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Connectedness is in my character: Cultivating nature relatedness in environmental education through character strengths

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Abstract
Fostering interconnectedness with nature is a central goal of environmental education. Exposing students to natural sites has been a common practice in environmental education to nurture this connection among students. However, activities in nature are not always feasible in classroom-based programs nor is it clear that these activities equally accrue nature relatedness among students. Thus, there are calls for greater understanding of psychological factors that may impinge into greater conectedness. Responding to these calls, in a sample of 967 students, we examine whether character strengths are antecedents of nature relatedness and which character strengths are more predictive of greater nature relatedness. Our results evidence that *intellectual character strengths* (i.e. appreciation of beauty, love of learning, and curiosity) are strongly associated with nature relatedness. In addition, our findings unveil that nurturing the character strength of *appreciation of beauty* might be the most effective route to increase nature relatedness among learners. These findings have theoretical and practical implications for environmental education.

Key words

Nature relatedness, nature connectedness, appreciation of beauty, environmental education, character strengths, character education

1. Introduction

The evidences of the risks and uncertainties for the stability of the Earth system caused by human activity are mounting (Steffen, Richardson, Rockström, Cornell, Fetzer, & Bennett, 2015). The rupture between our self and nature is arguably one central reason

behind current environmental crisis (Jordan, 2009; Liefländer, Fröhlich, Bogner, & Schultz, 2013). Our innate connections with nature were already highlighted by foundational environmental thinkers such as Leopold (1987[1949]) in his land ethic or Naess (1995) through the notion of ecological self. The challenges posed by environmental deterioration have increased the interest in examining this human-nature relationship (Braun & Dierkes, 2017; Schultz, 2002; Schultz, Shriver, Tabanico, & Khazian, 2004). It is defended that, as nature is integrated into the construal of self, any harm to the natural world would be lived as harm to oneself; so, the more the individual self-construe as interdependent with nature, the more she would want to protect it (Wilson, 1996). In fact, a large body of evidence shows that interdependence with nature or nature relatedness[1] (hereafter NR) is an antecedent of pro-environmental concern and behavior (Davis, Le, & Coy, 2011; Dutcher et al., 2007; Kals et al., 1999; Mayer & Frantz, 2004; Nisbet et al., 2009; Olivos, Sebastian, Tapia, & Díaz, 2014; Tam, 2013; Zelenski, Dopko, & Capaldi, 2015). Thus, a significant body of research has focused on how to develop this connection (Restall & Conrad, 2015).

A stream of research has defended that NR diminishes because our current urban lifestyles reduce our possibilities to experience adequate contact with natural world creating a cycle of disaffection (Stott, Soga, Inger, & Gaston, 2015) or a "nature-deficit disorder" (Louv, 2008). To redress this deficit, environmental educators have nurtured

[1]The notion of the human interdependence with nature has been studied with different constructs, such as nature relatedness (Nisbet, Zelenski, & Murphy, 2009), commitment to nature (Davis, Green & Reed, 2009), connectedness with nature (Mayer & Frantz, 2004), inclusion of nature in the self (Schultz, 2002), connectivity to nature (Dutcher, Finely, Luloff, & Johnson, 2007), emotional affinity towards nature (Kals Schumacher, & Montada, 1999), or ecological identity (Walton & Jones, 2018) (see a review of these constructs in Tam, 2013). We use NR as it is the most used construct to capture the human interdependence with nature (Capaldi, Dopko & Zelenski., 2014; Howell, Dopko, Passmore, & Buro, 2011; Olivos & Clayton, 2017). NR is formally defined as "one's appreciation for and understanding of our interconnectedness with all other living things on the earth" (Nisbet et al., 2009: 718). Its main advantage over other similar concepts lies in its multi-dimensional character, as it encompasses cognitive, affective and behavioral dimensions (Tang, Sullivan, & Chang, 2015).

NR by providing direct experiences in nature (Braun & Dierkes, 2017; Bruni, Winter, Schultz, Omoto, & Tabanico, 2017; Lankenau, 2018; Mayer & Frantz, 2004). Indeed, extensive research has shown that experiences and exposure to natural settings may facilitate the feeling of interconnectedness (Louv, 2008; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009; Olivos & Clayton, 2017; Restall & Conrad, 2015; Tam, 2013), evidencing the malleability of NR (Nisbet et al., 2009).

However, others have claimed that providing experiences with nature may not be sufficient, or even necessary, to nurture NR. For instance, the use of creative arts (focused on nature) in classroom-based programs has proven to be effective to increase children's NR (Bruni et al., 2017). Furthermore, even in the same urban context, individuals differ in the degree in which they integrate nature in their construal of self (Schultz & Tabanico, 2007), which suggests that other factors affect the development of this trait. Similarly, Restall and Conrad (2015) call for a holistic study of NR, understanding that it is part of a gestalt of individual traits (Restall & Conrad, 2015). Thus, there is a growing concern among environmental educators to identify which other factors may impinge on the development of NR and the role of education to foster them (Bruni et al., 2017; Liefländer et al., 2013; Phenice & Griffore, 2003), under the assumption that "[t]he quality of environmental education for young children determines how young children see themselves in relation to the natural world" (Phenice & Griffore, 2003, p.167).

Yet, at the time of writing, it is unclear which these factors are. Only limitedly have studies examined the antecedents or correlates of connectedness with nature, which have prompted calls for more research (Howell et al., 2011). Regarding previous works on the role of environmental education to enhance NR, results about the dimensions and characteristics of the programs that might be involved in the outcomes are non-conclusive (Ernst & Theimer, 2011; Lankenau, 2018).

