in Chile. As can be seen, there is similarity in these relationships across measurement tools, supporting the predictive validity of our new measure of connection to nature. It is also worth noting that the strength of these relationships is in accordance with prior research [8,35].

Table 3. Validation of our new measure of connection to nature through the comparison of Pearson correlations between the studies of [8] and the present study.

Variable	Pearson Correlations with Connection to Nature	
	Study of [8], [34] scale	Present study, [13] modified scale
Altruistic behavior	0.36 ***	0.28 **
Ecological behavior	0.55 ***	0.37 **

Note. ** $p < 0.01$; *** $p < 0.001$.

5. Results and Discussion

5.1. Empathy as an Indicator

This research shows that individual differences in empathy can serve as an indicator of an individual's disposition for enacting prosocial behaviors, i.e., their prosocial propensity (Table 4). Empathy is a generalized ability to feel the emotions of others or to adopt another's perspective to understand their experience [36–38]. The effect of empathy in motivating prosocial behavior is accounted for by an expansion of self (self–other overlap) that incorporates the other [23,25]. Likewise, Batson [39,40] theorizes that empathy is the key variable through which prosocial behavior occurs. Indeed, individual differences in empathy have been shown to positively predict altruistic behaviors in a variety of contexts and settings [23,41–43]. Adding to this, individual differences in empathy have also been shown to positively predict ecological behaviors across a host of ecological outcomes [25,44,45]. Similar to the empathy–altruism hypothesis [23,24], some have gone so far as to contest that empathy is a pre-requisite for ecological action, proposing an additional empathy–sustainability hypothesis [25].

Table 4. Pearson correlations between the variables under study.

Variable	1	2	3	4
Russian sample				
1. Empathy				
2. Connection to nature	0.23 *** [0.16, 0.29]			
3. Connection to humans	0.27 *** [0.21, 0.33]	0.34 *** [0.28, 0.40]		
4. Altruistic behavior	0.07 * [0.01, 0.14]	0.25 *** [0.19, 0.32]	0.18 *** [0.11, 0.24]	
5. Ecological behavior	0.16 *** [0.09, 0.23]	0.50 *** [0.45, 0.55]	0.19 *** [0.12, 0.25]	0.35 *** [0.29, 0.41]
Spanish sample				
1. Empathy				
2. Connection to nature	0.28 *** [0.18, 0.37]			
3. Connection to humans	0.28 *** [0.19, 0.37]	0.50 *** [0.42, 0.57]		
4. Altruistic behavior	0.26 *** [0.16, 0.35]	0.28 *** [0.19, 0.37]	0.26 *** [0.16, 0.35]	
5. Ecological behavior	0.15 ** [0.05, 0.25]	0.37 *** [0.28, 0.45]	0.19 *** [0.09, 0.28]	0.24 *** [0.15, 0.33]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

5.2. Mediation Effects

The mediation effects are summarized in Figures 2 and 3. In both samples, the mediation models with ecological behavior as the dependent variable were significant, with a R^2 of 0.25, $F(2,811) = 89.97$, $p < 0.001$ for the Russian sample and a R^2 of 0.13, $F(3,382) = 18.76$, $p < 0.001$ for the Spanish sample. Direct effects (c') in both samples were not statistically significant, that is, the effects of prosocial propensity on ecological behavior were fully mediated by connection to nature. The bootstrapped indirect effects via connection to nature were $ab = 0.11$, $SE = 0.02$, 95% CI $*(0.07, 0.15)$ in the Russian sample and $ab = 0.09$, $SE = 0.02$, 95% CI $(0.05, 0.14)$ in the Spanish sample. The parallel mediation did not yield a significant influence of connection to humans on ecological behavior ($ab = -0.00$, $SE = 0.01$, 95% CI $(-0.02, 0.02)$ in the Russian sample and $ab = 0.00$, $SE = 0.02$, 95% CI $(-0.03, 0.03)$ in the Spanish sample).

