Environmental Attitudes in Children: An Exploratory Study of Their Relationships with Future Perspectives and Values

Actitudes medioambientales de los niños: un estudio exploratorio de sus relaciones con las perspectivas de futuro y con los valores

Atitudes ambientais das crianças: estudo exploratório de suas relações com a percepção de futuro e com os valores

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Abstract

The present study aims to assess the extent and direction in which future perception and human values are related to environmental attitudes in a sample of children. The participants were 406 Brazilian children, most of them female (56.3 %) with a mean age of 10.23. The results indicated that environmental attitudes of preservation were positively related to all factors of the future perspective scale and the excitement, suprapersonal, existence, interactive, and normative values. The utilization attitudes correlated with the promotion, suprapersonal, existence, interactive, and normative values, but were not significantly correlated with future perspective. The analysis of predictive power showed that optimism towards the future, suprapersonal, normative, and existence values predicted preservation attitudes, while promotion, existence, and interactive values predicted utilization attitudes. The results support the importance of human values and time perspective in environmental attitudes from childhood.

Keywords: Environmental attitudes; future; values; children; correlation.

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Resumen

El presente estudio tiene como objetivo evaluar en qué medida y dirección la percepción del futuro y los valores humanos están relacionados con las actitudes ambientales en una muestra de niños. Participaron 406 niños brasileños, la mayoría del sexo femenino (56.3 %) y con media de edad de 10.23 años. Los resultados indicaron que las actitudes ambientales de preservación se relacionan positivamente con todos los factores de la escala de perspectiva de futuro y los valores de excitación, suprapersonal, existencial, interactivo y normativo. Las actitudes de utilización se correlacionaron con los valores de promoción, suprapersonal, existencia, interactiva y normativa, pero no se correlacionaron significativamente con perspectiva de futuro. En el análisis del poder predictivo se evidenció el optimismo hacia el futuro, los valores suprapersonal, normativo y existencial como predictores de actitudes de conservación y los valores de promoción, existencia e interactivos como predictores de actitudes de utilización. Los resultados apoyan la importancia de los valores humanos y la perspectiva temporal en las actitudes ambientales desde la infancia.

Palabras clave: actitudes ambientales; futuro; valores; niños; correlación.

Resumo

O presente estudo tem como objetivo avaliar até que ponto e em que direção a percepção do futuro e os valores humanos estão relacionados às atitudes ambientais em uma amostra de crianças. Participaram 406 crianças brasileiras, a maioria do sexo feminino (56.3 %) e com idade média de 10.23 anos. Os resultados indicaram que as atitudes ambientais de preservação estavam positivamente relacionadas a todos os fatores da escala de percepção de futuro e aos valores de entusiasmo, suprapessoal, existencial, interativo e normativo. As atitudes de utilização se correlacionaram com os valores de promoção, suprapessoal, existencial, interativa e normativa, mas não se correlacionaram significativamente com a perspectiva de futuro. O análisis do poder preditivo mostrou que o otimismo com relação ao futuro, os valores suprapessoais, normativos e existenciais foram preditores de atitudes de conservação e os valores de promoção, existência e interativos foram preditores de atitudes de utilização. Os resultados apoiam a importância dos valores humanos e da perspectiva de tempo nas atitudes ambientais desde a infância.

Palavras-chave: atitudes ambientais; futuro; valores; crianças; correlações.

In recent years, there has been considerable interest, from government authorities to environmentally conscious people, in the environmental issue. In the academic context, this topic has long been the subject of research, with an increasing number of researchers highlighting the importance of studying environmental dimensions, especially pro-environmental attitudes (Rosa & Collado, 2019; Tam & Milfont, 2020).

Traditionally, attitudes can be defined as "an enduring organization of beliefs and cognitions in general, endowed with an affective charge for or against a defined social object, which predisposes to an action coherent with the cognitions and affections related to this object" (Rodrigues et al., 2012, p. 100), showing cognitive, affective, and behavioral components, becoming a fundamental variable in environmental psychology research (Tamar et al., 2021).

Environmental attitudes are understood as "a construct that a person develops and are associated with the extent to which an individual believes that s/he is part of the natural environment" (Schultz et al., 2005, p. 31), representing the tendency of individuals to analyze the natural environment in a favorable or unfavorable way, and for or against aspects of the environment or objects related to it (Hawcroft & Milfont, 2010). Thus, dealing with pro-environmental attitudes involves what can lead to actions that prevent, benefit, or reduce damage to the environment.