We join this conversation by pointing at other psychological traits that may affect NR, so to characterize the gestalt of individual traits in which NR is arguably embedded. More specifically, we draw from positive psychology and conceptually articulate the association of NR with the much-established notion of character strengths (CS hereafter), i.e. dispositions to thinking, feeling, and acting towards a moral goal (Peterson & Seligman, 2004). The psychological construct of CS might provide a more holistic view of interconnectedness as being part of the moral character gestalt. In effect, as other authors have defended (Hannis, 2015; Jordan & Kristjánsson, 2017), the development of a deep connection with nature is a matter of character, rather than of knowledge and deliberation. In doing so, we respond to the call of Howell et al. (2011) for better understanding of the antecedents or correlates of NR. Also, previous work about connectedness to nature and well-being (Howell, Passmore, & Buro, 2013) defended the opportunity to examine the associations between CS and NR. Yet, to our knowledge, no empirical study has examined them.

Moreover, we aim to determine whether some CS show a stronger association with NR and, therefore, should be prioritized to design efficient interventions in educational settings. This analytical inquiry is comparable to studies in positive psychology (e.g. Quinlan, Swain, & Vella-Brodrick, 2012; Schutte & Malouff, 2019), where some CS, such as Love, Gratitude, Hope or Zest, have been selected as initial targets to cultivate the good life since they have a greater association with life satisfaction (Park, Peterson & Seligman, 2004). Similarly, in educational settings, it is important to identify the CS that discriminate between individuals with high and low levels of NR, signaling the most meaningful route to nurture NR.

In sum, the present study aims to respond to two research questions: *Is there an empirical association between CS and NR?* (RQ1), and *Which of the CS best discriminate*

between individuals with high and low NR –as a guide to cultivate NR? (RQ2). By responding to these questions, this study intends to expand our understanding on the association of NR with other trait-like differences. Thus, our results contribute to the environmental education field in several ways. First, by bridging research in interconnectedness with nature and research on CS, this study shows that NR could be part of a gestalt moral character, what may contribute to better address the individual and social divorce between self and nature, particularly in educational settings. Second, this study signals novel routes and methods to nurture NR, since by focusing on other traits of character, NR would be developed. Thus, it provides useful insights for setting up environmental education programs beyond the provision of experiences with nature. Finally, the findings reported here provide guidance for educators to design different character education pathways appropriate to nurture NR in individuals that differ in their initial levels of NR. Additionally, this study is also relevant to scholarship on NR in environmental psychology. Whereas research in this field has studied the outcomes of NR and its association with other trait-like constructs such as personality traits (Mayer & Frantz, 2004; Nisbet et al., 2009; Tam, 2013; Zelenski et al., 2015), our findings unveil other individual variables that may explain the construal of one's self as interdependent with nature.

2. VIA-IS framework of Character Strengths and Nature Relatedness

Although the notion of character strengths has long been used in philosophy -and specifically in virtue ethics (Dahlsgaard, Peterson, & Seligman, 2005)-, its development as empirical constructs is more recent. The most comprehensive empirical framework to measure character strengths is the VIA-IS framework. The VIA-IS was first articulated by Peterson and Seligman (2004) as a counterbalance to the *Diagnostic and Statistical Manual of Mental Disorders*, sponsored by the American Psychiatric Association (1994).

Their quest was psychological, rather than philosophical: they aimed to unveil a set of traits that could explain optimal human development, so to ultimately provide a conceptual and empirical framework that could both ground and expand the field of positive psychology. The analysis of 200 texts from influential cultural traditions (e.g., Buddhism, Islam or Christianity) led the authors to identify six core virtues (wisdom, courage, humanity, justice, temperance, and transcendence) that are universally considered excellence traits (Dahlsgaard et al., 2005). Next, they identified 24 CS defined as "the corresponding distinguishable psychological routes in which these virtues are displayed" (Peterson & Park, 2004, p. 13). These 24 CS that compose the VIA-IS can facilitate the development of a good life (Peterson & Seligman, 2004); in this respect, CS are conceptually similar to the Greek *aretḗ*.

The 24 identified CS meet a set of criteria, namely, they are valued in their own right regardless of their consequences, they are found in moral paragons, and they are developed by practice (Peterson & Seligman, 2004; Park et al., 2004). The VIA-IS framework has been defended as a valid measure of a virtuous character (Berger & McGrath, 2019; Beadle, Sison, & Fontrodona, 2015; Morales-Sánchez & Cabello-Medina, 2015). The reliability and validity of the VIA-IS framework has been amply demonstrated cross-culturally and cross-generationally (e.g. Biswas-Diener, 2006; McGrath, 2015a; Park, Peterson, & Seligman, 2006; Shimai, Otake, Park, Peterson, & Seligman, 2006).

Whereas the list of CS is widely accepted, there is disagreement regarding the latent structure of the CS. The original classification proposed by Peterson and Seligman (2004) does not follow a theoretical criterion, as the authors reckon, and they could not replicate it empirically. Indeed, later studies have not validated the proposed hierarchical structure of CS (McGrath, 2015b; McGrath & Walker, 2016; Peterson & Seligman, 2004),

suggesting that the six classes of CS originally hypothesized may not correspond to the actual covariation of the CS in every sample (Toner, Haslam, Robinson, & Williams, 2012).

Not only is there limited agreement in the optimal number of factors but also in the group where a given CS is located, due to the presence of cross-loadings. For instance, Creativity is included with the *Intellectual strengths* in some studies (Azañedo, Fernández-Abascal, & Barraca, 2014; Ruch, Weber, Park, & Peterson, 2014; Singh & Choubisa, 2010) and with the *Emotional strengths* in others (McGrath, 2015b). These difficulties in classifying CS are often attributed to the correlation among CS or the so-called "unity of virtues" (Fowers, 2008). To structure the following discussion, we follow McGrath's model of a five-factor structure of CS (2014) (Table 1), as this structure has also been amply replicated in other cultural settings such as Spain (Azañedo et al., 2014), Germany (Ruch et al., 2014), India (Singh & Choubisa, 2010) or Israel (Littman-Ovadia & Lavy, 2012).