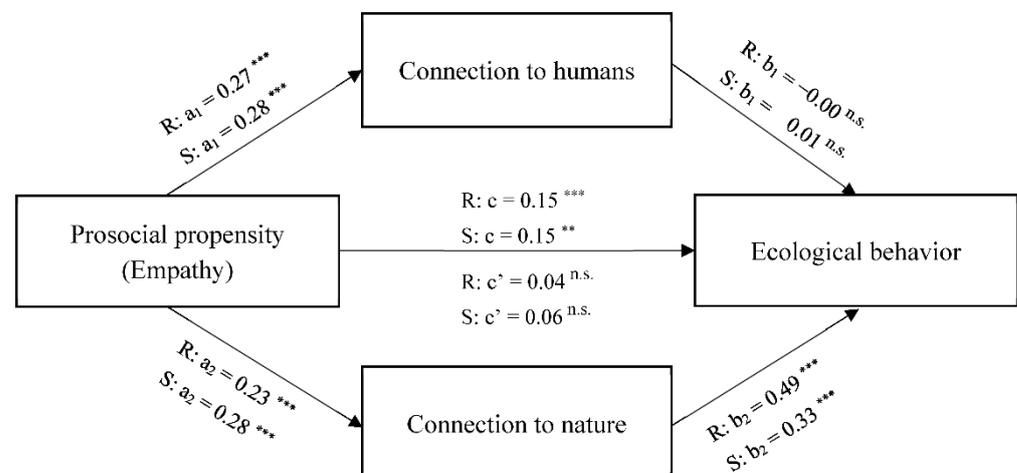


Figure 2. Mediated relation of prosocial propensity and ecological behavior. Here and below, R and S mean Russian and Spanish samples, respectively. Likewise, c and c' mean total and indirect effects, respectively. ** $p < 0.01$; *** $p < 0.001$; n.s. = not statistically significant.

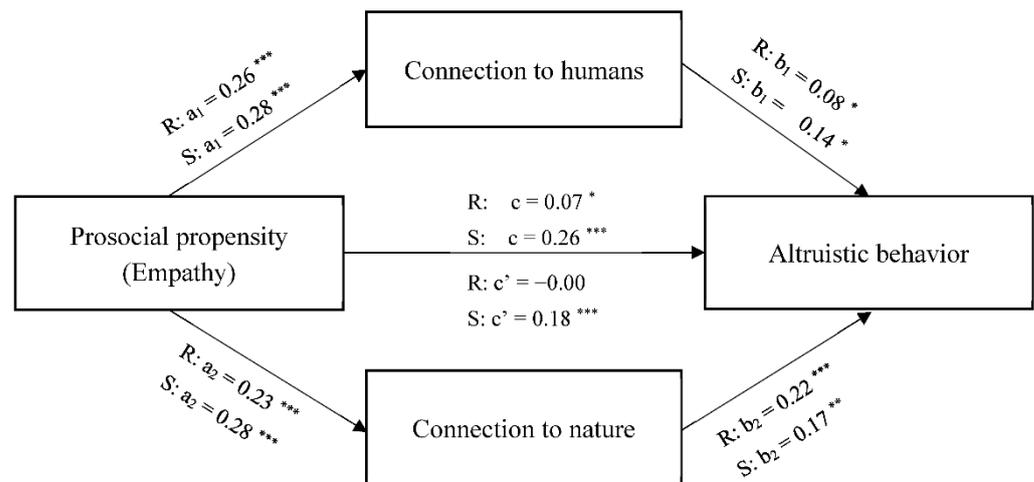


Figure 3. Mediated relation of prosocial propensity and altruistic behavior. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Likewise, for altruistic behavior, parallel mediation models in both samples were significant, with full mediation, $R^2 = 0.07$, $F(3,809) = 20.29$, $p < 0.001$ in the Russian sample and a partial mediation, $R^2 = 0.13$, $F(3,382) = 18.83$, $p < 0.001$ in the Spanish sample. The influence of prosocial propensity on altruistic behaviors is directed via connection to humans ($ab = 0.02$, $SE = 0.01$, 95% CI (0.00, 0.04) in the Russian sample and $ab = 0.04$, $SE = 0.02$, 95% CI (0.00, 0.08) in the Spanish sample), but also via connection to nature ($ab = 0.05$, $SE = 0.01$, CI (0.03, 0.08) in the Russian sample and $ab = 0.05$, $SE = 0.02$, 95% CI (0.01, 0.09) in the Spanish sample). In both samples, the mediation through connection to nature exerted a stronger influence on altruistic behaviors than the mediation through connection to humans.

5.3. Reanalysis of a Previous Study

The study of [8] showed that connection to nature partially mediated the positive relationship between prosocial propensity and ecological behavior (Table 5). However, the authors overlooked another important finding, which was that connection to nature also partially mediated the positive relationship between prosocial propensity (measured as honesty–humility) and altruistic behavior. The indirect effect of connection to nature was similar for both ecological and altruistic behaviors.

Table 5. Comparison of mediation analyses with honesty–humility as predictor (X) and connection to nature as mediator (M) for the response variables of ecological behavior or altruistic behavior (Y), in the sample of [8].

X → M	Standardized Regression Coefficients			95% CI	
	M → Y	Total Effect	Direct Effect		Indirect Effect
0.12 *	0.48 ***	0.32 ***	0.26 ***	0.06 *	−0.00, 0.12
0.12 *	0.29 ***	0.31 ***	0.27 ***	0.04 *	−0.00, 0.08

Note. * $p < 0.05$; *** $p < 0.001$. The honesty–humility domain of the HEXACO personality inventory [21] was used as an indicator for prosocial propensity. Connection to nature was measured using the scale of [34], whereas ecological and altruistic behaviors were measured by the same scales as in the present study. 95% CI stands for 95% confidence interval.

