

## Is School Adjustment Related to Environmental Empathy and Connectedness to Nature?

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### ABSTRACT

Environmental empathy and connectedness to nature are two main constructs that explain variations in pro-environmental behavior. However, little is known about whether environmental (cognitive and emotional) empathy and connectedness to nature might vary as a function of school adjustment. Participants were 881 Spanish adolescents from 12 to 17 years old (47.2% males). The design was a  $2 \times 2$  MANOVA (school adjustment  $\times$  sex). Results of the CFA analysis confirmed the theoretical assumptions about two different but related aspects of environmental empathy (cognitive and emotional) and connectedness to nature as a unidimensional construct. Overall, results showed that high school adjustment was related to higher environmental empathy (cognitive and emotional) and greater connectedness to nature. Moreover, interactions were found between school adjustment and sex. Females reported the highest levels of environmental emotional empathy and connectedness to nature (regardless of their school adjustment). By contrast, males with both low and high school adjustment reported lower environmental emotional empathy than females with high school adjustment. Furthermore, only males with high school adjustment reported similar connectedness to nature to that of females (regardless of their school adjustment). Implications of these findings for research and psychosocial interventions in environmental education are discussed.

### ¿Se relaciona el ajuste escolar con la empatía ambiental y la conexión con la naturaleza?

### RESUMEN

La empatía ambiental y la conexión con la naturaleza son dos constructos relevantes para explicar las variaciones en el comportamiento proambiental. Sin embargo, poco se sabe acerca de si la empatía ambiental (cognitiva y emocional) y la conexión con la naturaleza pueden variar en función del ajuste escolar. Los participantes fueron 881 adolescentes españoles de 12 a 17 años (47.2% hombres). El diseño fue un MANOVA  $2 \times 2$  (ajuste escolar  $\times$  sexo). Los resultados del análisis de CFA confirmaron los supuestos teóricos sobre dos dimensiones diferentes pero relacionadas de la empatía ambiental (cognitiva y emocional) y la conectividad con la naturaleza como un constructo unidimensional. En general, los resultados mostraron que un alto ajuste escolar se relacionaba con una mayor empatía ambiental (cognitiva y emocional) y una mayor conexión con la naturaleza. Además, se observó interacción entre el ajuste escolar y el sexo. Las mujeres reportaron un nivel más alto de empatía emocional ambiental y conexión con la naturaleza (independientemente de su ajuste escolar). En contraste, los hombres con ajuste escolar bajo y alto reportaron menor empatía emocional ambiental que las mujeres con ajuste escolar alto. Además, solo los hombres con alto ajuste en la escuela informaron de una conexión similar con la naturaleza que las mujeres (independientemente de su ajuste escolar). Se discuten las implicaciones de estos hallazgos para la investigación y la intervención psicosocial en el ámbito de la educación ambiental.

School is a place where information, values, and attitudes that are considered fundamental in life are transmitted (García, Carrero, Marande, & Musitu, 2017). To achieve these goals, it is important for adolescents to feel integrated and have adequate school adjustment (Harrison, Clarke, & Ungerer, 2007; Ladd & Troop-Gordon, 2003). School

adjustment is defined as an adolescent's ability to adapt to school, and includes variables such as academic performance, adaptation to school rules, respect for the teacher as an authority figure, a positive attitude toward school, and participation in school activities (Ladd & Burgess, 2001). School is also a place where adolescents interact

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with other adults outside the family and form friendships with their peers. In this regard, teacher-student relationship and adolescents' acceptance by their peers are sources of relevant information about school adjustment (Pianta & Steinberg, 1992). School adjustment, a key component of cognitive and emotional development, is an important predictor of the extent to which students will succeed in academic and other social contexts (Birch & Ladd, 1997; Quaglia, Gastaldi, Prino, Pasta, & Longobardi, 2013).