<<insert table 1 over here>>

The association between CS and NR can be justified for two reasons. First, NR and CS have been found to bring about similar outcomes. If both NR and CS have similar outcomes, it is plausible to think that these constructs could be related. Past studies have shown that CS are antecedents of pro-environmental behavior (Corral-Verdugo, Tapia-Fonllem, & Ortiz-Valdez, 2015) and well-being (Littman-Ovadia & Steger, 2010; Park et al., 2004). As aforementioned, NR has been also found a predictor of pro-environmental behavior (Davis, Green, & Reed, 2009; Dutcher et al., 2007; Kals et al., 1999; Mayer & Frantz, 2004; Nisbet et al., 2009; Tam, 2013; Zelenski, et al., 2015) and well-being (Capaldi et al., 2014; Cleary, Fielding, Bell, Murray, & Roiko, 2017; Nisbet, Zelenski, &

Murphy, 2011; Zelenski & Nisbet, 2014). Moreover, other constructs such as mindfulness-as-a-trait has been found to correlate with both NR (Barbaro and Pickett, 2016; Howell et al., 2011) and CS (Baer, 2015; Niemiec, 2014).

Second, CS could facilitate the development of an interdependent construal of self. As Bragg (1996) defends, the ecological self is the result of a constructionist process where the self is expanded and transcended; as a result of this process, we identify with other human and nonhuman entities that are eventually considered as constitutive parts of our self. In other words, NR goes beyond feelings of appreciation of nature; it should be understood as the constitution of our own self as one and the same as nature (Lumber, Richardson, & Sheffield, 2017). We defend that CS may facilitate the construal of this expanded and transcendent self, insofar as they broaden our perspective and facilitate new, more complex ways of thinking our relationship with other entities (Jordan & Kristjánsson, 2017). Other studies have shown that the development of NR demands curiosity and disposition for exploration (Tang, Sullivan, & Chang, 2015), probably because these strengths increase altruistic and biospheric attitudes, which have been proven antecedents of NR (Mayer & Frantz, 2004). Past work has also found an association between NR and the personality trait of openness to experience (Nisbet et al., 2009), which is conceptually similar to the intellectual strength of Love of learning. This work indicates that there should be a positive association between *Intellectual strengths* and NR. Similarly, other studies have found an association between Humility and connectedness with nature (Lee, Ashton, Choi & Zachariasson, 2015).

Also, CS may nurture NR as they facilitate ego-decentering which has been repeatedly shown an antecedent of NR (Aspy & Proeve, 2017; Barbaro & Pickett, 2016). CS promote the inclusion of other human and nonhuman beings into the self and the development of an altruistic orientation that takes into account the potential harm that humans inflict on

nature, thus facilitating the development of NR (Frantz, Mayer, Norton, & Rock, 2005; Frantz & Mayer, 2014; Joireman, Lasane, Bennett, Richards, & Solaimani, 2001; Nisbet et al., 2009). This body of work leads to posit a positive association between *Interpersonal* and *Theological strengths* and NR, since these strengths facilitate ego-decentering.

Finally, since *Strengths of restraint* enhance the volitional abilities of the individual to self-regulate their behavior, they may facilitate the adoption of a lifestyle that respects natural entities (Giangrande, White, East, et al., 2019; UNESCO, 2017). *Emotional strengths* may facilitate to the adoption of more sustainable lifestyles by minimizing the stress and burnout experienced by sustainable practitioners (Valor, Antonetti & Carrero, 2018) or the negative feelings arising from environmental problems (Moser, Jeffress Williams, & Boesch, 2012; Verlie, 2019). Thus, we could expect a positive association between *Strengths of restraint* and *Emotional strengths* and NR.

3. Method

Sample

The data for this study were collected from students of a medium-sized Spanish university. Permission for data collection was given by the deans and the study was approved by the Committee of Ethics. Around 1200 students were contacted in their classrooms and invited to participate in the study while the teacher was not present. All students were informed at that moment that participation was voluntary and could be ceased at any point in time during the study, and that all data would be treated confidentially. If they agreed to participate, they were then given the opportunity to complete an online version of the survey during class time without the presence of their teachers. The respondents took around 10 minutes to complete the questionnaire. As a control for common method effects, time taken for completing the questionnaire was controlled and two quality control questions were employed. Participants that failed either

control question or whose questionnaires that were answered in less than seven minutes were eliminated from further data analysis (256 individuals). The final usable sample was comprised of 967 individuals (48.4% female students)

Measures

Nature relatedness. NR was measured using the 6-item version of the Nature-Relatedness Scale developed by Nisbet and Zelenski (2013). Sample items included "*My ideal vacation spot would be a remote, wilderness area*" or "*My relationship to nature is an important part of who I am*". A composite reliability score of 0.89 reflects an excellent reliability.

Character Strengths. The measurement of CS was assessed using the 24 Character Strength Alphas Values in Action (VIA) Survey-72. This scale was developed from the original VIA-IS by extracting the 3 most internally consistent items from each scale of the 24 scales. Internal consistency, reliability and validity measures of the shortened VIA Survey-72 are acceptable (www.viacharacter.org/researchers/assessments/via-72). The Spanish version of this instrument was used.

The VIA Survey-72 is a self-report questionnaire on which respondents report the extent to which statements apply to them through a 5-point Likert scale ranging from 1 (very much unlike me) to 5 (very much like me). The subscale score for each of the 24 CS is calculated using the mean of the three items related to each strength; higher values indicate greater identification with the CS. Sample items include "I find the world a very interesting place," for measuring Curiosity, or "I always let bygones be bygones," assessing Forgiveness.

Given the high correlation among CS, they need to be collapsed into factors to avoid multicollinearity problems. For this, we conducted an exploratory factor analysis (principal component analysis extraction method) using Varimax rotation, where 5

factors were retained, all of them with eigenvalues exceeding 1.00. The five-factor solution accounted for 50.72% of the variance in the data. Our factor structure was very similar to McGrath's (2014) and Azañedo et al. (2014). Accordingly, we labeled the resulting five factors with the same terms used by these authors: *Interpersonal*, *Restraint*, *Emotional*, *Theological*, and *Intellectual*. Table 2 offers the factorial results and composite reliability of each factor. Despite the adequate factor results, some cross-loads appear to be relatively significant; this is the case of Creativity and Zest, but it is not different from past studies (Azañedo et al., 2014; McGrath, 2014). The use of factor scores in the analysis allows reflecting the adequate factorial loads on the different factors while preventing multicollinearity. The factor scores for each of the five groups of CS were retained and used in subsequent analysis.