5.4. Differences between the Russian and Spanish Samples

There was a substantial difference between the Russian and Spanish samples with respect to the correlation strength between empathy and altruistic behavior (Table 4). Specifically, this correlation was rather weak in the Russian sample ($r = 0.07$) and considerably stronger in the Spanish sample ($r = 0.26$). These results agree with the findings of [20], who reported an inconsistent link between values and environmental concern in their Russian sample. Specifically, in the Russian sample of [20], respondents exhibited high levels of self-transcendence (as opposed to self-enhancement), but they also exhibited high levels of egoistic concerns, whereas high levels of altruistic and biospheric concerns were expected.

We can assume that the differences between the Russian and Spanish samples may be explained by the sociodemographic differences of participants, for instance income and educational level (Table 1). As discussed in detail in our previous study [28], the effect of income on individual's ecological behavior is quite ambiguous. On the other hand, higher educational level implies higher environmental knowledge [46], whose effect on an individual's ecological behavior is also quite ambiguous [28]. Furthermore, other sociodemographic variables not considered in the study, e.g., religious identity [47], could have influenced the altruistic and ecological behaviors of respondents. Thus, it is hard to pinpoint the exact cause of differences between the Russian and Spanish samples. Nevertheless, in the present study, we obtained similar mediated relations of prosocial propensity and prosocial behaviors in both the Russian and Spanish samples (Figures 2 and 3), demonstrating the robustness of our rationale.

5.5. Possible Mechanisms, Limitations, and Future Directions

The research of [8] proposed that an individual's prosocial propensity is oriented toward a particular domain of prosocial behavior (either human or ecological), depending on the individual's connection to that specific domain (either human or ecological, respectively). The present study confirms this claim by showing that an individual's prosocial propensity can be actioned into ecological (nature-related) behavior through connection to nature (Figure 2). Likewise, this study adds that an individual's prosocial propensity can be actioned into altruistic (human-related) behavior through connection to humans (Figure 3). Importantly, this study also shows that an individual's prosocial propensity can be directed to altruistic behavior through the individual's connection to nature (Figure 3), in agreement with the findings of our previous study [8] (reported in Table 5).

The seemingly surprising mediation of connection to nature on altruistic behavior (Figure 3) can be explained by the fact that both altruistic and ecological behaviors are two facets of the same overarching behavior, driven by the same prosocial propensity of the individual. As mentioned above, the combined scale of altruistic and ecological behaviors exhibited an excellent reliability of 0.83–0.84 (Table 2), which implies that the combined scale measures a broader behavior. These results are consistent with the findings of [10], who showed that altruistic and ecological behaviors are two facets of one overarching domain of behavior and proposed to call it "sustainable behavior", because it protects both human (social) and natural environments.

However, the question arises of why an individual's prosocial propensity is not directed to ecological behavior through the individual's connection to humans (Figure 2). To answer this question, we will provide evidence from our previous study [8], in which we compared the altruistic and ecological behaviors of members of environmental (i.e., nature-oriented) and humanitarian (i.e., human-oriented) organizations. Importantly, members of environmental organizations scored high in both altruistic and ecological behaviors, whereas the members of humanitarian organizations scored high only in altruistic behavior. It should be taken into account that the members of environmental organizations exhibited high connection to nature, whereas high connection to humans can be assumed in the members of humanitarian organizations.

Overall, from the research of [8] and findings of the present study, we suggest that connection to nature is a broad concept that includes humans, whereas connection to humans

is a more narrow concept that does not include nature. This assumption allows explanation of why an individual's prosocial propensity can be directed to altruistic behavior through the individual's connection to nature but cannot be directed to ecological behavior through the individual's connection to humans.

However, we have only cross-sectional evidence and are unable to make exact claims about causation. Further research is needed to examine these variables experimentally, longitudinally, or from a developmental perspective. For example, constructs that are known to affect connection to nature, such as nature exposure [48], could be considered. Future research may also be useful in replicating these findings using other measures of connection, including connection to a broader human domain such as "all of humanity" [13]. Likewise, research that would further examine the perception of humans as part, or not part, of nature would also be welcome.

It must be pointed out that the geographical coverage of the study represents a limitation to the generalizability of our findings. Indeed, in other research by [19], respondents from the United States and Western Europe tended to be less biospheric and more egoistic in their approach to environmental issues, while respondents from Central America and South America tended to be more biospheric. Thus, while we were able to demonstrate support for our mediation model (Figure 1), our research could be strengthened by including respondents from other countries, such as Germany and Australia. Future research would thus be needed to further demonstrate the robustness of our model.