Research shows that good school adjustment is related to academic achievement (Baker, 2006; McCormick & O'Connor, 2015; Pianta, 1999; Quaglia et al., 2013; Rudasill, 2011), positive attitudes toward school (Birch & Ladd, 1997), being accepted at school, and participation in school activities (Runions, 2014). Many studies also link adolescents' school adjustment to several variables related to individual, family, and social domains. On an individual level, for example, analyses have been carried out on variables such as depressive symptomatology (Buelga, Cava, & Musitu, 2012), academic performance (Abietar-López, Navas-Saurín, Marhuenda-Fluixa, & Salva-Mut, 2017; Ruiz & Romero, 2017; Valle et al., 2018), attention problems and social isolation (Seo, 2015), and self-concept and empathy (Sanmartín, Carbonell, & Baños, 2011; Veiga, García, Reeve, Wentzel, & Gracia, 2015). In the family setting, the variables analyzed include family functioning (Lila & Gracia, 2005; Musitu & Callejas, 2017; Rodrigo, 2016), family communication (Estévez, Musitu, & Herrero, 2005), parenting styles (Fuentes, Alarcón, Gracia, & García, 2015; Gracia, Lila, & Musitu, 2005), and on a social level, peer relations (Sánchez & Breso, 2018) and social integration, and community relations (Crespo-Ramos, Romero-Abrio, Martínez-Ferrer, & Musitu, 2017; Gracia, Fuentes, García, & Lila, 2012; Jiménez, Musitu, Ramos, & Murgui, 2009).

However, despite many years of research in the area of environmental education, little is known about the links between school adjustment and environmental empathy and connectedness to nature (Cantú-Martínez, 2014; Eugenio & Aragón, 2017). Nevertheless, concern and sensitivity about environmental education dates back to the 1940s, when Dewey stated that one of the social functions of education was to promote the development of awareness about the conservation and protection of the natural environment (Dewey, 1944).

### Environmental Empathy and Connectedness to Nature

Environmental empathy and connectedness to nature are two main constructs that explain variations in pro-environmental behavior. Environmental empathy is linked to theories of interpersonal empathy, even though they are clearly distinct constructs (Tam, 2013). Environmental empathy refers to the ability to feel and understand issues related to the natural environment (Albelda & Sgaramella, 2015), and it influences one's attitudes and behaviors toward the natural environment (Cheng & Monroe, 2012; Mustapa, Maliki, Aziz, & Hamzah, 2016; Palavecinos, Amérigo, Ulloa, & Muñoz, 2016; Schultz, 2000). For example, Schultz (2002) found that witnessing other creatures being mistreated increased empathy and activated people's motivation to protect them. Moreover, Cheng and Monroe (2012) observed that feelings of responsibility for the protection of nature are a key component of pro-environmental attitudes and behaviors.

Connectedness to nature refers to the extent to which one identifies with the natural environment (Restall & Conrad, 2015), and it incorporates the idea that the natural environment is an extension of the self (Clayton & Opatow, 2003; Hoot & Friedman, 2011; Martín & Czellar, 2016; Matas-Terrón & Elosgui-Byera, 2012; Olivos-Jara & Aragones, 2014; Restall & Conrad, 2015; Tang, Sullivanm, & Chang, 2015). Connectedness to nature is also negatively correlated with selfish attitudes and beliefs (Olivos, Aragonés, & Amérigo, 2011) and

positively related to attitudes towards the natural environment and ecological behavior (Mayer & Frantz, 2004), greater commitment to nature (Perkins, 2010), physical and mental well-being (Corraliza, Berenguer, & Martín, 2006; Tauber, 2012), and emotional health (Louv, 2008).

Regarding gender differences, research suggests that females have higher-quality school relationships and better integration than males (Ewing & Taylor, 2009; Hamre & Pianta, 2001). In addition, females have higher ratings in terms of teacher-student relationships and better classroom adjustment (Ewing, 2016). Research also consistently finds that males show less commitment and poorer performance in school and are more likely to drop out than their female counterparts (Cooper, 2014; Lam et al., 2012; Lamote, Speybroeck, Van Den Noortgate, & Van Damme, 2013; Wang & Eccles, 2012). Moreover, females are more involved in and committed to school assignments (Wang & Eccles, 2012), and most studies conclude that women tend to have higher levels of environmental empathy and connectedness to nature (Arnocky & Stroink, 2010; Luchs & Mooradian, 2012). At the same time, females show a more positive attitude toward the environment and are more involved in pro-environmental activities (Richardson & Sheffield, 2015; Tam, 2013).

Sex-related differences in school adjustment, environmental empathy, and connectedness to nature have been explained through psycho-social theories of gender-role socialization (Rueckert & Naybar, 2008). The underlying idea is that a female's heightened capacity for empathy, resulting from gender-socialization processes and her experiences of the gender role, helps her better adjust at school and display greater commitment and empathy toward the natural environment (Milfont & Sibley, 2016; Santoro, Martínez-Ferrer, Monreal-Gimeno, & Musitu, 2018; Xiao & McCright, 2015).

