



Design and validation of the Altruism and Empathy Test (AET) for Primary Education

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ABSTRACT

This study had three objectives: (1) to design and validate the Altruism and Empathy Test (AET) for primary school children under the age of 10, thus addressing the lack of self-report questionnaires on altruism and empathy adapted to this age group and context; (2) to analyze the relationship between empathy and altruistic behavior; and (3) to examine gender differences in these variables. For validation, both scales were applied to a sample of 183 primary school students (41% girls), aged between 6 and 8 years. Reliability analyses indicated high coefficients on both scales, and confirmatory factor analyses revealed a unifactorial structure on the altruism scale, while the empathy scale showed a bifactorial structure: empathic stress and empathic joy. In conclusion, this study has developed an assessment tool to measure empathy (with two emotional components, one positive and one negative) and altruism in different contexts. In practical terms, the findings suggest that fostering empathy and altruistic prosocial behavior can improve cooperation and mutual support among students, with important implications for social coexistence at an early age.

Keywords: altruistic prosocial behavior, empathy, primary education, validation.

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1. Introduction

The study of prosocial behavior is an element that promotes coexistence among peers and is highly relevant in childhood and adolescence within the process of socialization and emotional stability. In the early stages of life, parenting styles and educational models influence the learning of emotional, social and behavioral skills that contribute to the comprehensive development of students, both personally and academically. It is during the schooling stage that the acquisition of these skills is reflected in the quality of peer relationships and the imp tve emotions lies, as they are the motivational basis that activates this prosocial behavior (Espinosa et al., 2011). This research, among others, has shown that in life situations that increase positive affect (e.g., a pleasant environment that inspires tranquility), people develop prosocial behaviors, such as altruism. Similarly, empathy has been shown to be the most powerful mechanism for motivating this prosocial behavior (Lam, 2012; Van der Graaff et al., 2014), understanding empathy as the cognitive and affective ability to differentiate between the emotional states of others, understand them and put oneself in their place (Mestre et al., 2004). Interest in understanding the mechanisms underlying these prosocial behaviors has led to a more in-depth exploration of the relationship between empathy and altruism. In this vein, various studies have pointed out that empathy is a fundamental predictor of prosocial behavior, such as altruism (Eisenberg et al., 2006; Hoffman, 2000). Empathic concern, understood as the affective component of empathy that involves feelings of compassion and tenderness towards the suffering of others, has been identified as a strong driver of altruistic behavior by mobilizing the individual to act to alleviate the suffering of others. Complementarily, perspective taking, as a cognitive component of empathy, allows the subject to adopt another person's point of view, understand their thoughts, emotions, and needs, and thereby promote a more reflective and help-oriented disposition (Davis, 1980; Decety and Jackson, 2004). Although evidence indicates that this cognitive dimension alone does not always directly predict prosocial behavior, several longitudinal studies have shown that it can indirectly influence it by enhancing empathic concern, which ultimately facilitates prosocial action (Van der Graaff et al., 2018). Consequently, the relationship between empathy and altruism is a dynamic, reciprocal and constantly evolving process that progressively consolidates from childhood to adolescence as part of the development of social skills and the socio-emotional and moral development of the individual (Van der Graaff et al., 2018).

From this perspective, both the family and school contexts play a fundamental role in the development of empathy and prosocial behavior in the early stages of life. According to social learning theory (Bandura, 2001), children acquire their social skills both through direct experience and vicarious observation, that is, through the modelling provided by significant adults and their peers. Parents and teachers are therefore key figures in the learning of altruistic behaviors (Espinosa et al., 2011). In the family context, the quality of positive expression in interactions within the family, such as living in an environment of love and understanding, has been linked to greater empathy and prosocial behavior (Mestre et al., 2007; Streit et al., 2020). In the educational context, establishing positive relationships with both peers and teachers promotes socialization and emotional stability, acting as a protective factor against hostile behaviors such as bullying. Research has shown that promoting a positive school climate helps students feel supported by the educational community, improves their integration and participation in school life, and cultivates empathy towards their peers (Valdés-Cuervo et al., 2018).