5.6. Implications from an Educational Perspective

When scientists cut the world into pieces and batch them up in bins called "scientific disciplines", the fact that these fragments are part of a greater whole is erased from memory. This applies to the disciplines of prosocial education and environmental education. Combining the findings of these two scientific disciplines can produce results that far exceed the sum of their parts. Below, we provide an educational perspective on how prosocial behavior can be promoted in both ecological and human domains.

Prosocial education is defined as education that promotes openness, compassion, care, and responsibility for others (e.g., [49]). Prosocial education helps students overcome feelings of alienation, get out of themselves to embrace others, and learn to care about others as they care about themselves [50]. On the other hand, the first definition of environmental education emphasizes the importance of educating the general public to take action to solve environmental issues [51]. Since some authors point out that 'environmental problems' are actually problems of human behavior [52], the ultimate goal of environmental education should be to instill ecological behavior in people [46].

Environmental education programs typically focus on increasing students' environmental knowledge and promoting a sense of connection to nature [53,54]. Although researchers of altruism and prosocial behavior have developed models that predict ecological behavior [55], environmental education programs rarely integrate all aspects of prosociality [56,57]. The same is true for prosocial education programs, which mostly ignore any aspect of environmental education. One could argue that prosocial and environmental education are integral parts of educational programs in sustainable development. However, the social aspect in most educational programs for sustainable development is limited to fostering the connection between the environment and society [58]. As a result, education for sustainable development has overlooked the necessary examination of the relationship between prosocial and environmental education.

Based on the findings of the present study, we suggest that the traditional emphasis of environmental education on protecting the environment can be reinforced with cooperative educational practices that aim at cultivating a better prosocial environment among students. In particular, we suggest that prosocial education that specifically addresses empathy can reinforce environmental socialization, following the terminology of [56], which in turn converts experiences with nature and like-minded people into valuing nature and environmental topics.

By generating a warm atmosphere among students, a spirit of caring is created in the classroom [59]. Our findings (Figure 2) suggest that the generation of such an atmosphere in class might also result in greater concern for the environment among students. Indeed, the study of [57] demonstrated that cooperative contexts, as opposed to competitive contexts, appear to stimulate ecological behavior in populations with a low level of environmental knowledge. Thus, to promote greater ecological behavior in students, there is a need for a greater emphasis on prosocial education.

Additionally, the traditional emphasis of prosocial education can be reinforced with educational practices that aim at protecting and/or preserving the environment. In our opinion, one of the main educational challenges today is developing the capacity to care for the other, to free some space within oneself where concern for the desires and needs of the other could enter [60,61]. The development of such tendencies is the goal of prosocial education. Our findings suggest that the generation of care for nature might also result in greater concern for other humans. Currently, global humanitarian need—due to climate change, the COVID-19 pandemic, global inequality, war, and terrorism, among others—is almost at an “unimaginable” level [62]. Thus, an integrated approach to prosocial and environmental education will contribute to a multidisciplinary and interdisciplinary effort to create a society that is both ecologically and socially sustainable.

6. Conclusions

The findings of the present study complement a growing body of literature suggesting that ecological behavior is a form of prosocial behavior. In this study, we show that an individual’s prosocial propensity can be enacted as prosocial behavior (ecological or altruistic) through connection to either nature or humans.

Specifically, the present study demonstrated that an individual’s prosocial propensity can be directed to a particular domain of prosocial behavior through the individual’s connection to this domain. However, an individual’s prosocial propensity can also be actioned into altruistic (human-related) behavior through connection to nature.

We propose that the traditional separate teaching of prosocial and environmental subjects be combined into a single educational approach. The integrated approach is expected to promote sustainable behavior, which has been shown to consist of both altruistic (prosocial) and ecological (pro-environmental) behaviors.

Author Contributions: Conceptualization, A.N. and S.O.; methodology, A.N., S.Z. and S.O.; software, S.Z.; validation, A.N., P.P., S.Z. and S.O.; formal analysis, P.P., S.Z. and S.O.; investigation, D.S.E., E.A.D., E.B., M.C. and C.N.-V.; resources, D.S.E., E.A.D., E.B., M.C. and C.N.-V.; data curation, S.Z. and E.B.; writing—original draft preparation, A.N., C.N.-V. and P.P.; writing—review and editing, A.N., P.P., S.Z. and S.O.; visualization, S.Z. and E.B.; supervision, A.N. and S.O.; project administration, A.N.; funding acquisition, E.A.D. All authors have read and agreed to the published version of the manuscript.