School adjustment is a relevant variable that has been ignored in the field of environmental education, particularly in the study of the relationship between empathy and connectedness to nature. This study aims to extend existing knowledge about the relationships between school adjustment and (cognitive and emotional) environmental empathy and connectedness to nature.

## Method

### Participants

An a priori power analysis indicated a minimum sample size of 772 observations to detect a power of .95 ( $\alpha = .050$ ,  $1 - \beta = .95$ ) for a small-medium effect size ( $f = 0.13$ ) on a univariate *F*-test of low and high school adjustment groups (Gracia, García, & Musitu, 1995; Pérez, Navarro, & Llobell, 1999; Riquelme, García, & Serra, 2018). The initial sample in this cross-sectional study consisted of 881 adolescents, of whom 48 (5.45%) were excluded for the following reasons: 69% for not filling out some of the scales or for answering one or more scales in the same way; 20% due to difficulties in understanding Spanish; and 11% for voluntarily leaving the study. The final sample was composed of 833 adolescents (47.2% males and 52.8% females) between 12 and 17 years old ( $M = 13.89$ ,  $SD = 1.36$  in males and  $M = 13.45$ ,  $SD = 1.28$  in females), enrolled in 6 compulsory secondary education centers located in southeastern Spain. The participants attended public (53.3%) and private (47.7%) schools.

The average of missing data was 3.9%, and it was never higher than 5% for an individual measure. It was processed for scales or subscales using the regression imputation method. Univariate outliers were detected by exploring the standardized scores with an absolute value greater than 4 (Hair, Hult, Ringle, & Sarstedt, 2016). The Mahalanobis distance was calculated for multivariate-detection purposes. A multivariate outlier is identified if the probability associated with a Mahalanobis distance is .001 or less (Tabachnick & Fidell, 2007).

**Measures**

**Environmental empathy.** To measure cognitive and emotional environmental empathy, an 11-item measure was developed ad hoc: the Environmental Empathy Scale (EES; see Appendix A). The cognitive environmental empathy was measured with five items. A sample item is “I put myself in the place of living things when they are mistreated”. Emotional environmental empathy was measured with six items. A sample item is “When the environment recovers after damage, I feel happy”. On both subscales, adolescents answered on a 5-point scale ranging from 1 (*never*) to 5 (*always*). Higher scores represent a greater sense of environmental empathy. Cronbach’s alpha for each environmental empathy subscale was as follows: cognitive, .79, and emotional, .83.

**Connectedness to nature.** To measure connectedness to nature, an 8-item measure was developed ad hoc: Connectedness to Nature Scale (CN8; see Appendix B). A sample item is “I am convinced that I am an essential part of the natural environment”. Adolescents responded on a 5-point scale ranging from 1 (*never*) to 5 (*always*). Higher scores represent a greater sense of connectedness to nature. The Cronbach’s alpha value was .86.

**School adjustment.** It was measured with the social adjustment, academic competence, and family involvement subscales of the Scale of Teacher’s Perceptions of Students (PROF-A; Cava, Povedano, Buelga, & Musitu, 2015). This scale assesses school adjustment based on teaching staff’s perceptions of adolescent students. Social adjustment was measured with five items. A sample item is “The student’s relationship with his/her classmates”. Academic competence was measured with four items. A sample item is “Student’s interest in and attention to what is done in class”. Family involvement was measured with four items. A sample item is “The degree of the family’s involvement in the school monitoring of the child”. In all subscales, teachers responded on a 10-point scale, ranging from 1 (*very low*) to 10 (*very high*). Higher scores represent a greater sense of school adjustment. Cronbach’s alpha for each subscale of school adjustment was as follows: social adjustment, .91, academic competence, .93, and family involvement, .95.

**Procedure**

The schools were selected based on whether they were public or private. First, we contacted the principals at the six schools selected and explained the research project, requesting their consent. We further outlined that participation would be anonymous, voluntary, and confidential. We also emphasized to the teaching staff that their role was important because they would be evaluating each student on the three dimensions of the questionnaire. At the same time, we sent out letters to all the families involved, via the students, requesting parents’ active consent for their children’s participation in the study (0.8% of parents refused consent). The study has the approval of the Ethical Committee of the Pablo de Olavide University (UPO; Seville, Spain). It also complies with the ethical values required in research with human beings and respects the fundamental principles included in the Helsinki Declaration.