From a gender perspective, several studies have pointed out that girls tend to show higher levels of empathy than boys, possibly due to differences in parenting and socialization practices from an early age (Garaigordobil and García de Galdeano, 2006; Malonda et al., 2019). Girls have also been observed to have a greater inclination towards altruistic prosocial behavior (Balabanian and Lemos, 2024; Garaigordobil and Maganto, 2011).

However, although meta-analyses generally support greater female empathy, the results in terms of prosocial behavior are more heterogeneous depending on the form of assessment (Chaplin and Aldao, 2013; Eisenberg and Fabes, 1998). In this regard, while studies based on self-reports and third-party reports (parents or teachers) tend to consistently favor girls, experimental studies show more variable results, and in some cases even fail to detect significant differences.

Given this apparent disparity in studies, the meta-analysis conducted by Xiao et al. (2019) suggests that differences should be analyzed according to the type of prosocial behavior, i.e., women tend to excel in behaviors related to care and emotional support, and men in more instrumental or heroic behaviors.

1.1. Cognitive-affective structure of empathy

Empathy has been defined as the ability to understand and respond adaptively to the emotions of others, considering both cognitive and affective components, with the ability to discriminate between one's own self and that of others being vital. Some research has shown that from childhood onwards, emotional components (such as joy) correlate with prosocial behavior (Schultz et al., 2004). In other words, infants from fourteen months of age can engage in prosocial behaviors modelled by adults (López et al., 1994), as indicated by Piaget (1968) in his cognitive development theory able to understand the emotions of other children and offer a response tailored to their needs, thereby resolving their moral dilemma. In this sense, the nature of empathy explains the quest to do good to promote people's well-being.

Within this cognitive-affective structure of empathy, much research has focused on evaluating this construct in infants, adolescents, and young people, demonstrating that empathy is a fundamental factor in establishing positive social relationships (Tur et al., 2004), improving self-concept (Garaigordobil and Maganto, 2011), increasing cooperation and promoting inclusive

educational environments (Piñeiro-López et al., 2022). Some of this research has evaluated empathy from different perspectives. On the one hand, focusing solely on empathy as an affective component (i.e., *Questionnaire Measure of Emotional Empathy*; Mehrabian and Epstein, 1972). Subsequently, Caruso and Mayer (1998) improved the version by understanding empathy as a cognitive component (i.e., *Hogan Empathy Scale*; Hogan, 1969). Later, empathy was assessed from a comprehensive view of both cognitive and affective components (i.e., *Interpersonal Reactivity Index*, Davis, 1980; *Empathy Quotient*, Baron-Cohen and Weelbrigh, 2004; Spanish Empathy Index, Ocejá and Jiménez, 2007; and the Cognitive and Affective Empathy Test (CAET), López-Pérez et al., 2008), all of which were aimed at a population of adolescents and adults, leaving a gap in the assessment of the construct in childhood. The latter, the CAET questionnaire (López-Pérez et al., 2008), is one of the most widely used for a comprehensive assessment of empathy. However, its use is limited to adolescents aged 16 and above. Consequently, the absence of empathy questionnaires that address both affective and cognitive aspects in the primary school population creates a need to develop and validate a questionnaire specifically aimed at this group of students.

1.2. Altruistic prosocial behavior

Altruistic prosocial behavior has been defined as voluntary and intentional behavior that benefits others. It encompasses various social actions such as sharing, cooperating and volunteering, among others, one of its fundamental aspects being the voluntary nature of the behavior (Hyson and Taylor, 2011).

This construct has been studied from different theoretical perspectives, and there is a positive relationship with cognitive-emotional development at different stages of life, increasing with age (Caprara, 2014; Underwood and Moore, 1982). Analyzing this construct, it is important to recognize that both individual factors (e.g., temperament) and situational factors (e.g., family, school and peer microsystems) influence the acquisition of this altruistic prosocial behavior. In this regard, altruistic behavior has been explained from different perspectives: from genetics, where Hur and Rushton (2007) determined that 55% of prosocial behavior was determined by genetic factors in a sample of students aged between 2 and 9 years; from evolutionary theories, where infant temperament and secure attachment are fundamental variables for prosocial and resilient behavior (Craig, 1999); and from social learning theories, where direct experience and modelling lead to the learning of these prosocial behaviors (Espinosa et al., 2011). Therefore, the focus on the family microsystem (e.g., positive and trusting communication), the educational microsystem (e.g., cooperative learning strategies) and peer relationships (integration and acceptance into the group) have proven to be vital for understanding the development of altruistic prosocial behavior (Barroso-Hurtado and Bem-bibre, 2019).