This topic has been studied in different cultures and contexts, mainly with adult and adolescent research samples (Domingues & Gonçalves, 2020;

Uram et al., 2021). For the latter, it is considered a group likely to have attitudes, norms, and behaviors similar to adults because they already have many of their psychological aspects established (Hidayah & Agustin, 2017). Nevertheless, despite research indicating that positive environmental attitudes acquired in early childhood are fundamental for the formation of children's future environmental behaviors, there are less studies in this population in comparison to those carried out with adults and adolescents.

To fill this gap, researchers have been developing measures of environmental attitudes that would allow the assessment of the construct with children (e.g., Children's Attitudes Toward the Environment Scale, Musser & Malkus, 1994; Children's Environmental Attitude and Knowledge Scale, Leeming et al., 1995; and the New Ecological Paradigm Scale for Children, Manoli et al., 2007). However, these measures have limitations (e.g., actions over which children normally have no control, items that are difficult to understand and one-dimensional structure; Bogner & Wiseman, 2004; Johnson & Manoli, 2008).

To develop a measure that would allow measuring the construct in adolescent samples, Bogner and Wilhelm (1996) developed the Environmental Scale (2-SEM), which in its final version was composed of 19 items distributed in two dimensions: preservation "a biocentric dimension that reflects conservation and protection of the environment" and utilization "an anthropocentric dimension that reflects the utilization of natural resources" (Wiseman & Bogner, 2003, p. 787).

These dimensions make up the so-called Theory of Ecological Attitude (Bogner & Wiseman, 1999), which was later analyzed in a sample of children (Johnson & Manoli, 2008), arriving at a version called Revised 2-MEV, modified for use with 9–12-year-old children in the United States. The final 16-item version, resulting from a longitudinal survey conducted by Johnson and Manoli (2008), was considered adequate to measure environmental attitudes in children (preservation and utilization).

The development of a deeper understanding of the psychological factors that motivate environmental attitudes in children (Baierl et al., 2021; Regmi et al., 2019) is relevant for the development and implementation of more sustainable practices that enable greater incorporation of behaviors that provide a more environmentally sustainable future (De Leeuw et al., 2015).

The cognitive development of children aged 8-10 years, as described by Piaget's theory, places them in the concrete operational stage (Piaget, 1970). At this stage, children begin to think logically about concrete events but may struggle with abstract and hypothetical concepts (Inhelder & Piaget, 1958). This stage involves mastery of operations such as conservation, classification, and seriation but still limits the child's ability to fully understand abstract ideas (Volansky, 2023).

This developmental stage implies that, while children in this age group can begin to grasp the importance of values, future perspectives, and environmental attitudes, their understanding may be more concrete and less abstract compared to older individuals. They can recognize the tangible aspects of environmental conservation and resource utilization but might find it challenging to internalize these concepts at a more abstract level (Inhelder & Piaget, 1958).

Therefore, when evaluating the extent and direction these variables are related, and understanding the psychological dimensions that can help comprehend environmental attitudes in a sample of children, it is necessary to consider their developmental stage. This approach can enhance the effectiveness of promoting environmental education and fostering pro-environmental attitudes in children, preparing them for more complex understanding as they grow older.

Considering that there are several reasons underlying the attitudes of individuals, different factors play a role in this variation, and psychosocial dimensions such as human values and the perspective of the future may be important in this

construction. Research has identified the importance of time (e.g., Carmi, 2013; Huang et al., 2019) and values (e.g., Milfont & Gouveia, 2006; Schultz et al., 2005; Schultz & Zelezny, 1999) in understanding and predicting environmental attitudes.

Although the literature identifies the relationship between the phenomena (attitudes, future, and human values) in samples of adolescents and adults, values are formed in childhood and the perspective of the future is fundamental for the psychological and social development of children (Soares et al., 2018; 2019). Thus, it is hypothesized that evaluating the extent and direction in which these variables are related, as well as which psychological dimensions can help understand environmental attitudes in a sample of children, seems to be a necessary scientific undertaking. This is especially relevant when observing the possibility of applying this theoretical knowledge in the promotion of environmental education.