**Analysis Plan**

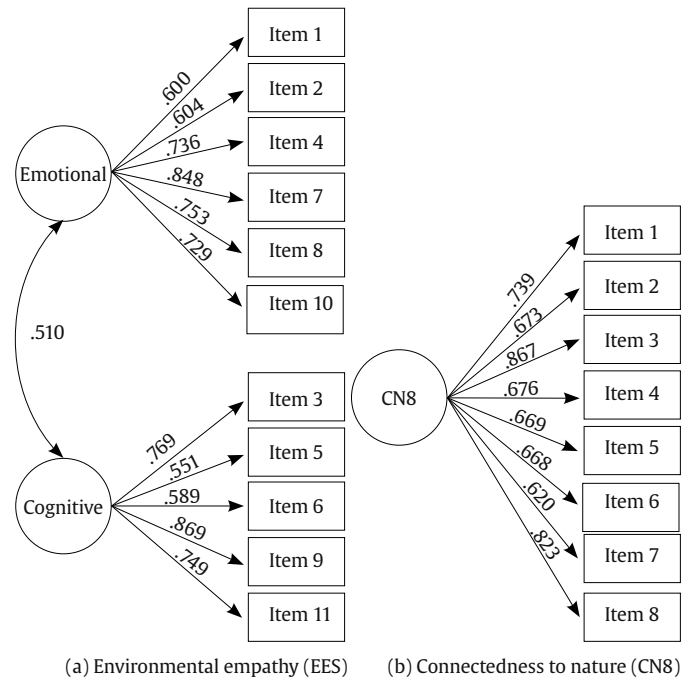
(1) A confirmatory factor analysis (CFA) was performed using the EQS software in order to test the theoretical factor structure (Bentler, 2006; Martínez, Cruise, García, & Murgui, 2017; Murgui, García, García, & García, 2012). (2) A cluster analysis following the assumption of maximum intragroup homogeneity and maximum intergroup heterogeneity was carried out to obtain groups of adolescents with low and high school adjustment. Specifically, to obtain homogeneous groups according to adjustment in the

classroom, two cluster analyses were conducted with the three indexes of school adjustment (i.e., social adjustment, academic competence, and family involvement). First, a hierarchical analysis was performed to obtain an optimal number of groups. Second, k-means were used to assign the subjects to the groups. (3) Finally, a factorial (2 × 2) multivariate analysis of variance (MANOVA) was applied, with environmental empathy (cognitive and emotional) and connectedness to nature as dependent variables, and school achievement (low vs. high) and sex (females vs. males) as independent variables. Univariate *F*-tests were conducted for all sources of variations when multivariate statistically significant differences reached the significant statistical level. Then, univariate significant results were followed by post hoc tests using the Bonferroni procedure to compare all possible pairs of means (García, López-Fernández, & Serra, 2018; Martínez, Murgui, García, & García, 2019).

**Results**

**Confirmatory Factor Analysis: Environmental Empathy (EES) and Connectedness to Nature (CN8)**

**Environmental empathy (EES).** Results of the CFA (see Figure 1) showed that the theoretical model of environmental empathy with two dimensions (cognitive and empathy) has a good fit to the data. CFA fit index:  $S-B\chi^2 = 421.1204$ ,  $df = 158$ ,  $p < .001$ , CFI = .98, RMSEA = .038 (0.034, 0.043). The cognitive and emotional environmental empathy dimensions were correlated,  $r^{(EESF1, EESF2)} = .51$ . Additionally, results indicated that both subscales had adequate convergent validity. Cognitive and emotional environmental factors were positively correlated with a global measure of environmental empathy (DEN; Tam, 2013; Spanish version by Sevillano, Corraliza, & Lorenzo, 2017): cognitive and global environmental empathy,  $r = .48$ ,  $p < .01$ ; emotional and global environmental empathy,  $r = .53$ ,  $p < .01$ .



**Figure 1.** Confirmatory Factor Analysis (CFA). (a) Environmental empathy (EES); (b) Connectedness to nature (CN8).

**Connectedness to nature (CN8).** The CFA performed (see Figure 1) showed that the theoretical unidimensional model of

connectedness to nature has a good fit to the model,  $S-B\chi^2 = 23.25$ ,  $df = 18$ ,  $p = .18$ , CFI = .99, RMSEA = .019 (.000, .038). Additionally, results indicated that this scale had adequate convergent validity, showing a positive correlation with another unidimensional measure of connectedness to nature (Mayer & Frantz, 2004; Spanish version by Olivos et al., 2011):  $r = .63$ ,  $p < .01$ .