Altruistic prosocial behavior has been assessed from different perspectives and shaped by different dimensions depending on each theory, such as the Altruistic Behavior Questionnaire (Romer et al., 1986), the *Altruism Scale* (Johnson et al., 1989) or the Prosocial Behavior Inventory (Silva, 1998).

However, all these instruments are designed to be applied to children aged ten and above. In the case of pupils younger than this age, the evaluation of the prosocial construct is usually carried out using situational tests, such as estimation scales or systematic observation, administered by adults close to the children, who collect the information. Consequently, the absence of a self-report questionnaire that assesses altruistic prosocial behavior in students aged six to eight years in different situational settings creates or promotes the need to develop a specific tool for this age range.

1.3. Objectives and hypotheses

Considering the absence of self-report questionnaires on empathy and altruistic prosocial behavior adapted to primary school pupils, this research has three objectives. Firstly, to validate the Altruism and Empathy Test (AET), which, as its name suggests, consists of two scales: one for altruistic prosocial behavior adapted to different contexts (i.e., family, school, leisure) and to the students for whom it is intended, and another for empathy, understood as the combined process of cognitive-affective components. Secondly, to analyze the relationship between empathy and altruistic prosocial behavior. Finally, to explore the existence of significant differences between gender and the different scales of the study (i.e., empathy and altruism).

In this regard, the study proposes four hypotheses: 1) empathy will be composed of two factors: joy and empathic stress; 2) altruistic prosocial behavior will be saturated in a single factor; 3) positive relationships will be found between empathy and altruistic prosocial behavior; and 4) women will obtain significantly higher scores in empathy and altruistic prosocial behavior than men.

2. Method

2.1. Participants

This study involved a sample of 183 first- and second-year primary school pupils aged between 6 and 8 ($M = 6.96$; $SD = 0.56$), of whom 59% were boys and 41% were girls. The sample was selected for convenience and consisted of natural groups, i.e., classes already formed in their respective schools. In total, eight classrooms participated: four from the first year and four from the second year of primary education, from two public schools located in urban areas of the city. Both schools are located in areas with an average socioeconomic profile, characterized by a majority of working families.

2.2. Design and procedure

Once the two scales had been designed, six experts in social-emotional learning were asked to evaluate the content validity of the Altruism and Empathy Test (AET) for Primary Education. These experts received an attached questionnaire by email, in which they were asked to evaluate the quality, relevance, comprehension, and association of each item with the corresponding dimensions, using a scale of three response options (i.e., from 1 = *does not meet the criteria* to 3 = *high level*). After the content validity analysis, 25 items were retained from an initial total of 33, selected based on agreement of 80% or more among the experts.

Subsequently, schools were selected using convenience sampling, and informational meetings were held with management teams, teachers, and school councils to obtain their approval to participate. Once all consents were obtained, the data collection process began.

The questionnaire was administered during the first term of the school year, during school hours between 9:00 and 12:00, Monday to Thursday. The application procedure was individual in nature, due to the developmental characteristics of the students, especially in the case of the first year of primary education, where basic reading skills are still being consolidated. The research staff visited the schools and were directly responsible for administering the questionnaires.

During the administration, the research staff read each item aloud to the students, ensuring that they understood the statement and recording their responses individually according to the corresponding protocol. The data were then entered into a database for statistical analysis.

2.3. Instruments

This tool is based on the drafting of comprehensible items adapted to everyday situations that students aged between 6 and 8 may experience. In addition, it incorporates an integrative perspective in the study of the two constructs, as it does not focus solely on educational situations, but also covers other areas such as the family.

2.3.1. Empathy scale

This scale provides an overall measure of empathy and consists of 18 items organized into a two-factor structure: empathic joy and empathic stress. Its items are formulated as questions to ascertain the emotional state of students in each situation (i.e., positive or negative). The first factor, *empathic joy*, refers to the ability to share the positive emotions of another person (i.e., classmates, family members, or teachers) and consists of nine items (e.g., *how do you feel when a new child at school has fun playing with other children?*). On the other hand, the second factor, *empathic stress*, refers to the ability to share another person's negative emotions and consists of nine items (e.g., *how do you feel when a classmate is ill?*).