Funding: We wish to express our deepest gratitude for the financial support provided by the Fondo Nacional de Desarrollo Científico y Tecnológico, Chile (FONDECYT), project number 1200259 (granted to: Christian Berger, data collection), the RUDN University Strategic Academic Leadership Program (granted to: Elvira A. Dovletyarova, data collection), and the Priority-2030 grant to Sevastopol State University, strategic project 3 (article writing).

Institutional Review Board Statement: Approval for the study was not required in accordance with local/national legislation.

Informed Consent Statement: Approval for the study was not required in accordance with local/national legislation.

Acknowledgments: The authors wish to thank Andrei Tchourakov for editing this article.

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

Appendix A

Table A1. Summary of the empathy items used in the study and their translation into English.

English Translation	Spanish Items	Russian Items
S23. I feel like crying when I see other people crying.	S23. Siento ganas de llorar cuando veo llorar a otras personas.	S23. Готов(а) заплакать, если вижу плачущего человека.
S47. When someone I know well is unhappy, I can almost feel that person's pain myself.	S47. Cuando alguien muy cercano a mí es infeliz, casi puedo sentir el dolor de esa persona.	S47. Остро переживаю несчастья моих близких.
S71. I feel strong emotions when someone close to me is going away for a long time.	S71. Siento emociones fuertes cuando alguien cercano a mí se va a alejar por un largo tiempo.	S71. Страдаю от долгих расставаний с близкими.
S95. I remain unemotional even in situations where most people get very sentimental.	S95. No me emociono incluso en situaciones donde la mayoría de las personas se ponen muy sentimentales.	S95. Сохраняю хладнокровие даже в ситуациях сильного эмоционального напряжения.

Note. Items in **boldface** were reversed.

Table A2. Summary of the ecological behavior items used in the study and their translation into English.

English Translation	Spanish Items	Russian Items
1. I turn off the TV, computer, and other electrical devices when I'm not using them.	1. Apago el televisor, computador y otros artefactos eléctricos cuando no los utilizo.	1. Выключаю телевизор, компьютер и другие электроприборы, когда ими не пользуюсь.
2. I buy natural products and/or products with ecolabels (e.g., cleaning products, shampoos, etc.).	2. Compró productos naturales y/o con sello ecológico (por ejemplo, detergentes, champúes, etc.).	2. Покупаю натуральные/эко продукты/товары (например, моющие средства, шампуни и т.д.).
3. I buy drinks or beer in disposable containers (plastic or cans).	3. Compró bebidas o cervezas en envases desechables (plástico o lata).	3. Покупаю напитки в одноразовой таре (пластиковой, металлической).
4. I wait until I have a full load before doing laundry.	4. Espero a tener una carga completa de ropa antes de usar la lavadora.	4. Накапливаю белье до полной загрузки стиральной машины.
5. When I shower, I turn the water off while I soap up and then turn it back on to rinse.	5. Cuando me ducho, cierro el agua para jabonarme y finalmente abro el agua para enjuagarme.	5. Выключаю воду в душе во время намыливания и снова включаю для ополаскивания.
6. I read about environmental issues.	6. Leo acerca de temas ambientales.	6. Интересуюсь экологическими проблемами.
7. I buy products in reusable packaging.	7. Compró productos con envases reutilizables.	7. Покупаю товары в многоразовой упаковке.
8. I shop using my own reusable bags.	8. Hago compras usando mis propias bolsas reutilizables (por ejemplo, bolsas de género).	8. Отправляясь за покупками, беру с собой собственные многоразовые сумки/пакеты.
9. I use public transportation, ride my bike, or walk to get around my neighborhood.	9. Para desplazarme dentro de la ciudad, utilizo el transporte público o la bicicleta, o camino a pie.	9. Передвигаюсь по городу на общественном транспорте, велосипеде или пешком.
10. I recycle or reuse used paper.	10. Reciclo o reutilizo el papel usado.	10. Отправляю в переработку и повторно использую старую бумагу.
11. I recycle or reuse glass bottles and/or glass jars.	11. Reciclo o reutilizo las botellas de vidrio y/o frascos de vidrio.	11. Отправляю в переработку и повторно использую стеклянную тару.
12. I dispose of empty cans in the trash.	12. Boto latas a la basura.	12. Выбрасываю алюминиевые банки в мусор.

Table A2. Cont.