**Cluster Analysis: School Adjustment Groups (Low vs. High)**

As expected, results of the preliminary analysis showed that the three indicators of school adjustment (social adjustment, academic competence, and family involvement) were positively related to each other: social adjustment and academic competence,  $r = .48$ ,  $p < .01$ ; social adjustment and family involvement,  $r = .39$ ,  $p < .01$ ; and academic competence and family involvement,  $r = .53$ ,  $p < .01$ . Results of the cluster analysis revealed three groups: cluster 1, high levels of school adjustment, with 326 adolescents; cluster 2, medium levels of school adjustment with 341 adolescents; and cluster 3, low levels of school adjustment, with 83 adolescents. Clusters 1 and 3 were used in the subsequent analyses to test the study hypotheses.

**Multivariate Analysis**

The 2 x 2 multivariate factor analysis (MANOVA) yielded significant interaction effects between school adjustment and sex,  $\Lambda = .978$ ,  $F(3, 403) = 3.08$ ,  $p = .027$ , and main effects of school adjustment,  $\Lambda = .977$ ,  $F(3, 403) = 3.17$ ,  $p = .024$ , and sex,  $\Lambda = .976$ ,  $F(3, 403) = 3.27$ ,  $p = .024$  (see Table 1).

**Table 1.** 2 x 2 Factorial MANOVA for Environmental Empathy and Connectedness to Nature

Source of variation	$\Lambda$	$F$	$g^2_{between}$	$g^2_{error}$	$p$
(A) School adjustment <sup>1</sup>	.977	3.17	3	403	.024
(B) Sex <sup>2</sup>	.976	3.27	3	403	.021
A x B	.978	3.08	3	403	.027

<sup>1</sup>a1: low, a2: high; <sup>2</sup>b1: females, b2: males.

**Univariate Analysis for School Adjustment and Sex**

**Environmental empathy.** In both the cognitive and emotional dimensions, the results confirmed the first hypothesis. Adolescents with high adjustment in school had more cognitive and emotional environmental empathy than those with low school adjustment (see Table 2). Regarding the second hypothesis, adolescent females reported higher cognitive environmental empathy than their

male peers (see Table 2). In emotional environmental empathy, an interaction was found between school adjustment and sex,  $F(3, 41) = 9.61$ ,  $p < .001$  (see Figure 2). Females obtained the highest levels of emotional environmental empathy (regardless of their school adjustment). However, statistically significant differences ( $\alpha < .05$ ) indicated that adolescent females with high adjustment in school reported more emotional environmental empathy than males with high and low school adjustment. In fact, the scores of adolescent males with high adjustment in school were equal to those of adolescent females with low adjustment in school.

**Connectedness to nature:** results confirmed the first hypothesis. Again, adolescents with high school adjustment have greater connectedness to nature than those with low school adjustment (see Table 2). Moreover, results confirmed the second hypothesis. Females scored higher on connectedness to nature than males. An interaction was found between school adjustment and sex,  $F(3, 45) = 3.44$ ,  $p < .05$  (see Figure 2). In a similar way, females obtained the highest levels of connectedness to nature (regardless of their school adjustment). Females reported higher connectedness to nature than males, although only within the low school adjustment condition. By contrast, among adolescents with high adjustment in school, females and males reported equal connectedness to nature.

**Discussion**

The main aim of this study was to analyze the links between environmental empathy and connectedness to nature and adolescent school adjustment and sex. The theoretical assumptions about multidimensional environmental empathy (emotional and cognitive) empathy, as well as connectedness to nature as a unidimensional construct, were tested and confirmed. Overall, our results confirmed the key role of school adjustment in fostering environmental empathy and connectedness to nature. Adolescents with high adjustment in school reported more cognitive and emotional environmental empathy and greater connectedness to nature than those with low school adjustment. These results add new empirical and theoretical evidence to the field of environmental research in the debate about unidimensional or multidimensional approaches to key constructs such as environmental empathy or connectedness to nature. It also presents findings that open up a new avenue in the field of environmental education, where these dimensions and school adjustment have been explored very little.