The items are answered using a five-point Likert scale of emotional responses. To facilitate understanding of the scale, five faces are included to represent different emotional levels, ranging from 1 (very happy) to 5 (very sad).

2.3.2. Altruistic prosocial behavior scale

The prosocial behavior scale consists of seven items formulated as questions; they refer to the action of sharing (*How often have you shared your materials with a classmate who did not bring a pencil case to class?*), the action of helping (*Have you ever helped a classmate who did not know how to do their homework?*) and the action of encouraging or comforting their peers (*Have you ever approached a child who was crying?*). *have you helped a classmate who did not know how to do their homework?*) and the action of encouraging or comforting peers (e.g., *have you approached a child who has fallen to ask if they are hurt?*). To facilitate understanding, the response scale is represented by four circles of increasing size (i.e., from smallest to largest), using an interval from 0 (never) to 4 (always).

Given that at this age pupils are developing the ability to establish relationships between quantity and size, the use of circles ranging from small to large on the scale is in line with their learning process.

On the other hand, during the individual administration of the questionnaire, the research staff was responsible for recording basic sociodemographic data (year, group, school, gender, and age) to adequately characterize the sample. This information was not requested directly from the students but was provided in advance by the teaching teams at the participating schools.

2.4. Data analysis

The analyses were performed using SPSS 29.0 and AMOS 28.0 software. First, descriptive statistics and internal consistency coefficients (Cronbach's alpha) were calculated for the items on the empathy and altruistic prosocial behavior scales. Correlations between the instruments were also explored.

To evaluate the factorial structure of the scales, internal cross-validation was applied. The total sample ($N = 183$) was randomly divided into two equivalent subsamples ($n_1 = 89$; $n_2 = 94$). Exploratory factor analysis (EFA) was performed on the first subsample to identify the latent structure of the items (Lloret-Segura et al., 2014). Prior to this analysis, Bartlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) index were applied.

In addition, confirmatory factor analysis was performed on the second subsample. Model fit was evaluated using absolute and relative indicators: χ^2 , RMSEA, GFI, IFI, CFI, and AIC, considering the cut-off points established by Browne and Cudeck (1992) and Hu and Bentler (1995). Common method bias was examined using Harman's single-factor test. In addition, the extracted mean variance (EMV) and composite reliability coefficient (CRC) indices were calculated to assess the convergent validity and internal reliability of the constructs.

Finally, MANOVAs were performed to analyze possible gender differences in the empathy (joy and stress) and altruistic prosocial behavior scales.

3. Results

3.1. Descriptive statistics

The results of the descriptive analyses (mean, standard deviation, skewness, and kurtosis) of the total sample of the seven items on the altruistic prosocial behavior scale and 18 items on the empathy scale are shown in Tables 1 and 2, respectively. As can be seen, the asymmetry and kurtosis indices are close to zero and below two, as recommended by Bollen and Long (1994), indicating similarity to the normal curve. These results allow the use of maximum likelihood factorial techniques in the exploratory and confirmatory analyses that we will perform later.

Table 1

Descriptive statistics for the items on the altruistic prosocial behavior scale ($N = 183$). Own elaboration

Items	Mean (SD)	G1	G2
1. How many times have you shared your lunch in the playground with a classmate who did not bring their own?	1,84 (1,01)	1,01	-0,12
2. How many times have you shared your materials with a classmate who did not bring a pencil case to class?	2,70 (1,10)	-0,13	-1,01
3. How many times have you given your chair to a classmate who was on crutches and did not have a chair?	1,56 (0,97)	1,41	1,01
4. How many times have you carried the rucksack of a classmate who was ill?	1,70 (1,04)	1,25	0,16
5. How many times have you helped a classmate who did not know how to do their exercises or homework?	2,60 (1,08)	0,01	-1,20
6. How often have you approached a child who has fallen in the playground to ask if they are hurt?	2,92 (1,00)	-0,36	-1,09
7. How many times have you called the teacher when you saw a classmate being bullied in the playground?	3,03 (1,07)	-0,71	-0,85

Note. SD = Standard Deviation; G1 = Skewness; G2 = Kurtosis.