<<insert table 2 over here>>

Analyses

To answer our first research questions on whether CS predict NR, OLS regression analysis was run on the five factors - *Interpersonal*, *Theological*, *Emotional Intellectual* and *Restraint* CS - as regressors of NR. The use of factors as predictors of NR, further than been appropriated for giving a summarized information regarding CS, offered the additional advantage of avoiding the intrinsic correlation between the different strengths.

Once the association between CS and NR was tested, we proceeded with the second research question intended to identify both the most discriminant CS and the optimal routes to nurture NR via CS. To favor a fine-grained analysis, we worked with the initial 24 CS. An approach based on decision tree analysis was employed based on two main reasons. First, decision tree analysis is a suitable classification method in case of high correlation among independent variables, as multicollinearity does not provoke instability in the final classification. Second, the method serves to identify the CS that discriminate

between individuals with high and low levels of NR signaling the most meaningful route to nurture NR. To split individuals between high and low groups, the median (3) was used, following Song and Kim (2018). We ran a decision tree for the exhaustive CHAID (Chi-squared Automatic Interaction Detection) method in order to allow multiway node splitting and used 10-fold cross-validation technique. Misclassification risk, overall accuracy, sensitivity and specificity were used as performance measures. All the analyses were conducted using SPSS v.20.

4. Results

Descriptive statistics for the variables were first computed and are shown in Table 3.

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Table 3 shows that Honesty, Kindness, Fairness and Gratitude are the CS with the highest scores (mean values greater than 4). In contrast, Self-regulation, Love of Learning, Spirituality and Humility are the CS with lowest values in the sample, with mean values under 3.5. These scores are similar to those found by Azañedo et al (2014) in a Spanish adult sample with the exception of Love of Learning, which score is remarkably lower. Nevertheless, this is not surprising considering the use of a student sample: according to the same study, this CS is significantly and positively correlated with age. Finally, NR level (M= 2.99, S=0,90) is slightly lower than in previous studies (e.g. Nisbet & Zelenski, 2013). All the correlations between CS were significant, awarding the convenience of applying a factor analysis, as we did. Additionally, the correlations of CS and NR are generally positive and significant, awarding the relationship between them.

The regression analysis was conducted on the 5 factors was statistically significant (p=0.000) and explained 18.0% of NR total variance. Estimates are shown in Figure 1. Overall, the regression analysis shows that all the factors present statistically significant estimates on NR, with the exception of the Emotional CS. As expected, all the estimates

are positive, indicating that the higher the level of the *Interpersonal, Theological, Intellectual* and *Restraint* CS, the higher NR. However, the Beta coefficients show that the *Intellectual CS* has the strongest association with NR, followed by the *Interpersonal* and *Theological* ones.

<<insert figure 1 over here>>

To respond to the second research question, a decision tree was estimated. Values for cross-validation misclassification risk, overall accuracy, sensitivity and specificity were acceptable (0.35, 66%, 74.5% and 56.4% respectively), awarding the adequacy of solution. The exhaustive CHAID algorithm conducted on the 24 strengths yielded an optimal classification tree model (Figure 2) from the data comprising six terminal nodes (i.e., a node that is not split any further); three with higher percentage of individuals with high NR groups, thus predicting "high NR", and three predicting "low NR" groups. The decision tree started with a root node (n = 967) that split into three branches according to indicators of Appreciation of Beauty (under or equal to 3.3, between 3.3 and 4 and above 4), leading to further nodes. The first one (node 1), split further according to indicators of Creativity (under or equal and over 3), leading to terminal nodes 4 and 5. The higher the probability of observation (Pr) the greater the strength of the decision we derived from the tree model. Accordingly, individuals possessing Appreciation of Beauty under 3.3 and Creativity under 3 (n = 133, 13.8 %, Pr = .805) were predicted as "low NR", denoted "0" in the final terminal node (shadowed). Also, individuals with Appreciation of Beauty under 3.3 and Creativity over 3 (n = 119, 20.3 %, Pr = .607) were predicted as "low NR", although now, the strength of the prediction is lower. The second one, node 2, in which Appreciation of Beauty was between 3.3 and 4, was a terminal node (n=301, 31.1%, Pr=0.528) predicting "high NR", denoted as "1" and shadowed. The third node (node 3)

was again split by values of Love of Learning (under and above 3) leading to nodes 6 and 7. Again, node 6 was split in two branches according to values of Zest (under and above 3.3) leading to terminal nodes 8 and 9. Node 8 (n = 60, 6.2 %, Pr = .567) predicted "low NR", while node 9 (n=87, 9.0%, Pr=72.4) predicted high NR. Finally, node 7 was terminal (n=190; 19.6%, Pr=.816), strongly predicting "high NR".

<<insert Figure 2 over here>>

In sum, this analysis shows that developing Appreciation of Beauty is the first route for enhancing NR in all individuals. However, among individuals with low Appreciation of Beauty, those with greater Creativity exhibit more NR than those without. Thus, Creativity partially mitigates a possible low development of Appreciation of Beauty. To further expand NR among those in the high group, enhancing Love of Learning and Zest would foster a greater sense of interdependence with nature.

5. Discussion

This study builds on past work on the relationship between CS and NR, and respond to our first research question (RQ1) by confirming an empirical association between NR the CS *Intellectual, Interpersonal*, *Theological* and *Restraint*. Specifically, our results show the centrality of the *Intellectual* CS to nurture NR, as well as a positive correlation with *Interpersonal, Theological* and *Restraint* CS. In addition, *Restraint* CS are also positively associated with NR, although the magnitude of the association is smaller. Finally, our results do not evidence a significant association between *Emotional* CS and NR. These general findings allow us to give evidence of CS as a promising avenue for cultivating NR, different from exposure to natural settings.