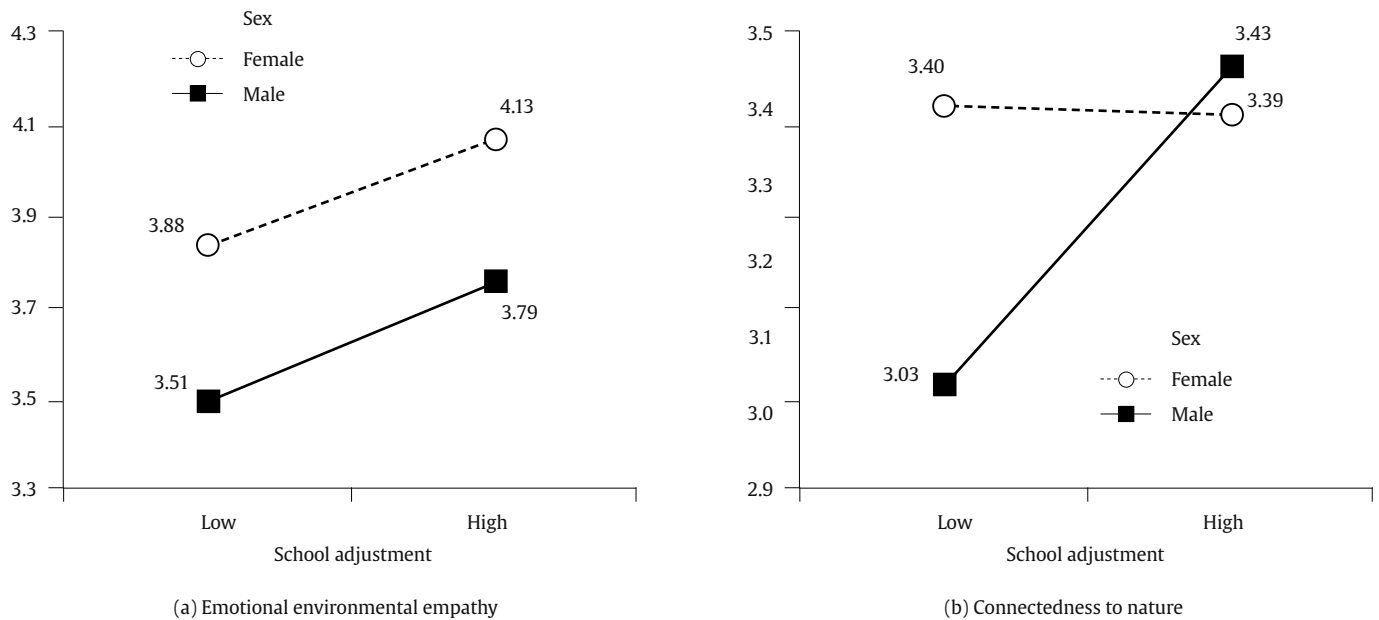
Results of the CFA analysis confirmed the theoretical assumptions: environmental empathy as a multidimensional construct with two main dimensions (i.e., cognitive and emotional) and connectedness to nature as a unidimensional construct. Additionally, results indicated that the measures of environmental empathy (cognitive and emotional) and connectedness to nature have positive correlations with other measures of unidimensional environmental empathy and connectedness to nature.

**Table 2.** Means (and Standard Deviations) of School Adjustment and Sex, and Main Univariate F Values for Environmental Empathy and Connectedness to Nature

	School adjustment				$\eta^2$	Sex				
	Low	High	$F(1, 407)$	$p$		Female	Male	$F(1, 831)$	$p$	$\eta^2$
Environmental empathy										
Cognitive	4.24 (0.88)	3.62 (0.87)	12.36	<.001	.029	3.59 (0.78)	3.31 (0.67)	22.54	<.001	.026
Emotional	3.64 (0.93)	4.00 (0.81)	12.34	>.001	.029	4.06 (0.69)	3.67 (0.89)	51.19	<.001	.058
Connectedness to nature	3.16 (0.89)	3.40 (0.77)	6.05	.014	.015	3.39 (0.76)	3.33 (0.84)	1.15	.284	.001

Note. Bonferroni test  $\alpha = .05$ .





**Figure 2.** Interactions between School Adjustment and Sex. (a) Emotional environmental empathy; (b) Connectedness to nature.