Environmental Attitudes, Future Perspective and Human Values

Temporal perspective and human values have already been identified as important factors for understanding environmental constructs (e.g., Joireman, 2005; Schultz et al., 2005). Milfont and Gouveia (2006) analyzed environmental attitudes starting from the idea that environmental issues can be understood as social dilemmas that represent "the conflict between the individual costs (or benefits) of particular actions and the benefits (or costs) of those actions when performed by enough members of a collective" (Estrela et al., 2019, p. 8). These dilemmas are important for environmental issues because they include a temporal conflict (Joireman, 2005), broadening the understanding of the relationship between two central conflicts: social (individual versus collective) and temporal (short versus long term) (Joireman et al., 2004; Milfont & Gouveia, 2006).

Social conflicts are often studied through the analysis of social values, with more socially oriented people presenting higher levels of pro-environmental attitudes compared to individuals guided by values considered more individualistic (Milfont & Gouveia, 2006; Van Vugt & Samuelson, 1999). Despite research results with broad and universal theoretical approaches (e.g., Schwartz, 1992; typology of values), the Functional Theory of Human Values has recently offered the opportunity to evaluate human values in a parsimonious and integrative way (Gouveia et al., 2014), defining values as orientation criteria that guide human actions and express their basic needs.

Gouveia et al. (2014) present two functions of values: guiding behavior (type of orientation: social, central, and personal) and expressing human needs (type of motivator: idealistic and materialistic). The combination of these two functions yields a 3×2 structure with six subfunctions: excitement (emotion, sexuality, and pleasure), promotion (success, power, and prestige), suprapersonal (beauty, knowledge, and maturity), existence (personal stability, health, and survival), interactive (affectivity, social support, and belonging), and normative (obedience, religiosity, and tradition). Some items/values from the adult version have been replaced in the children's version (stimulation for sexuality, arts for beauty, and equality for maturity) (Gouveia et al., 2011; Soares et al., 2020).

The temporal conflict dimension of social dilemma has been studied through individual differences when thinking of future perspectives (Milfont & Gouveia, 2006). Considering that behaving sustainably requires the individual to focus on future results and sustainable behaviors at the expense of immediate advantages (Bain et al., 2016), it seems appropriate to consider this temporal conflict in the study of environmental attitudes.

In child development, the representation of the future by children is a fundamental element for the formation of key developmental elements (e.g., delay gratification, achieve goals, and behave in a

pro-environmental way; Carmi, 2013). Soares et al. (2018) investigated children's future prospects and developed an instrument that assesses three dimensions: optimism towards the future (reflecting how positive children are about their future aspirations), aspirations for material possessions (children who crave material resources), and aspirations for family (children who hope to form a family in the future).

Research shows an increase in the number of studies evaluating how temporal perspectives are associated with environmental concerns, evidencing that temporal conflict influences pro-environmental behaviors (Carmi, 2013). Thus, behaving sustainably requires focusing on future results and sustainable behaviors at the expense of immediate advantages (Bain et al., 2016), a characteristic of individuals with an accentuated future perspective, as their behaviors are influenced by meaningful mental representations of future events, focusing on planning and achieving future goals (Milfont et al., 2012).

Considering that temporal conflicts involve satisfying short and long-term interests (Carmi, 2013; Milfont et al., 2012), research has identified that orientation towards the future is related to environmental attitudes (Milfont & Gouveia, 2006). For example, Milfont and Gouveia (2006) found a positive relationship between preservation attitudes and future and past-positive values, and a negative relationship with present-fatalistic, self-enhancement, and openness to change values. Utilization attitudes were negatively correlated with future and past-positive, and positively with self-enhancement values. The two dimensions of environmental attitudes were predicted by future and biospheric values.

Carmi (2013) evaluated whether individuals' concern for the future of the environment mirrored their concern for their own future health. The results showed that future-oriented people were more concerned about health but did not express stronger pro-environmental attitudes, and their willingness to sacrifice for the environment was significantly lower. This suggests that individuals adopt a pro-environmental behavior only if it coincides with their personal benefit, indicating that the future of the environment may not be perceived in the same way as personal future health.

The Present Study

Research shows that individual differences are important for understanding and predicting environmental attitudes (Gifford & Nilsson, 2014). The powerful role that human values play in defining individuals' involvement with environmental issues and in supporting a pro-environmental orientation, coupled with the necessity to focus on future results for sustainable behavior (Bain et al., 2016), confirms the relevance of these variables for understanding environmental attitudes (Carmin, 2013; Huang et al., 2019; Regmi et al., 2019; Uram et al., 2021).