Regarding our second research question (RQ2), aiming at identifying those CS that better help to discriminate individuals with higher and lower NR, our findings highlight the strong relevance of the CS of Appreciation of Beauty. Thus, two differentiated pathways

appear to be more appropriate to effectively nurture NR through the development of specific CS. First, those individuals that report low levels of Appreciation of Beauty would increase their NR in a fruitful way through the enhancement of this particular CS. In addition, a higher level of Creativity seems to increase the probability of a high NR, which suggests that fostering this CS may pave the way for the development of NR among individuals scoring low on Appreciation of Beauty. Second, among those individuals showing a high level of Appreciation of Beauty, the probability to report a high level of NR raises when they score high on Love of Learning and Zest. Thus, efforts on training these CS when Appreciation of Beauty is high would be a more productive route for the development of NR.

These findings offer empirical support for the established theoretical rationale of a link between CS and NR. Moreover, we respond to Howell et al.'s call (2013), as our results show which CS are more related with NR. Whereas they suggested that faith-based and transcendence CS (what we labelled Theological) would be more associated with NR and such association was plausible in view of past research, our study did not confirm that. We do find, however, that Appreciation of beauty is highly associated with NR, as these authors conjectured.

Some implications derive from these results for the field of environmental education. First, this study opens other avenues for achieving its purpose of cultivating a close human-nature relationship through those three distinct CS. This finding allows for an answer to the general acknowledgement of character education as hard and controversial (Jeynes, 2019; Lapsley & Narvaez, 2006). Many teachers resist the idea of including character education in curricula, because they defend the neutrality of education, adopt moral muteness in their role as teachers, or lack the necessary time and training (Chung, 2016; Jeynes, 2019). As Arthur (2014) points out, our heterogeneous and pluralistic

society makes particularly problematic to find agreements on a specific set of values to conform character. Therefore, the focus on a small set of CS might facilitate such agreements to overcome resistances to engage in moral education in the classroom. Moreover, as education is built over the assumption that learning occurs by mainly accumulating knowledge (Foster, 2001; Wals & Jickling, 2002), the development of NR supported by training *Intellectual* CS might be more naturally accepted in the classroom than by focusing on *Theological* CS, for instance.

Second, all CS are interrelated and interdependent forming an integrated unity (Fowers, 2008), which would demand a complex view of character education pointing at the diverse psychological processes underlying such unity (Park & Peterson, 2009). However, when it comes about nurturing NR, our findings unveil the opportunity to focus on a specific set of CS to draw a more understandable and easier way to operationalize a route towards NR. Furthermore, since CS (like virtues) are acquired by practice and habituation (Crossan, Mazutis, & Seijts, 2013; Russell, 2015), focusing on the development of a specific set of CS helps to define a manageable collection of activities to train those CS that learners can carry out in their daily lives and its progress monitorized (Park & Peterson, 2008, 2009).

In addition, scholarship on the cultivation of character strengths, encourages individualized approaches based on individual's profile of CS (Park & Peterson, 2008, 2009). It is suggested that character educators should focus interventions on a short number of strengths inspired in the notion of "signature strengths", i.e. those strengths that are more important for the individual or those in which s/he gets higher value –usually identified through a VIA-IS questionnaire (Peterson & Seligman, 2004). Similarly, our findings point at the convenience to design different CS training pathways for different

profiles of learners, mainly based on their different levels of Appreciation of Beauty, in order to increase NR.

Third, the relevance of Appreciation of Beauty for developing NR, together with other CS included in the *Intellectual strengths* (i.e., Love of learning and Curiosity) is clearly supported by our findings. Thus, environmental educators aiming to promote connectedness with nature may introduce in their programs a range of methods and pedagogies aimed at the development of these CS, which can be complementary or alternative to outdoor experiences.

Considering the central role of Appreciation of Beauty in NR that our findings evidence, we suggest that training this strength is a particularly productive route to higher levels of NR; hence it merits particular attention in environmental education. Peterson & Seligman (2004) define Appreciation of Beauty as "the ability to find, recognize, and take pleasure in the existence of goodness in the physical and social worlds" (p. 537)[2]. The relevance of cultivating this strength has been pointed out by empirical research on the association between engagement with nature's beauty and connectedness with nature (Capaldi et al., 2017; Richardson & McEwan, 2018; Echarri, & Echarri, 2018), well-being and flourishing (Diessner, Kirk, Guenthner, Pohling, & Mobasher, 2017; Zhang, Howell and Iyer, 2014), and prosocial behavior (Zhang, Piff, Iyer, Koleva & Keltner, 2014).

An additional reason for environmental education to focus on Appreciation of Beauty is that beauty is everywhere and it is accessible to all (Peterson & Seligman, 2004). Therefore, it might be trained in a number of contexts, in a diversity of individuals, and through a wide range of resources, approaches and methods, either in nature/outdoor-

[2] A broader notion of Appreciation of Beauty refers to the foundational values of the Western canon -Truth, Beauty, and the Good- or to the Eastern idea of beauty as integrated with goodness, since the former cultivates the latter (Diessner & Steiner, 2017). See also Diessner, Pohling, Stacy, & Güsewell (2018) for a review of definitions of Appreciation of Beauty.

based or in classroom-based programs (D'Amato & Krasny, 2011; Dresner, & Gill, 1994; Negra & Manning, 1997). (Howell, Diessner, & Robinson, 2020; Diessner, Pohling, Stacy, & Güsewell, 2018; Haluza-Delay, 2001). Howell et al. (2020) and Diessner and Steiner (2017) highlight an additional domain related to the experience of beauty with ideas, either political, religious, philosophical, or mathematical ideas. This diversity of foci of beauty allows for exercising Appreciation of Beauty in a variety of courses, contents and subjects, so facilitating its training throughout curricula in formal education, but also in informal education settings.