Table 2

Descriptive statistics for the items on the empathy scale (N= 183). Own elaboration

Ítems	Media (DT)	G1	G2
1. How do you feel when a classmate wins a prize?	2,37 (1,17)	0,53	-0,57
2. How do you feel when people share amusing stories about things that have happened to them?	1,91 (0,94)	1,11	-1,4
3. How do you feel when you see the teacher congratulating a classmate?	2,33 (1,15)	0,67	-0,21
4. How do you feel when you see a new child at school having fun playing with other children at break time?	1,61 (0,95)	0,61	1,55
5. How do you feel when you see a friend's parents buy them a game they wanted?	1,89 (1,07)	1,30	1,20
6. How do you feel when you see your best friend getting good grades?	2,00 (1,09)	1,28	0,41
7. How do you feel when you see your friend's mother or father congratulating them on something they have done well in class?	1,93 (1,11)	1,02	-0,50
8. How do you feel when a classmate lends their materials to someone else because they have not brought their pencil case?	2,33 (1,11)	0,60	-0,17
9. How do you feel when you see the teacher helping a classmate who does not know how to do the worksheet?	2,13 (1,02)	0,56	-0,42
10. How do you feel when you are told that a colleague is ill?	3,99 (0,67)	-0,55	1,43
11. How do you feel when you see the teacher punishing a classmate?	3,58 (0,93)	-0,62	0,71
12. How do you feel when you see your father or mother crying?	4,46 (0,63)	-0,87	0,40
13. How do you feel when you hear that a child on your street has broken their leg or arm?	4,20 (0,80)	-0,89	0,81
14. How do you feel when you see another child hitting your friend?	4,01 (0,64)	-0,20	-0,09
15. How do you feel when you see a friend not receiving any presents on their birthday?	4,21 (0,80)	-0,37	-0,22
16. How do you feel when you see a child fall in the playground and hurt themselves?	3,99 (0,69)	-0,60	-1,21
17. How do you feel when other classmates do not want to play with your classmate during break time?	3,94 (0,71)	-0,37	0,97
18. How do you feel when you see on television that there has been an accident and people have been injured?	4,12 (0,85)	-0,78	0,63

Note. SD = Standard Deviation; G1 = Skewness; G2 = Kurtosis.

3.2. Exploratory Factor Analysis

To verify the proposed dimensionality of the empathy and altruistic prosocial behavior scales, two successive analyses were performed on a sample of first-year primary school pupils (N = 89). First, Bartlett's sphericity test and the KMO index were analyzed to determine whether there were significant correlations between the variables under study and thus evaluate the applicability of the factor analysis technique in this case.

The KMO test for the empathy scale yielded a value of 0.73, indicating moderate adequacy for factor analysis, according to the recommendations of Hair et al. (2009). This suitability was corroborated by Bartlett's sphericity test, which was highly significant with $2 = 541.76$ (degrees of freedom = 190; $p < 0.001$), confirming that there is sufficient correlation between the variables to proceed with factor analysis.

On the other hand, the KMO test for the altruistic prosocial behavior scale yielded a value of 0.80, suggesting excellent suitability for factor analysis. Likewise, Bartlett's sphericity test was also significant in this case, with $\chi^2 = 129.18$ (degrees of freedom = 21; $p < 0.001$), which supports the existence of adequate correlations between the variables studied. In both cases, the results indicate that the data have the appropriate characteristics for factor analysis.

Secondly, an Exploratory Factor Analysis (maximum likelihood extraction method) was performed to verify the dimensionality. Table 3 shows the factorial result obtained. On the empathy scale, we found a two-factor model composed of two factors represented by nine items each, which together explain 37.47% of the total variance. The first factor, called *empathic joy*, explained 19.76% of the

variance, with factor loadings ranging from 0.34 to 0.81. This factor showed good internal consistency (Cronbach's alpha) of 0.79. On the other hand, the second factor, called *empathic stress*, explained 17.72% of the variance, with factor loadings ranging from 0.48 to 0.66, and showed good internal consistency of 0.76.