Studies evaluating the dimensions separately, such as that by Huang et al. (2019), found that future orientations were positively correlated with environmental attitudes, specifically with general beliefs in the environment-environment relationship. Kuar et al. (2020) identified the importance of personal values (self-transcendence value) and environmental attitudes in understanding pro-environmental behaviors.

Milfont and Gouveia (2006) evaluated the dimensions together and found that future time perception is related to environmental attitudes (both preservation and utilization) and biospheric values. Preservation attitudes were positively correlated with future and biospheric values, while utilization attitudes were negatively correlated with these values.

Nevertheless, most studies assessing both future perspective and human values related to environmental attitudes focus on adult samples (e.g., Huang et al., 2019; Milfont & Gouveia, 2006; Regmi et al., 2019). Considering that future-oriented individuals tend to be more concerned with and act

on pro-environmental issues, and certain values support a pro-environmental orientation, evaluating these constructs simultaneously in a sample of children is justified. This analysis is crucial for understanding long-term environmental issues and how to promote sustained care for nature in future generations.

Thus, the present study aims to evaluate the extent and direction in which future perception and human values are related to environmental attitudes in a sample of children. Specifically, it estimates the direction and strength of the correlations between the variables, assesses gender differences, and identifies the predictive power of future perspective and human values on environmental attitudes.

Method

Participants and Procedure

The participants were 406 Brazilian children, with an average age of 10 years (ranging from 8 to 10 years; SD = 1.10). Most of them were female (56.3 %) and in the 5th year of elementary school. A non-probabilistic convenience sample was used. Data collection was performed physically (N = 386; 95 %) by two researchers in the classroom and online (N = 20; 5 %) through the dissemination of a link to the children's parents/guardians using the snowball sampling method (Dusek et al., 2015). In both forms, after authorization from the parents/guardians, the children (who agreed to participate; 100 %) answered the research instrument individually (on paper or on computers and tablets).

As an inclusion criterion, we considered only children from Brazil, aged between 8 and 12 years, who could read and write, and who voluntarily agreed to participate in the research. This age group was selected for two reasons: (1) in Brazil, a person up to twelve years of age (Statute of Children and Adolescents - SCA) is considered a child, and (2) because it is a self-reported and self-administered measure, we sought children who already had a greater ability to read and interpret text (eight years of age or older).

Materials

Participants answered a set of questions about themselves (gender, age, and schooling level) and completed the following surveys:

Children's version of the Basic Value Survey (BVS – C): This measure was adapted by Gouveia et al. (2011) and comprises 18 items, divided into six subfunctions (excitement, promotion, existence, suprapersonal, interactive, and normative), with three items for each (e.g., Health: Not getting sick, being always excited and wishing to play, avoiding things that harm health; Arts: Attending exhibitions of paintings and sculptures, listening to music, going to the theater or movies, learning to draw and paint). Respondents evaluate the extent to which each value is important as a guiding principle in their life, rated on a 5-point scale, ranging from 1 = Not important to 5 = Extremely important. The original study identified adequate indicators of internal consistency, ranging from suprapersonal ($\alpha = .51$) to existence ($\alpha = .62$). In this study, Cronbach's alpha and omega scores ranged from existence ($\alpha/\omega = .53$) to promotion ($\alpha = .60$; $\omega = .62$). Mueller (1986) argued that, for samples larger than 100, Cronbach's alpha coefficients greater than 0.40 are acceptable for research purposes.

The Revised 2-MEV Scale (Revised 2-MEV) was originally developed by Bogner and Wilhelm (1996) and adapted for use with 9–12-year-old children by Johnson and Manoli (2011). This scale comprises 16 items, divided into two factors: preservation (e.g., 6. I would help raise money to protect nature) and utilization (e.g., 14. To feed people, nature must be cleared to grow food), with a 5-point Likert-style response set, from 1 (strongly disagree) to 5 (strongly agree). The original study

identified adequate indicators of validity [χ^2/df = 2.25, GFI = .98, AGFI = .97, CFI = .96, TLI = .95, RMSEA = .03]. Johnson and Manoli (2011) did not report its internal consistency. In this study, validity indicators were [χ^2/df = 1.81, GFI = .96, CFI = .93, TLI = .91, RMSEA = .045 (IC90%: .034–.055)] and Cronbach's alpha/omega scores ranged from preservation (α = .72; ω = .72) to utilization (α = .70; ω = .69).