Notwithstanding, scant research has empirically measured the results of interventions to enhance Appreciation of Beauty. A handful of experimental or quasi-experimental studies have shown an increase of Appreciation of Beauty through different interventions: web-based exercises to increase awareness of beauty and its effects on emotions, thoughts and behaviors (Martínez-Martí, Avia, & Herández-Lloreda, 2014); weekly walks directed to notice beauty in nature (Diessner, Woodward, Stacy, & Mobasher, 2015); a service-learning experience aimed at increasing moral beauty in a course focused on psychology of beauty (Diessner et al., 2017); and the use of beauty logs to write a variety of beauty experiences (Diessner & Steiner, 2017). Despite this initial encouraging evidence, the discussion is still open about the difficulties to increase Appreciation of beauty as a trait beyond changes in its state (see Diessner & Steiner, 2017), these experiences illuminate spaces for cultivating Appreciation of Beauty in the classroom. They also call for further research on the development of this CS in our quest for sustainable societies.

No study goes without limitations. Although, to our knowledge, this is the first study examining the association of CS with NR, our data is restricted to a single university which may limit the generalizability of results. Also, the findings may be culturally bounded. Future studies should replicate this study in different age and cultural samples

before a robust statement about the relationship between CS and NR can be drawn. Also, future studies could explore variables that can moderate the relationship between the examined variables.

As a concluding remark, the results of our study support the idea that developing a sense of wholeness, relatedness and interconnectedness is necessary so that we can deconstruct the frames of reference that lay the foundation of our unsustainable societies (Mochizuki and Fadeeva, 2010; Podger, Piggot, Zahradkni, et al., 2010). This leads us to argue that NR should be a central value in education if we truly aim to respond to sustainability challenges. However, increasing NR as a learning goal is neither obvious, nor it is always possible to expose students to natural sites. Thus, we have attempted to contribute to expand the understanding of NR by inquiring into its relationship with CS, and so to explore complementary ways to nurture it. The evidence provided about the prominence of the CS Appreciation of Beauty in nurturing NR contribute to fight the decline of beauty in Western culture, labelled by Howell et al. (2020) as "the tragedy of beauty". Hence, drawing attention to Appreciation of Beauty in the educational realm helps to unveil a pathway for environmental (and other disciplines) educators towards the aim of cultivating our sense of wholeness and interconnectedness.

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Table 1. McGrath's (2014) model of character strengths

Interpersonal strengths	Fairness: treating all people the same according to notions of fairness and justice Kindness: doing favors and good deeds for others Teamwork or citizenship: working well as a member of a group or team. Modesty: letting one's accomplishments speak for themselves. Leadership: organizing group activities and seeing that they happen. Forgiveness: forgiving those who have done wrong.
Emotional strengths	Social intelligence: being aware of the motives and feelings of self and others. Humor: liking to laugh and tease; bringing smiles to other people; seeing the light side; making (not necessarily telling) jokes. Bravery: not shrinking from threat, challenge, difficulty, or pain. Creativity: thinking of novel and productive ways to do things. Perspective: being able to provide wise counsel to others.
Strengths of restraint	Prudence: being careful about one's choices; not saying or doing things that might later be regretted. Perseverance: finishing what one starts; persisting in a course of action in spite of obstacles; taking pleasure in completing tasks. Self-Regulation: regulating what one feels and does

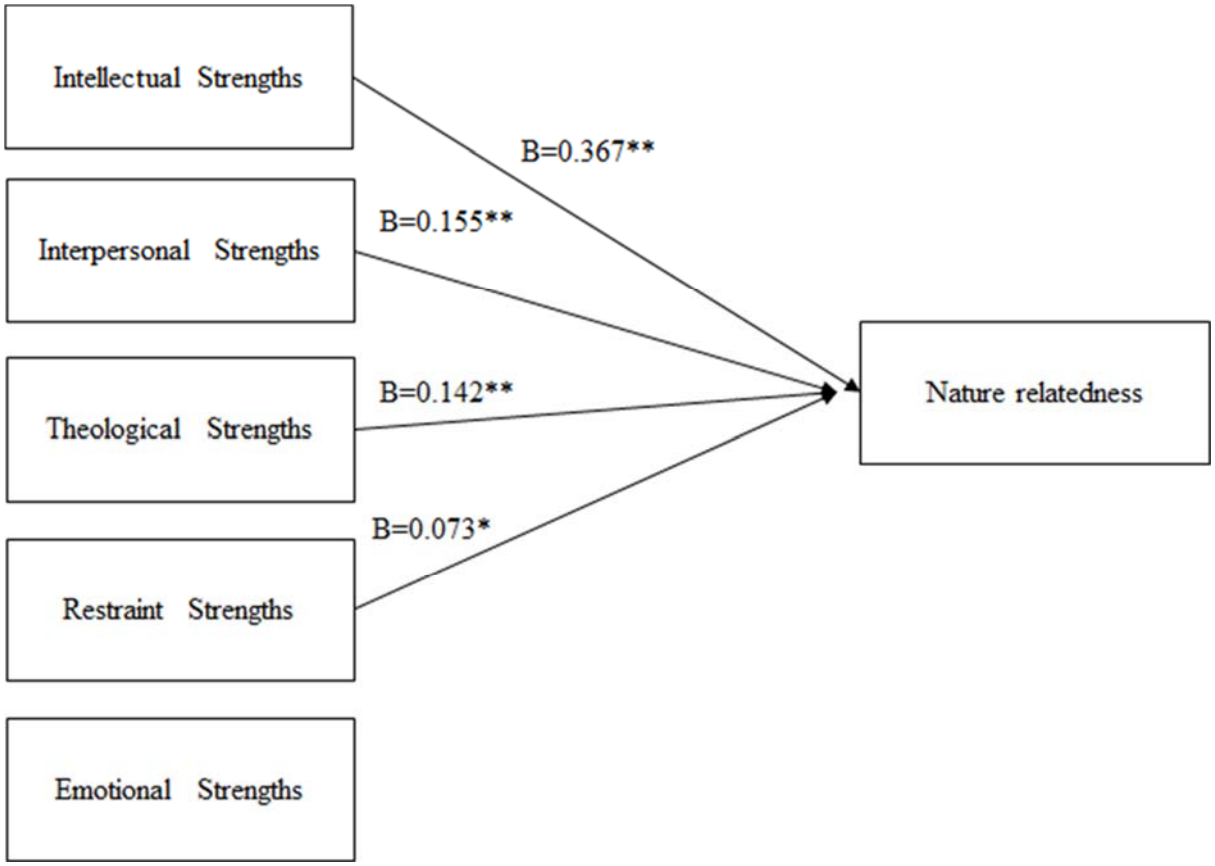
	Judgement: thinking things through and examining them from all sides; not jumping to conclusions; being able to change one's mind in light of evidence; weighing all evidence fairly. Honesty: speaking the truth and presenting oneself in a genuine way.
Theological Strengths	Zest: approaching life with excitement and energy. Hope: expecting the best and working to achieve it. Gratitude: being aware of and thankful for the good things that happen. Spirituality: having coherent beliefs about the higher purpose and meaning of the universe; knowing where one fits within the larger scheme; having beliefs about the meaning of life that shape conduct and provide comfort. Love: valuing close relations with others.
Intellectual Strengths	Love of learning: mastering new skills, topics, and bodies of knowledge. Appreciation of beauty: noticing and appreciating beauty, excellence, and/or skilled performance in all domains of life. Curiosity: taking an interest in all of the ongoing experience.