Table 3

Exploratory factor analysis of the two constructs of the empathy scale (N = 89). Own elaboration

Factor loadings for empathy	Factor 1 Empathic stress	Factor 2 Empathic joy
Item 1		0,69
Item 2		0,40
Item 3		0,79
Item 4		0,49
Item 5		0,81
Item 6		0,68
Item 7		0,70
Item 8		0,34
Item 9		0,41
Item 10	0,66	
Item 11	0,48	
Item 12	0,51	
Item 13	0,60	
Item 14	0,63	
Item 15	0,51	
Item 16	0,62	
Item 17	0,49	
Item 18	0,62	
Cronbach's alpha	0,76	0,79
% Variance	17,72	19,76
% Variance (cumulative)	37,47	19,76

On the other hand, the altruistic prosocial behavior scale showed a unifactorial model for the data set with a satisfactory fit. Table 4 shows that this factor is composed of seven items that explain 42% of the variance, with factor loadings ranging from 0.52 to 0.73, and has an internal consistency of 0.77. In short, all the internal consistency analysis data (Cronbach's alpha) showed that the values obtained exceeded the criterion of 0.70 recommended by Nunnally and Bernstein (1994).

Table 5 shows the correlations between the variables under study calculated separately in the two subsamples used for cross-validation ($n_1 = 89$; $n_2 = 94$). In the first subsample, a negative and marginally significant correlation was observed between empathic joy and empathic stress ($r = -0.21$, $p = 0.05$), while no significant associations were found between altruistic prosocial behavior and the dimensions of empathy.

In the second subsample, the negative correlation between empathic joy and empathic stress was replicated, being stronger and statistically significant ($r = -0.29$, $p = 0.005$). However, as in the first subsample, no significant correlations were identified between altruistic prosocial behavior and any of the dimensions of empathy.

Overall, the results show a repeated pattern of negative relationship between the two dimensions of empathic experience (i.e., joy and stress), although the magnitude of this relationship is low, not exceeding the threshold considered moderate (≥ 0.30). Thus, the absence of associations with prosocial behavior suggests that, in this sample, empathic emotions do not directly translate into prosocial behaviors.

Table 4

Exploratory factor analysis of the two constructs of the altruistic prosocial behavior scale (N = 89). Own elaboration

Factor loadings of altruistic prosocial behavior	
	Factor 1
Ítem 1	0,68
Ítem 2	0,73
Ítem 3	0,67
Ítem 4	0,65
Ítem 5	0,52
Ítem 6	0,69
Ítem 7	0,57
Cronbach's alpha	0,77
% Variance	42,10
% Variance (cumulative)	42,10

Table 5

Correlations between study variables (i.e., joy and empathic stress, and altruistic prosocial behavior). Own elaboration

Scales	M (SD) n ₁ = 89	M (SD) n ₂ = 94	(1)	(2)	(3)
(1) Altruistic prosocial behavior	2,27 (0,68)	2,37 (0,60)	(—)	−0,51 (p = 0,63)	0,10 (p = 0,93)
(2) Empathetic joy	2,15 (0,69)	2,17 (0,58)	−0,19 (p = 0,06)	(—)	−0,21* (p = 0,05)
(3) Empathetic stress	3,96 (0,44)	4,16 (0,36)	0,18 (p = 0,83)	−0,29** (p = 0,005)	(—)

Note. *p < 0.05; **p < 0.01; ***p < 0.001. Correlations above the diagonal correspond to the first subsample used for the CFA (n₁ = 89), and correlations below the diagonal correspond to the second subsample used for the CFAs (n₂ = 94).

3.3. Confirmatory Factor Analysis

A second sample of 94 students was used to perform Confirmatory Factor Analysis (CFA) to verify the adequacy of the two-factor model of empathy. This analysis allows us to check the relevance or goodness of fit of the data and compare two oblique models of one and two factors. Model 1 (i.e., M1, one-factor model) assumes that empathy is a unidimensional construct, and model 2 (i.e., M2, two-factor model) assumes that empathy is based on empathic joy and empathic stress.

The results of the two-factor model are significant, as shown in Figure 1. Subsequently, Table 6 shows that M2 has better fit indices (χ^2 (149) = 181.78, p < 0.03, RMSEA = 0.05, GFI = 0.90, IFI = 0.92, CFI = 0.92, TLI = 0.90, AIC = 263.78). Thus, M2 fits the data significantly better than M1, $\Delta\chi^2$ (1) = 177.15, p < 0.001.