Children's Future Perspective Scale (CFP-S): This measure was developed by Soares et al. (2018) and consists of 12 items, with a response scale ranging from 1 (not at all important) to 5 (most important), representing three factors: optimism towards the future (e.g., I think positive things about my future), aspirations for material possessions (e.g., When I am an adult, I will have a big and beautiful house), and aspirations for family (e.g., I will have a family in the future). The original study identified adequate indicators of internal consistency, ranging from aspirations for material possessions and aspirations for family (α = .67) to optimism towards the future (α = .69). In this study, Cronbach's alpha and omega scores were α = .75 and ω = .77 (aspirations for material possessions), α = .77 and ω = .79 (aspirations for family), and α = .73 and ω = .75 (optimism towards the future).

Data Analysis

For data analysis, we used PASW software (version 24). Since missing values represented a maximum of 2.7% in one of the variables, we used mean substitution as the imputation method. Pearson's correlation coefficient (r) was calculated to estimate the direction and strength of the correlations between the variables. Student's t-test was performed to assess gender differences. Finally, we used multiple regression (stepwise method) to identify the predictive power of future perspective and human values on environmental attitudes. The sample size for conducting multiple regression analyses was estimated using G*Power (version 3.1.9.7), with a priori power of .95, α error probability of .05, and 9 predictors. This calculation was based on a medium effect size, f^2 = .15, given the scarcity of prior literature and the exploratory nature of our study. The desired total sample size was 166.

Results

Initially, we calculated the descriptive statistics to characterize the variables of our sample. As seen in Table 1, regarding environmental attitudes factors, the participants showed high scores for preservation (M = 4.23; SD = .65). In future perspective, high scores were observed in optimism towards the future (M = 4.18; SD = .83). Finally, among the human values, participants scored higher on existence values (M = 4.57; SD = .67).

When comparing male and female children, a statistically significant difference was identified in the levels of preservation attitudes [t(317) = -3.12, $p < .05$], suprapersonal [t(332) = -2.83, $p < .05$], and interactive [t(385) = -2.54, $p < .05$]. Female children showed higher scores for preservation (M = 4.32; SD = .57), suprapersonal (M = 4.36; SD = .65), and interactive (M = 4.55; SD = .58) than male children [preservation (M = 4.11; SD = .71), suprapersonal (M = 4.16; SD = .76), and interactive (M = 4.38; SD = .72)].

Pearson correlation was calculated to determine the extent and direction of the correlations between environmental attitudes and future perspective and human values. Previous research has indicated that gender may impact environmental protection, so gender was included as a control variable (Table 2).

The results, both controlling and not controlling for the gender variable, were similar. Without controlling for gender, preservation attitudes correlated positively with all future perspective factors [optimism towards the future ($r = .37$, $p < .01$), aspirations for material possessions ($r = .23$, $p < .01$), and aspirations for family ($r = .22$, $p < .01$)]; and with five subfunctions of values [excitement

Table 1
Descriptive analyses of environmental attitudes, future perspective, and human values

Environmental attitudes	Total		Male		Female	
	M	SD	M	SD	M	SD
1. Preservation	4.23	.65	4.11	.71	4.32	.57
2. Utilization	2.30	.86	2.37	.89	2.29	.84
Future perspective						
3. Optimism towards the future	4.18	.83	4.08	.86	4.23	.82
4. Aspirations for material possessions	4.17	.88	4.19	.86	4.13	.91
5. Aspirations for family	4.13	.94	4.13	1.04	4.12	.87
Human values						
6. Excitement	4.29	.73	4.21	.78	4.34	.70
7. Promotion	3.15	.98	3.21	.88	3.09	1.04
8. Suprapersonal	4.28	.71	4.16	.76	4.36	.65
9. Existence	4.57	.67	4.46	.75	4.59	.60
10. Interactive	4.49	.64	4.38	.72	4.55	.58
11. Normative	4.30	.72	4.22	.79	4.34	.66

Note. M = mean; SD = standard deviation; n = sample size.

(r = .31, p < .01), suprapersonal (r = .42, p < .01), existence (r = .34, p < .01), interactive (r = .36, p < .01), and normative (r = .38, p < .01)]. In turn, utilization attitudes correlated positively with promotion values (r = .25, p < .01) and negatively with suprapersonal (r = -.12, p < .01), existence (r = -.23, p < .01), interactive (r = -.17, p < .01), and normative values (r = -.10, p < .01).