Definitions shortened from Park et al. (2014)

Table 2. Varimax rotated 5-factor solution

Strengths	Interpersonal	Restraint	Emotional	Theological	Intellectual
Fairness	**0.738**	0.209	0.105	0.033	0.042
Teamwork	**0.701**	0.152	0.151	0.078	-0.064
Leadership	**0.696**	0.109	0.242	-0.018	0.144
Forgiveness	**0.610**	-0.069	-0.057	0.223	0.233
Kindness	**0.553**	0.055	0.221	0.308	0.123
Humility	**0.541**	0.198	-0.387	0.031	0.079
Prudence	0.237	**0.729**	-0.154	0.000	-0.037
Judgement	0.155	**0.716**	0.129	0.007	0.144
Perseverance	0.046	**0.605**	-0.002	0.159	0.075
Perspective	-0.083	**0.583**	0.183	0.065	0.266
Self-Regulation	0.098	**0.534**	-0.041	0.039	0.142
Honesty	0.257	**0.441**	0.258	0.273	-0.177
Social Intelligence	0.226	0.095	**0.710**	0.098	0.005
Humor	0.097	-0.157	**0.676**	-0.024	0.056
Hope	0.088	0.111	**0.560**	0.239	0.135
Spirituality	0.064	0.023	-0.121	**0.772**	0.039
Love	0.328	0.029	0.291	**0.533**	0.082
Gratitude	0.329	0.257	0.209	**0.530**	0.115
Zest	0.131	0.155	0.425	**0.439**	0.339
Bravery	-0.135	0.232	0.363	**0.419**	0.024
Love of Learning	0.073	0.173	-0.053	-0.002	**0.756**
Curiosity	0.182	0.196	0.366	0.127	**0.588**
Appreciation of Beauty & Excellence	0.200	0.092	0.029	0.327	**0.566**
Creativity	0.000	0.102	0.499	-0.094	**0.543**
Eigenvalue	5.629	2.160	1.847	1.310	1.227
Explained variance (%)	12.745	10.971	10.634	8.278	8.095
Composite reliability	0.808	0.775	0.877	0.676	0.709