In summary, AFCs indicate that the empathy scale is best described by a two-factor structure: empathy-induced joy and empathy-induced distress (see Figure 1).

Subsequently, the Extracted Mean Variance (EMV) and the Composite Reliability Coefficient (CRC) of the two factors were analyzed. For the empathic joy factor, the EMV was 37% and the CRC determined a value of 0.83. In the case of the empathic stress factor, the EMV was 28.9% and the CRC reached a value of 0.80. Although both factors showed optimal levels of composite reliability (above the threshold of 0.70), the EMV values were below the recommended criterion of 0.50, indicating limited common variance between items and suggesting low convergent validity.

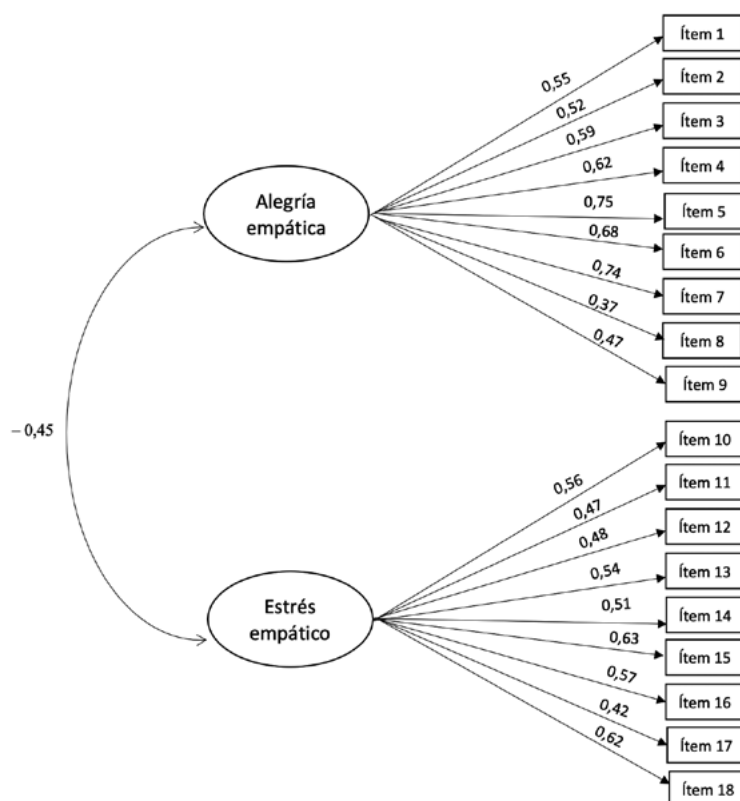


Figure 1. Factor structure of the empathy scale (N = 94).

Own elaboration

Table 6

Fit index for structural equations in empathy (N = 94). Own elaboration

	Model		Difference between M2 and M1
	One factor (M1)	Two factors (M2)	
χ^2	358,93	181,78	
df	152	149	
RMSEA	0,12	0,05	
TLI	0,44	0,90	
IFI	0,53	0,92	
CFI	0,50	0,92	
AIC	434,93	263,78	
$\Delta\chi^2$			177,15***
Δ RMSEA			0,07
Δ TLI			0,46
Δ IFI			0,39
Δ CFI			0,42
Δ AIC			171,15

Note. df = degrees of freedom; Δ RMSEA = difference in Root Mean Square Error of Approximation between the two models; $\Delta\chi^2$ = difference in chi-square; *** p < 0.001.

3.4. Multivariate Analysis of Variance (MANOVA)

Prior to analysis, the statistical assumptions were verified. First, Box's test for equality of covariance matrices was not significant ($M = 4.87$, $F = 0.79$, $p = 0.57$), indicating that the assumption of multivariate homogeneity was met. Likewise, Levene's tests associated with each dependent variable were also not significant ($p > 0.05$), indicating homogeneity of variances between groups by sex.