Controlling for gender (partial correlation), preservation attitudes correlated positively with all future perspective factors [optimism towards the future (r = .35, p < .01), aspirations for material possessions (r = .23, p < .01), and aspirations for family (r = .22, p < .01)]; and with five subfunctions of values [excitement (r = .29, p < .01), suprapersonal (r = .39, p < .01), existence (r = .32, p < .01), interactive (r = .33, p < .01), and normative (r = .36, p < .01)]. In turn, utilization attitudes correlated positively with promotion values (r = .26, p < .01) and negatively with existence (r = -.21, p < .01) and interactive values (r = -.14, p < .01).

Next, we tested with two multiple regression analyses the extent to which the environmental attitudes factors (preservation and utilization) were predicted (Table 3) by factors of future perspective and human values with which they significantly correlated (see Table 2), adopting the stepwise method that accommodates the exploratory nature of this research (Hair et al., 2018).

The environmental attitudes of preservation were predicted by suprapersonal (β = .24, p <.001), normative (β = .17, p <.001) and existence (β = -.11, p <.05) values, and by optimism towards the future (β = .24, p <.001). While environmental attitudes of utilization were predicted only by human values [promotion (β = .28, p <.001), existence (β = .20, p <.001) and interactive (β = -.11, p <.05). The model presented 28% and 13% of explained variance for environmental attitudes of preservation and utilization, respectively.

Table 2
Correlations between environmental attitudes, future perspective, and human values

	1	2	3	4	5	6	7	8	9	10	11
1. Preservation	-	*-.07*	*.35***	*.23***	*.22***	*.29***	*.04*	*.39***	*.32***	*.33***	*.36***
2. Utilization	-.10	-	*.03*	*.04*	*.04*	*-.08*	*.26***	*-.10*	*-.21***	*-.14***	*-.09*
3. Optimism towards the future	.37**	-.01	-	*.60***	*.59***	*.22***	*.12**	*.24*	*.26***	*.35***	*.23***
4. Aspirations for material possessions	.23**	.03	.59**	-	*.55***	*.19***	*.07*	*.22*	*.18***	*.29***	*.19***
5. Aspirations for family	.22**	.01	.58**	.55**	-	*.23***	*.12**	*.15*	*.21***	*.28***	*.26***
6. Excitement	.31**	-.09	.24**	.20**	.24**	-	*.19***	*.52*	*.39***	*.47***	*.33***
7. Promotion	.02	.25**	.11*	.08	.12*	.19**	-	*.18*	*.09*	*.13**	*.10**
8. Suprapersonal	.42**	-.12*	.26**	.22**	.15**	.53**	.16**	-	*.39***	*.46***	*.45***
9. Existence	.34**	-.23**	.28**	.19**	.22**	.41**	.08	.41**	-	*.48***	*.41***
10. Interactive	.36**	-.17**	.37**	.29**	.29**	.48**	.12*	.47**	.49**	-	*.43***
11. Normative	.38**	-.10*	.25**	.19**	.26**	.34**	.09	.46**	.42**	.44**	-

Note. **p* < .05; ***p* < .01 (two-tailed test). Lower axis total sample correlation. Upper axis (in italics) correlation with control of gender variable.

Table 3
Linear regression for environmental attitudes (future perspective and human values as predictors)

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	Predictor	R	R^2 adjusted	F	B	Beta	*t*	*VIF*
Attitudes of preservation[1]	Suprapersonal	.42	.18	F(404)=86.42	.22	.24	4.77*	1.38
	Optimism towards the future	.50	.25	F(403)=39.52	.19	.24	5.32*	1.12
	Normative	.53	.27	F(402)=16.40	.15	.17	3.32*	1.40
	Existence	.54	.28	F(401)=4.87	.10	.11	2.21**	1.34
Attitudes of utilization[2]	Promotion	.25	.06	F(404)=26.46	.24	.28	5.94*	1.01
	Existence	.35	.12	F(403)=28.90	-.26	-.20	-3.74*	1.31
	Interactive	.36	.13	F(402)=4.05	-.14	-.11	-2.01**	1.32

Note. * p < .001; **p < .05. Durbin-Watson 1 = 2.02; 2 = 1.55.