Therefore, our results make an important contribution to environmental research. Although much has been written and studied about the processes of interpersonal empathy (Davis, 1983; Davis, Hull, Young, & Warren, 1987), there is a limited theoretical and empirical basis for specifically studying empathy for nature (environmental empathy), a clearly different construct from interpersonal empathy (see Tam, 2013). Our results support the idea of two different but related aspects of environmental empathy, the cognitive and emotional components, agreeing with classical studies of interpersonal empathy that distinguish the features of emotional and cognitive empathy (Davis, 1983; Davis et al., 1987). By contrast, our results did not support the current conceptualization of environmental empathy proposed by Tam (2013), who suggests that environmental empathy is a general or unidimensional concept, rather than a multidimensional construct. Additionally, our results are consistent with previous findings about connectedness to nature as a unidimensional construct, extending evidence obtained mainly from adults to adolescents (Mayer & Frantz, 2004).

Another main finding of this study is the key role of school adjustment. Adolescents with good school adjustment reported the highest levels of emotional and cognitive environmental empathy and connectedness to nature. By contrast, low school adjustment was related to the lowest levels of environmental (cognitive and emotional) empathy and connectedness to nature. These results lead us to believe that other relevant variables related to psychosocial processes that enhance school adjustment would presumably also play this role in environmental empathy (cognitive and emotional) and connectedness to nature, such as family relations, parental socialization, communication, family functioning (García, Serra, Zacarés, & García, 2018; George et al., 2017; Rodríguez-Gutiérrez, Martín-Quintana, & Cruz-Sosa, 2016), and peer relations (Farley & Kim-Spoon, 2017; Mavroveli, Petrides, Rieffe, & Bakker, 2007).

Additionally, our results showed sex-related differences, indicating that females have higher empathy for the natural environment and greater connectedness to nature than males, confirming the results of other previous studies (Baez et al., 2017; Olivos-Jara & Aragonés, 2014; Tam, 2013). However, beyond the univariate sex-related differences, it is important to note the interaction between school adjustment and sex. The relationship between emotional environmental empathy and connectedness to nature and school adjustment is different for males

and females. Females with poor school adjustment have the same levels of emotional environmental empathy as males with high levels of school adjustment. Females, who normally have better adjustment than males (Silva, Gallegos, & Gutiérrez, 2009; Valle et al., 2018), also have higher emotional environmental empathy, regardless of their level of school (low or high) adjustment. This means that females have a greater empathic disposition toward the natural environment, regardless of their school adjustment (Pfattheicher, Sassenrath, & Schindler, 2016; Tam, 2013). Overall, males with high levels of school adjustment showed the same levels of emotional environmental empathy as females with low school adjustment. At the same time, these results provide interesting information related to gender that should be considered in the field of environmental education (Hawkins & Williams, 2017; Saricam, 2016).

Similarly, it is important to note the interaction between school adjustment and sex in connectedness to nature. Both males and females with high adjustment in school reported that they are more connected to nature than males with low school adjustment. In addition, as in the case of emotional environmental empathy, females with high and low adjustment in school showed no variations in connectedness to nature; in other words, females' connectedness to nature is independent from their school adjustment. These are interesting results in the emerging field of connectedness to nature and gender relations, although the explained variance is low. If we take into account that connectedness to nature refers to human beings' identification with the natural environment and the relationships they establish with it (Restall & Conrad, 2015), special attention should be paid to students who have problems with school adjustment, mainly males, in order to achieve a greater effect in terms of connectedness to nature and, as a result, pro-environmental behaviors.

Evidence from this study also has implications for today's society, where the ecological crisis is still a pressing issue (Sevillano, Aragonés, & Schultz, 2007). Connectedness to nature has been found to be related to physical and mental health and psychosocial well-being throughout life span (Amérigo, García, & Sánchez, 2013; Corraliza et al., 2006). These results have a close connection with school adjustment, an area where numerous studies confirm that children and adolescents with good adjustment in school have a much more positive view of themselves and the world around them

(Shoshani & Steinmetz, 2014), as well as greater life satisfaction (Varela et al., 2018). Obviously, these potential links, due to their interest and relevance, require further exploration and testing, which would, in turn, contribute significantly to the scientific development of environmental education and to improving educational programs in this field. As a result, greater empathy and inclusion of the natural environment in our self, which is the essence of connectedness to nature, would be expected (Olivos-Jara & Aragonés, 2014; Tam, 2013).