English Translation	Spanish Items	Russian Items
13. I throw away cardboard packaging or wrapping.	13. Boto a la basura los paquetes o embalajes de cartón.	13. Выбрасываю в мусор картон/упаковочные материалы.
14. I buy drinks or beer in returnable containers.	14. Compro bebidas o cervezas en envases retornables.	14. Покупаю напитки в многоразовой таре.
15. I try to make my family and/or friends more environmentally friendly.	15. He tratado que mis familiares y/o amigos sean más amigables con el medio ambiente.	15. Стараюсь улучшить отношение родственников/друзей к окружающей среде.
16. I recycle or reuse plastic bottles and/or plastic containers.	16. Reciclo o reutilizo las botellas de plástico y/o frascos de plástico.	16. Отправляю в переработку и повторно использую пластиковую тару.
17. I turn down the heat when I leave my apartment/house for more than 1 h.	17. Apago la calefacción cuando salgo de mi casa por más de 1 hora.	17. Выключаю отопление, уходя из дома больше, чем на 1 час.
18. I buy seasonal produce.	18. Priorizo frutas y verduras de temporada.	18. Предпочитаю покупать только сезонные фрукты/овощи.
19. I take baths instead of showers.	19. Me doy baños de tina, en vez de ducharme.	19. Вместо душа предпочитаю принимать ванну.
20. I buy organic products.	20. Al realizar compras, compro productos orgánicos.	20. Делая покупки, выбираю экологически чистые продукты.
21. I use wood for heating.	21. Uso calefacción a leña.	21. Отапливаю дом дровами/углем.
22. I reuse my shopping bags.	22. Reutilizo las bolsas de la compra.	22. Пользуюсь многоразовыми сумками для покупок.
23. In the winter, I keep the heat on so that I do not have to wear a sweater.	23. En invierno, pongo la calefacción tan alta que no tengo que usar sweater/polar.	23. Зимой включаю отопление на такую температуру, чтобы не приходилось одевать свитер или кофту.
24. I use the clothes dryer year-round.	24. Utilizo secadora de ropa todo el año.	24. Пользуюсь сушилкой для белья круглый год.
25. When I brush my teeth, I keep the faucet on.	25. Mientras cepillo mis dientes, mantengo la llave del agua abierta.	25. Не выключаю воду, когда чищу зубы.
26. I make compost with my organic waste (food scraps, fruit and vegetable waste), then I use it to fertilize plants.	26. Hago compost con mis desechos orgánicos, para luego usarlo como abono para las plantas.	26. Компостирую органические отходы, превращая их в органические удобрения.
27. I am a member of an environmental organization.	27. Soy miembro de una organización ambiental.	27. Состою в организации по защите окружающей среды.
28. I change my used towels every day.	28. Cambio las toallas usadas cada día.	28. Ежедневно меняю использованные полотенца.
29. For long trips (more than 500 km) around the country, I prefer an airplane to a car and/or bus.	29. Priorizo avión sobre el auto y/o bus para viajes largos (más de 500 kilómetros) dentro del país.	29. Поездки по стране более чем на 500 км совершаю на самолете.
30. After a picnic, I leave the place as clean as it was originally.	30. Después de un picnic, dejo el lugar tan limpio como lo encontré.	30. На пикнике стараюсь не оставлять за собой никакого мусора.
31. I bought solar panels to produce energy.	31. He comprado paneles solares para producir energía.	31. У меня есть солнечные батареи для производства электроэнергии.
32. I produce my own organic food (fruits, vegetables, honey, etc.).	32. Produzco mis propios productos orgánicos (frutas y/o verduras y/o miel, etc.).	32. Произвожу/выращиваю собственные органические продукты (фрукты/овощи, мед, молоко, сыр и т.д.).

Table A2. Cont.

English Translation	Spanish Items	Russian Items
33. I dispose of used batteries in the garbage.	33. Boto las pilas gastadas a la basura.	33. Выбрасываю использованные батарейки в мусор.
34. I boycott companies with an environmentally unfriendly background.	34. Boicoteo compañías que tienen un historial antiecológico.	34. Бойкотирую компании с плохой репутацией в области охраны окружающей среды.
35. When I go to work or school, I usually carpool with one or more people.	35. Comparto mi auto con una o más personas cuando voy al trabajo o a mi lugar de estudio.	35. Добираюсь на работу/учебу на автомобиле совместно с другими людьми.
36. I have a fuel-efficient car (more than 13 km per liter).	36. Mi auto es de uso eficiente de combustible (más de 13 kilómetros por litro).	36. Расход топлива у моего автомобиля на превышает 7,5 литров на 100 км.
37. When I cook, I collect used oil in a bottle or container and then take it to a collection point.	37. En la cocina, colecto el aceite usado en una botella o recipiente, para luego dejarlo en un punto de colecta.	37. Использованное масло для жарки собираю и сдаю в приемный пункт.
38. I make financial contributions to environmental organizations.	38. Contribuyo económicamente a organizaciones ambientales.	38. Делаю денежные взносы в организации по защите окружающей среды.
39. I buy food in bulk (e.g., rice, noodles, nuts, beans, etc.) using my own containers.	39. Compró productos a granel (por ejemplo, arroz, fideos, nueces, porotos, etc.) usando mis propios envases.	39. Покупаю продукты оптом (рис, лапшу, орехи, бобы и т.д.) и в собственную тару.
40. I have taken environmental courses to become more informed.	40. He tomado clases ambientales para estar más informado/a.	40. Посещаю лекции по охране окружающей среды, чтобы всегда быть в курсе.