Discussion

This study aimed to evaluate the relationship between environmental attitudes, future perspective, and human values in a sample of children. Additionally, it assessed the differences by gender (male and female) and the predictive role of future perspective and human values in environmental attitudes. In line with previous findings that recognized the importance of human values and future perspective in environmental attitudes in samples of adults and adolescents (Ates, 2015; Schultz & Zelezny, 1999; Uran et al., 2021), environmental attitudes were found to be related to these variables.

This study has three main findings. First, statistically significant relationships were identified among environmental attitudes, future perspective, and human values. Second, when evaluating gender differences, significant results were observed only in the scores of preservation attitudes, suprapersonal, and interactive values. Finally, future perspective and human values were predictors of environmental attitudes. Given these findings, we believe that the objective of this research has been achieved.

Previous studies have shown that some demographic features, such as gender, are related to environmental issues (López-Bonilla et al., 2019; Tuncer et al., 2005). In this study, gender differences were identified only in preservation attitudes, suprapersonal, and interactive values, with girls presenting higher scores on all factors. Similar to Tuncer et al. (2005), where girls seemed more aware of environmental problems and had more positive attitudes, our results indicated that girls have higher levels of preservation attitudes compared to boys, meaning that they have attitudes more inclined to conserve and protect the environment.

Some authors explain this difference using the gender socialization theory, highlighting that girls in childhood are more socialized to perceive the world through their relationships with others. This socialization leads them to be more sensitive to others' feelings and needs, fostering care behaviors and attitudes towards environmental responsibility in adulthood (Bhattacharyya & Rahman, 2020).

The results also showed that girls scored higher on suprapersonal values (which emphasize abstract ideas over material needs) and interactive values (which emphasize social contact as a goal in itself). Literature indicates a potential impact of gender on human values. For example, Schwartz (1992) theorized that females give more importance to communal values, such as universalism and benevolence. Other studies have found that women score higher than men on interactive/benevolence and suprapersonal/universalism-self-direction values (Gouveia et al., 2015). While most of these results are based on adult samples, similar patterns are observed in children (6-14 years old), with girls endorsing community values (Block et al., 2018).

Our results also highlighted the relationship among the variables. It was observed that attitudes were not significantly correlated with each other, demonstrating independence among dimensions. Additionally, only preservation attitudes were related to future perspective. Specifically, children who endorse the preservation of the environment have an optimistic view of the future and aspire to material possessions and family.

Our findings empirically reinforce that future perspective is fundamental for promoting environmental preservation attitudes in childhood and, consequently, pro-environmental behaviors (Bain et al., 2016; Carmi, 2013; Huang et al., 2019). These relationships were identified both when considering the total sample and when controlling for gender.

When considering the relationship between attitudes and human values, it is observed that preservation attitudes were positively related to all subfunctions, except for promotion values (with and without gender control). As expected, the results were in line with previous studies that highlight the importance of human values in promoting environmental attitudes (Kuar et al., 2020; Schultz et al., 2005; Van Vugt & Samuelson, 1999). Positive correlations may be related to the positive nature of human values (Gouveia et al., 2014; Soares, 2015), which express human needs and, in general, the search for a satisfying life.

Utilization attitudes correlated with all values except excitement without control for the gender variable. These values, despite describing personal goals, are long-term oriented (Soares et al., 2020), probably justifying the lack of relationship when considering a sample of children.

When the gender variable was controlled, a correlation was observed only with the promotion, existence, and interactive values. Generally, children

with a more social orientation (interactive) tended to endorse fewer attitudes of utilization, as these are characteristic values of people who prioritize the collective interest and need (Gouveia et al., 2011; Soares, 2015). This view helps explain the negative relationship with normative values, which involve the importance given to respecting norms and rules (Soares, 2015). Since childhood is a time when norms and social rules are emphasized, children who internalize these norms perceive nature less as a source of resources.

When analyzing the predictors of environmental attitudes, it was observed that a positive vision of the future and suprapersonal, normative, and existence values help understand attitudes of preservation. In contrast, attitudes of utilization were predicted only by human values (promotion, existence, and interactive). Unlike the results with adult samples, where both attitudes were predicted by the temporal dimension (Bain et al., 2016; Milfont & Gouveia, 2006), only attitudes of preservation were predicted by future perspective in this study.