Figure 1. Regression standardized estimates on NR



Only significant paths are shown

*, ** Statistically significant at the 5% and 1% levels, correspondingly

Figure 2. Tree model for CS fostering NR

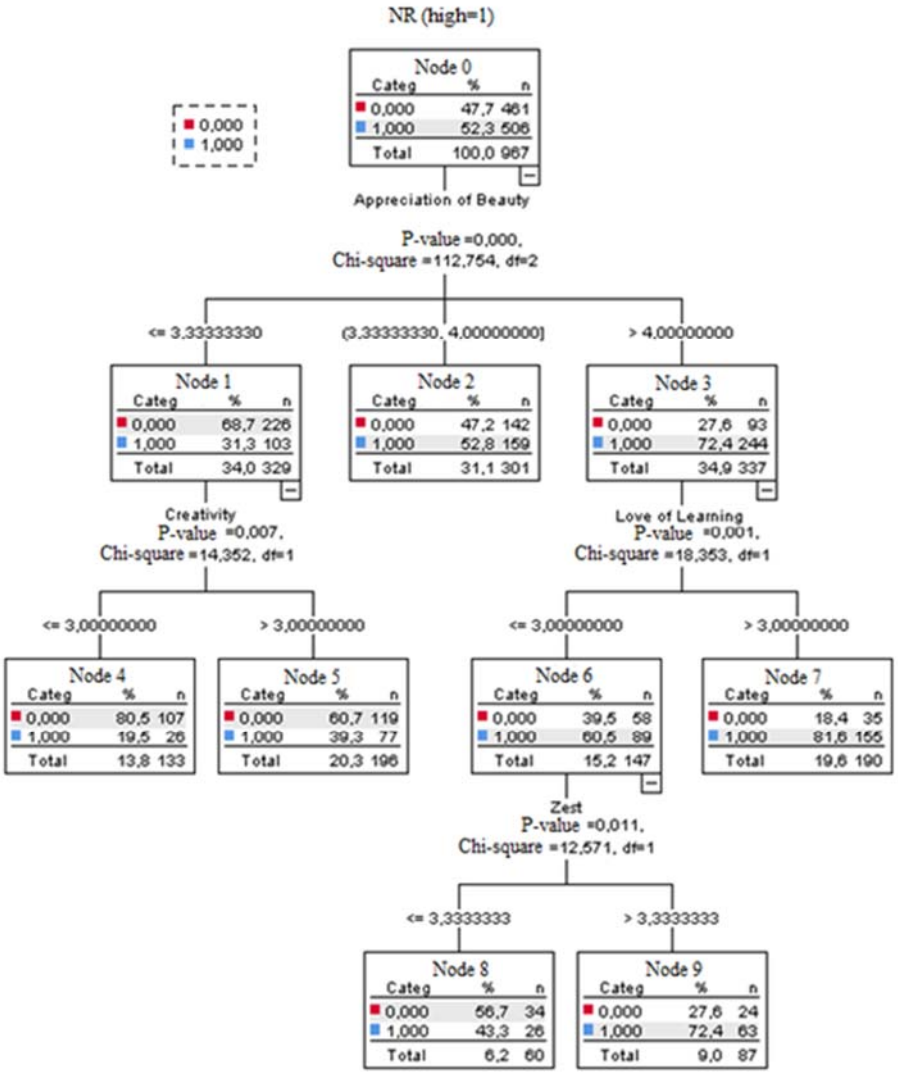


Table 3. Mean, standard deviation, and correlations of variables in the model

	Mean	Std. Dev.	Correlations																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. App. of beauty	3.78	0.83																								
2. Bravery	4.06	0.63	0.17**																							
3. Creativity	3.59	0.76	0.25**	0.22**																						
4. Curiosity	3.81	0.62	0.31**	0.18**	0.40**																					
5. Fairness	4.19	0.64	0.23**	0.08*	0.08**	0.23**																				
6. Forgive.	3.53	0.81	0.20**	0.03	0.07*	0.25**	0.40**																			
7. Gratitude	4.09	0.66	0.31**	0.18**	0.15**	0.29**	0.31**	0.22**																		
8. Honesty	4.42	0.52	0.15**	0.31**	0.11**	0.18**	0.36**	0.12**	0.31**																	
9. Hope	3.91	0.69	0.15**	0.19**	0.23**	0.33**	0.14**	0.16**	0.32**	0.20**																
10. Humility	3.29	0.81	0.13**	-0.03	-0.06	0.03	0.31**	0.27**	0.19**	0.15**	-0.05															
11. Humor	4.06	0.82	0.08**	0.19**	0.33**	0.19**	0.07*	0.08*	0.14**	0.08*	0.25**	-0.13*														
12. Judgem.	4.08	0.67	0.26**	0.19**	0.19**	0.27**	0.29**	0.11**	0.26**	0.31**	0.15**	0.12**	0.03													
13. Kindness	4.34	0.54	0.29**	0.18**	0.14**	0.27**	0.42**	0.33**	0.40**	0.29**	0.18**	0.19**	0.18**	0.23**												
14. Leadersh.	3.92	0.65	0.23**	0.10**	0.20**	0.29**	0.50*	0.33**	0.28**	0.25**	0.19**	0.26**	0.16**	0.19**	0.41**											
15. Love	4.02	0.77	0.41**	0.23**	0.14**	0.22**	0.27**	0.28**	0.37**	0.23**	0.28**	0.05	0.17**	0.18**	0.38**	0.26**										
16. Love Learning	3.10	0.93	0.32**	0.09**	0.27**	0.36**	0.14**	0.14**	0.15**	0.08*	0.13**	0.13**	0.02	0.22**	0.15**	0.15**	0.08*									
17. Persever.	3.78	0.80	0.05	0.13**	0.11**	0.24**	0.17**	0.08*	0.23**	0.25**	0.10**	0.10**	-0.08*	0.25**	0.11**	0.14**	0.10**	0.16**								
18. Perspect.	3.83	0.73	0.27**	0.23**	0.23**	0.23**	0.13**	0.02	0.23**	0.21**	0.18**	0.05	0.01	0.40**	0.13**	0.12**	0.13**	0.22**	0.25**							
19. Prudence	3.75	0.85	0.12**	0.02	-0.03	0.12**	0.22**	0.15**	0.23**	0.21**	0.06*	0.29**	-0.09*	0.58**	0.12**	0.15**	0.11**	0.10**	0.29**	0.29**						
20. Self-reg.	2.95	0.84	0.10**	0.07*	0.11**	0.18**	0.13**	0.09**	0.17**	0.15**	0.09**	0.15**	-0.01	0.23**	0.05	0.17**	0.08**	0.17**	0.37**	0.17**	0.31**					
21. Soc.Intel.	3.96	0.63	0.14**	0.21**	0.28**	0.33**	0.22**	0.10**	0.28**	0.22**	0.38**	-0.07*	0.35**	0.18**	0.27**	0.30**	0.36**	0.06	0.08*	0.20**	0.03	0.06				
22. Spirit.	3.20	1.20	0.16**	0.20**	0.01	0.12**	0.08*	0.20**	0.29**	0.15**	0.08**	0.11**	0.02	0.06	0.17**	0.10**	0.24**	0.05	0.13**	0.04	0.08*	0.10**	0.07*			
23. Teamw.	3.81	0.65	0.12**	0.01	0.10**	0.20**	0.44**	0.34**	0.34**	0.23**	0.18**	0.28**	0.11**	0.17**	0.32**	0.46**	0.30**	0.06	0.19**	0.03	0.24**	0.19**	0.26**	0.15**		
24. Zest	3.55	0.75	0.23**	0.21**	0.32**	0.52**	0.19**	0.23**	0.46**	0.21**	0.47**	-0.05	0.22**	0.18**	0.29**	0.23**	0.32**	0.21**	0.24**	0.19**	0.09**	0.22**	0.34**	0.27**	0.24**	
25. NR	2.99	0.90	0.42**	0.08*	0.19**	0.25**	0.13**	0.20**	0.16**	0.08*	0.15**	0.11**	0.07*	0.13**	0.14**	0.14**	0.17**	0.27**	0.12**	0.11**	0.08*	0.11**	0.09**	0.09**	0.18**	0.22**

*, ** Statistically significant at the 5% and 1% levels, correspondingly

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