Note. Items in **boldface** were reversed.

Table A3. Summary of the altruistic behavior items used in the study and their translation into English.

English Translation	Spanish Items	Russian Items
51. I helped push a stranger's broken-down car.	51. Empujo un auto en pana, perteneciente a una persona desconocida.	51. Помогаю незнакомым завести машину с толкача.
52. I gave directions to a stranger.	52. Explico a una persona desconocida cómo llegar a un lugar.	52. По просьбе незнакомых показываю им дорогу.
53. I changed money for a stranger.	53. Cambio dinero a una persona desconocida.	53. По просьбе незнакомых размениваю им деньги.
54. I gave money to a charity or fundraising campaign to help someone.	54. Dono dinero a una organización de beneficencia o a una campaña de colecta de dinero para ayudar a otros.	54. Жертвую деньги на благотворительность.
55. I gave money to a stranger who needed it (or asked me for it).	55. Entrego dinero a una persona desconocida que lo necesita.	55. По просьбе незнакомых выручаю их деньгами.
56. I donated goods or clothes to charity.	56. Dono alimentos o ropa como caridad.	56. Жертвую пищу и одежду на благотворительность.
57. I did volunteer work for a charity.	57. Hago trabajos voluntarios como caridad.	57. Состою волонтером в благотворительной организации.
58. I donate blood.	58. Dono sangre.	58. Сдаю кровь.
59. I helped carry other people's things (bags, parcels, etc.).	59. Ayudo a cargar cosas (maletas, bolsos, etc.) a una persona desconocida.	59. Помогаю незнакомым донести вещи (чемоданы, сумки и т.д.).
60. I held up the elevator and held the door open for a stranger.	60. Detengo un ascensor y mantengo sus puertas abiertas para una persona desconocida.	60. Останавливаю лифт и придерживаю двери для незнакомых.

Table A3. Cont.

English Translation	Spanish Items	Russian Items
61. I let people get in line ahead of me (when driving a car or standing in line at the store).	61. Le doy la preferencia a una persona desconocida (en una fila, manejando auto, etc.).	61. Пропускаю вперед незнакомых (в очереди, на машине и т.п.).
62. I gave a stranger a ride in my car.	62. Llevo en mi auto a una persona desconocida.	62. Подвожу незнакомых на своей машине.
63. When I get extra change, I give it back to the cashier.	63. Al recibir vuelto demás en una caja, le devuelvo el dinero extra al cajero.	63. Возвращаю кассиру лишнюю сдачу.
64. I bought a product at a telethon.	64. Compró un producto adherido a la Teletón.	64. Покупаю товары на благотворительной распродаже.
65. I refuse the help of strangers.	65. Rechazo la solicitud de ayuda de una persona desconocida.	65. Отказываю в помощи незнакомым.
66. I offered to help a disabled or elderly stranger across the street.	66. Ayudo a una persona desconocida (por ejemplo, anciana) a cruzar la calle.	66. Помогаю незнакомым (например, пожилой женщине) перейти через дорогу.
67. I offered my seat on the bus or train to a stranger who was standing.	67. Cedo mi asiento a una persona desconocida, en un bus o en el metro.	67. Уступаю свое место в общественном транспорте незнакомым людям.
68. I would comfort a stranger who was crying.	68. Consuelo a una persona desconocida que estaba llorando.	68. Стараюсь утешить даже незнакомого человека, если он плачет.
69. I would help a stranger who had fallen on the street.	69. Ayudo a una persona desconocida que se cayó en la calle.	69. Помогаю незнакомому человеку, упавшему на улице.
70. I would keep walking without listening if a stranger asked me anything.	70. Sigo mi camino cuando una persona desconocida comienza a pedirme algo y no la escucho.	70. Игнорирую просьбы ко мне со стороны незнакомых людей на улице.

Note. Items in **boldface** were reversed.

Table A4. Summary of the connection to nature or to humans items used in the study and their translation into English.