The results of this research would benefit the outdoor classroom (a natural laboratory) because they could help to significantly improve its functionality and effectiveness. These classrooms, which are increasingly used in educational establishments, fulfill two key functions. The first function is related to fomenting environmental empathy, connectedness to nature, and attitudes and respect for nature; and the second function is to help children and adolescents with adjustment problems to achieve greater motivation and school integration while promoting pro-environmental behaviors (Yaman, Abdullah, Rozali, & Salim, 2018). The possible positive effects of the outdoor classroom have been investigated with positive results (Dove, Zorotovich, & Gregg, 2018; Eugenio & Aragón, 2017; Jacobi-Vessels, 2013; Largo-Wight et al., 2018; Richmond, Sibthorp, Gookin, Annarella, & Ferri, 2018).

This study, as any empirically-based research, has weaknesses and strengths. Some of the strengths are the following: (a) the theoretical assumptions about environmental empathy as a multidimensional construct with two different but related aspects (emotional and cognitive), as well as about connectedness to nature as a unidimensional construct, were tested and confirmed through CFA analysis, contributing to the debate in the environmental field; (b) results of this research pave the way for a new line of research in which, in addition to the dimensions of environmental empathy and connectedness to nature, school adjustment should be included as a very important dimension of learning, motivation, and commitment to school activities; (c) the study provides interesting results in relation to these variables, and based on these results, these variables should be included in environmental education programs. This process, in turn, is likely to benefit educational and intervention programs aimed at promoting respect, awareness of the natural environment, the promotion of pro-environmental behavior and, ultimately, health and well-being. Among the weaknesses, we would like to point out that the selection of the sample was not probabilistic, which could influence the generalization of the results to the population. Additionally, due to the cross-sectional nature of this study, we cannot rule out bidirectional relationships between the examined variables.

Finally, although environmental problems are increasing, people continue to behave in ways that destroy the natural environment. The fact that people do not always behave pro-environmentally makes it necessary to study their motives, beliefs, and attitudes. Studies in this line of research could contribute to understanding the factors that can increase environmental empathy and connectedness to nature.

### Conflict of Interest

The authors of this article declare no conflict of interest.

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**APPENDIX A****Environmental Empathy Scale (EES)**

The following sentences describe what people think or feel about nature. Check the option that best represents what do you think or feel. Please mark one answer for each question. Remember that there are no right or wrong answers.

	<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Always</i>
REMEMBER	1	2	3	4	5

1.	I feel good if I am in a natural environment that is protected and cared for.	1	2	3	4	5
2.	I am happy when measures are taken for the protection of the natural environment.	1	2	3	4	5
3.	I try to put myself in the place of others when they cause a specific environmental problem.	1	2	3	4	5
4.	I am very happy to see people who protect and care for the natural environment.	1	2	3	4	5
5.	When a forest burns, I put myself in the place of all the living things that inhabit it.	1	2	3	4	5
6.	When a natural landscape disappears due to the action of humans, I try to understand the reasons.	1	2	3	4	5
7.	When the natural environment recovers after damage, I feel very happy.	1	2	3	4	5
8.	I feel happy when I see other people enjoy the environment without harming living things.	1	2	3	4	5
9.	I put myself in the place of living things when they are mistreated.	1	2	3	4	5
10.	When I see animals that are happy in their environment, I feel happy.	1	2	3	4	5
11.	I do not understand people who damage the natural environment.	1	2	3	4	5

**APPENDIX B****Connectedness to Nature Scale (CN8)**

Now you are going to read a series of sentences about your connection with the natural environment. Check the option that best represents your relationship with nature. Please mark one answer for each question. Remember that there are no right or wrong answers.

	<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Frequently</i>	<i>Always</i>
REMEMBER	1	2	3	4	5

1.	I am aware that some of my behaviors have a negative effect on the natural environment.	1	2	3	4	5
2.	I am convinced that I am a direct part of the natural environment.	1	2	3	4	5
3.	I cannot imagine my life and the life of human beings without the natural environment.	1	2	3	4	5
4.	I have a very close and respectful relationship with the natural environment.	1	2	3	4	5
5.	I think that everything on Earth (alive and not alive), including me, is interconnected.	1	2	3	4	5
6.	I identify with everything that happens in the natural environment.	1	2	3	4	5
7.	I feel that animals and plants are part of my life.	1	2	3	4	5
8.	My health and the health of the natural environment are closely related.	1	2	3	4	5