The results of the MANOVA analysis showed no statistically significant differences between boys and girls in the set of dependent variables (i.e., altruistic prosocial behavior, stress, and empathic joy). Wilks' Lambda multivariate test showed no significant differences ($\Lambda = 0.99$, $F(3, 179) = 0.28$, $p = 0.83$, partial $\eta^2 = 0.01$), with a very small effect size. Complementary univariate analyses also revealed no significant differences in any of the variables assessed: empathic joy ($F(1, 181) = 0.45$, $p = 0.50$, partial $\eta^2 = 0.00$), empathic stress ($F(1, 181) = 0.02$, $p = 0.90$, partial $\eta^2 = 0.00$), and behavior altruistic prosocial behavior ($F(1, 181) = 0.38$, $p = 0.53$, partial $\eta^2 = 0.00$).

4. Discussion

The main objective of this study was to design and validate the Altruism and Empathy Test (AET) for primary school students, analyze its relationship with altruistic prosocial behavior, and explore gender differences. Overall, the results partially support the hypotheses proposed.

Factor analyses confirmed that empathy is structured into two factors: empathic joy and empathic stress, with adequate fit indices, supporting the first hypothesis and consistent with previous studies in adolescents and adults (De Freitas and Lobato, 2021; Lemos et al., 2022). This differentiation allows for a more nuanced understanding of children's emotional development. Likewise, the altruistic prosocial behavior scale showed a unifactorial model consistent with the second hypothesis, differentiating this construct from empathy, similar to what has been reported in studies on prosociality (Caprara, 2014).

The Altruism and Empathy Test (AET) is a novel contribution, as it includes items tailored to the context and maturity of children aged 6 to 8, allowing for a more accurate assessment in the early stages of development. However, the results did not show significant correlations between empathy and prosocial behavior, which contradicts the third hypothesis. This lack of correlation could be due to the developmental stage of the students, as empathy and its link to altruism seem to consolidate with age (Underwood and Moore, 1982).

No significant differences were found between boys and girls in the variables studied, which does not confirm the fourth hypothesis. Although the literature tends to attribute higher levels of empathy and prosociality to girls (Garaigordobil and Maganto, 2011; Mestre et al., 2004), others suggest that these differences may be less evident at an early age and depend on the context of assessment (Chaplin and Aldao, 2013; Malti and Krettenauer, 2013). In this sense, the developmental stage of the sample (6 to 8 years old) may influence the absence of observed differences.

4.1. Theoretical and practical implications

From a theoretical perspective, this study contributes to developmental and educational psychology through the design and validation of the Altruism and Empathy Test (AET), a tool adapted to primary school students. The AET allows for the accurate assessment of a two-factor model of empathy (empathic joy and stress), facilitating understanding of how children begin to interpret emotions in different social contexts. Furthermore, the validation of a single-factor model for prosocial behavior reinforces the need to address empathy and altruism as distinct dimensions.

On a practical level, the AET offers a useful tool for early detection of difficulties in empathic expression or prosocial behavior among students. This type of assessment is key to guiding specific interventions and designing emotional education and school coexistence programs tailored to the maturity level of the students.

Recent research has shown that programs focused on social-emotional skills, such as empathy and prosociality, improve school coexistence and prevent bullying (Del Rey et al., 2018; Estévez et al., 2018; Tourón, 2020). In this context, teachers play a key role in incorporating these topics into the curriculum and building healthier and more inclusive school environments.

4.2. Limitations and future lines of research

Despite the study's contributions, some limitations should be considered. The sample was selected for convenience and without prior sample calculation, which limits the representativeness and generalization of the results. Although cross-validation was applied by dividing the sample for factorial analyses, this procedure does not replace replication with independent samples.

Regarding convergent validity, although the composite reliability coefficients were adequate, the extracted mean variance (EMV) values were below the recommended threshold, suggesting a limited explanation of common variance. However, some authors consider these values acceptable when the CFC is high and the number of items is small (Moral-de la Rubia, 2019).

Another important limitation lies in the exclusive use of self-report measures, which may have introduced biases related to reading comprehension, social desirability, or self-reference, especially in the case of young students with developing cognitive and linguistic skills.

For future research, it is recommended that the validation of the AET be replicated in larger and more diverse samples, belonging to different sociocultural and economic contexts. It would also be valuable to complement the assessment with qualitative or observational methodologies and to investigate the mediating role of variables such as emotional regulation, moral understanding, and family and school climate. It is also relevant to explore how the relationship between empathy and prosocial behavior evolves throughout development to establish more stable trajectories from a longitudinal perspective.

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