English Translation	Spanish Items	Russian Items
C1. How close do you feel to the following?	C1. ¿Qué tan cercano te sientes con cada uno de los siguientes grupos?	C1. Испытываю наибольшую близость с:
C2. Do you ever say “we” to refer to the following?	C2. ¿Qué tan seguido usas la palabra “nosotros” para referirte a los siguientes grupos?	C2. Говорю «мы» в отношении:
C3. How much would you say you have in common with the following?	C3. ¿Cuánto dirías que tienes en común con los siguientes grupos?	C3. Много ли у вас общего с:
C4. To what extent do you consider the following to be “family”?	C4. ¿Hasta qué punto piensas de los siguientes grupos como “familia”?	C4. Можете ли вы назвать «семьей»:
C5. How much do you care about the following?	C5. ¿Cuánto te preocupas por los siguientes grupos?	C5. Заботитесь ли вы о:
C6. How upset do you think you would be if something bad happened to the following?	C6. ¿Qué tanto dirías que sientes molestia cuando cosas malas suceden a los siguientes grupos?	C6. Беспокоят ли вас проблемы:
C7. How much would you like to be the following?	C7. ¿Qué tanto quisieras ser . . . ?	C7. Хотите ли вы быть:
C8. How much do you believe in the following?	C8. ¿Qué tanto crees en . . . ?	C8. Насколько вы преданы:
C9. If the need arose, how much would you like to help the following?	C9. En el caso de que surja la necesidad ¿Qué tanto quisieras ayudar a los siguientes grupos?	C9. Насколько вы готовы оказать помощь:

Table A5. Pearson correlations in the Russian sample for each item of the empathy scale with connection to humans (CH), connection to nature (CN), altruistic behavior (altruistic), and ecological behavior (ecological). The item numbers for the empathy scale agree with the sentimentality scale of the emotionality domain of the HEXACO personality inventory [21].

Variable	M	SD	1	2	3	4	5	6	7
1. S23	2.38	1.17							
2. S47	4.03	0.98	0.27 *** [0.21, 0.33]						
3. S71	3.53	1.13	0.23 *** [0.16, 0.29]	0.49 *** [0.44, 0.54]					
4. S95R	3.65	1.10	0.36 *** [0.30, 0.42]	0.16 *** [0.10, 0.23]	0.14 *** [0.08, 0.21]				
5. CH	4.04	0.22	0.11 ** [0.04, 0.18]	0.30 *** [0.24, 0.36]	0.25 *** [0.19, 0.31]	0.09 ** [0.03, 0.16]			
6. CN	3.61	0.27	0.16 *** [0.09, 0.23]	0.22 *** [0.15, 0.28]	0.20 *** [0.13, 0.26]	0.05 [−0.02, 0.12]	0.34 *** [0.28, 0.40]		
7. Altruistic	−0.74	1.40	0.11 ** [0.05, 0.18]	0.08 * [0.01, 0.15]	0.00 [−0.07, 0.07]	0.00 [−0.06, 0.07]	0.25 *** [0.19, 0.32]	0.18 *** [0.11, 0.24]	
8. Ecological	−0.03	0.90	0.14 *** [0.08, 0.21]	0.14 *** [0.08, 0.21]	0.10 ** [0.03, 0.16]	0.05 [−0.02, 0.12]	0.50 *** [0.45, 0.55]	0.19 *** [0.12, 0.25]	0.35 *** [0.29, 0.41]

M and *SD* represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table A6. Pearson correlations in the Spanish sample for each item of the empathy scale with connection to humans (CH), connection to nature (CN), altruistic behavior (altruistic), and ecological behavior (ecological). The item numbers for the empathy scale agree with the sentimentality scale of the emotionality domain of the HEXACO personality inventory [21].

Variable	M	SD	1	2	3	4	5	6	7
1. S23	3.11	1.20							
2. S47	3.94	1.03	0.24 *** [0.15, 0.33]						
3. S71	3.91	1.03	0.24 *** [0.15, 0.33]	0.40 *** [0.32, 0.48]					
4. S95R	3.59	1.07	0.30 *** [0.20, 0.38]	0.14 ** [0.04, 0.23]	0.17 *** [0.08, 0.27]				
5. CH	3.35	0.41	0.22 *** [0.12, 0.31]	0.30 *** [0.21, 0.39]	0.16 ** [0.06, 0.26]	0.06 [−0.04, 0.16]			
6. CN	3.83	0.38	0.09 [−0.01, 0.19]	0.36 *** [0.27, 0.44]	0.24 *** [0.15, 0.33]	0.08 [−0.02, 0.17]	0.50 *** [0.42, 0.57]		
7. Altruistic	−0.46	1.28	0.08 [−0.02, 0.18]	0.31 *** [0.21, 0.39]	0.11 * [0.01, 0.20]	0.19 *** [0.10, 0.29]	0.26 *** [0.16, 0.35]	0.28 *** [0.19, 0.37]	
8. Ecological	0.23	0.95	0.14 ** [0.05, 0.24]	0.21 *** [0.11, 0.30]	0.04 [−0.06, 0.14]	0.02 [−0.08, 0.12]	0.19 *** [0.09, 0.28]	0.37 *** [0.28, 0.45]	0.24 *** [0.15, 0.33]

M and *SD* represent the mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

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