These divergent findings regarding the role of the temporal dimension in environmental attitudes seem coherent, as age is an important demographic factor related to temporal perspective (Chen et al., 2016). Research indicates that future perspective in older adults (35-55 years old) is smaller than in younger people (15-25 years old) (Siu et al., 2014), allowing us to estimate that a utilitarian view of nature is understood as something negative and is less linked to children's vision of the future.

When analyzing the values that endorse attitudes of preservation, the relationship with the attribution of importance to (1) respect for norms (normative), an important aspect in expressing nature preservation behaviors (e.g., not throwing garbage on the floor); (2) promotion of a more universalist vision without attachment to material things (suprapersonal), which increases interest in preserving natural resources; and (3) values related to ensuring the basic conditions for the biological and psychological survival of human beings (existence), align with the idea that nature is fundamental for human survival (Gouveia et al., 2011; Soares et al., 2020).

The human values that predict attitudes of utilization have a materialistic nature (existence and promotion), emphasizing practical things and the conditions to ensure them (existence), the practicality of decisions and behaviors (promotion), and valuing social interaction (interactive) (Gouveia et al., 2011; Soares et al., 2020). These elements are typical of those who perceive nature as a resource and a means to achieve their interests, without necessarily implying contempt for nature, as the dimensions of utilization and preservation are not mutually exclusive (Johnson & Manoli, 2008; Wiseman & Bogner, 2003).

Despite the promising results, this study has some limitations. The first is the use of self-report measures. This factor may have biased responses, as the presence of adults during the administration of the questionnaires may have influenced children to respond in a socially desirable manner, potentially diverging from their true levels of environmental attitudes, future perspective, and human values. Although we strove to create a neutral environment and encouraged honest responses, emphasizing that there were no right or wrong answers, the possibility of social desirability bias remains a concern (Soares et al., 2016). Existing literature supports the validity of the questionnaires used and suggests that our findings are consistent with previous research facing similar challenges (Tamm & Tulviste, 2022). Therefore, although social desirability bias is a concern, it does not invalidate the significant insights provided by this study but rather highlights areas for further refinement and methodological investigation.

A second limitation could be related to developmental differences. Although the attention span of children was not directly tested, anecdotal evidence indicated that children who took longer to complete the survey may have impacted interest in completing it. These aspects should be

investigated in future studies. However, as is common in research with this age group, it is estimated that the results are not invalidated. Another limitation is that the measures used do not have test-retest reliability indicators. To minimize this, we report other indicators (e.g., Cronbach's alpha, omega).

Finally, the most important limitation of this study is its cross-sectional design. We can conclude that environmental attitudes were correlated with future perspective and human values, but these results do not imply any causal links, given the cross-sectional nature of the data.

Nevertheless, the results expand previous observations in the literature, such as the relevance of future perspective and human values in understanding environmental attitudes in childhood. This adds evidence that environmental issues must be analyzed from early ages to promote the development of a society concerned with sustainable use of natural resources.

We know that children aged 8 to 10 are in the cognitive development stage called the "concrete operational" stage, according to Piaget's theory. At this stage, while they are capable of logical thinking about concrete situations, they still face challenges in dealing with abstract concepts such as values. This characteristic can help explain why children tend to rate almost all values as equally important, with similar average scores.

Specifically, regarding the promotion value, which includes aspects such as success, power, and prestige, the lower average score may reflect that children in this age group do not consider these aspects as relevant as other more immediate and tangible values, such as friendship, security, and family. This suggests that the promotion value is less understood or less important to them, aligning with their experiences and life priorities.

However, despite this limitation, we believe that the research retains its validity. The results provide valuable insights into how children perceive and evaluate values at an early stage of development. It is also worth noting that a body of research that has studied this age group for years using similar types of questionnaires. For example, Döring (2010) conducted an exploratory study assessing children's values, and Döring et al. (2015) provided cross-cultural evidence of value structures and priorities in childhood.

These studies support the validity of using such questionnaires with children and underscore the importance of continuing research in this area (Döring, 2010; Döring et al., 2015). Moreover, the observations made in this study can serve as a basis for future methodological refinements, such as developing of more suitable assessment tools for children that incorporate concrete and relevant examples from their daily experiences. Therefore, while the lack of clear differentiation between values represents a limitation, it also paves the way for new research and methodological improvements without invalidating the important findings of the present investigation.

Our findings warrant future studies with larger samples (e.g., increasing the number of participants, including children under the age of 9 years and from other cultures), and longitudinal studies to evaluate the evolution of the predictive role of environmental attitudes in childhood.

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