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The Intergenerational Transmission of Pro-Environmental Behaviours: The Role of Moral Judgment in Primary School-Age Children

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Abstract: The environmental crisis poses a critical issue for current and future generations, driving research to investigate the key factors and psychological characteristics that motivate individuals to engage in pro-environmental behaviours (PEBs) from an early age. In this context, intergenerational transmission—which refers to how parents influence their children's behaviour—plays a crucial role in initiating and promoting eco-friendly practices. From a children-centred perspective, the current study focused on the intergenerational transmission of PEBs, addressing the moderating role of children's moral judgment. This latter was evaluated considering general moral judgment (i.e., moral transgressions, social-conventional transgressions, and non-harmful personal choices) and domain-specific environmental moral judgment (i.e., harmful actions with no specific victim, harmful actions to animals, and harmful actions to plants/trees). This study was carried out with 229 triads of Italian children (M_{age} = 8.54 years; SD_{age} = 1.46 years; $range_{age}$ 6–11 years, 130 girls and 99 boys), fathers (M_{age} = 45.73 years; SD_{age} = 5.07 years; $range_{age}$ 29–64 years), and mothers (M_{age} = 42.56 years; SD_{age} = 4.67 years; $range_{age}$ 28–57 years). Results revealed that only the moral evaluations on harmful actions directed at animals (B = 0.32, SE = 0.15, t = 2.18, CI 95% = [0.030, 0.612]) and those towards plants/trees (B = 0.19, SE = 0.08, t = 2.49, CI 95% = [0.369, 0.342]) moderated the association between parents' PEBs and children's PEBs, boosting the intergenerational transmission of PEBs. Overall, this research yielded novel evidence on the main factors affecting the intergenerational transmission of PEBs, suggesting moral judgment as a critical mechanism in nurturing pro-environmental practices in school-age children. Implications, limitations, and future research directions are discussed.

Keywords: social domain theory; morality; pro-ecological behaviours; parents; childhood

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1. Introduction

Overpopulation, consumerism, natural resource depletion, food production, and fossil fuel use have been identified as the main causes of environmental problems, which greatly affect the sustainability of the planet (Fletcher et al. 2024; Giancola et al. 2023b; Khan et al. 2021). Recent academic research has highlighted the need for everyone, including societies, organisations, and individuals, to change their behaviour in order to address environmental problems (Bleidorn et al. 2021; Lozano 2008). This scenario has resulted in a deeper acknowledgment of the fundamental psychological elements that drive intentional, impactful, and forward-thinking initiatives to preserve the natural world (Nielsen et al. 2021). Such actions are labelled pro-environmental behaviours (PEBs) and involve saving energy, using cars less often, recycling, composting, and so forth (Whitmarsh and O'Neill 2010).

Most research in psychology has focused on personality, beliefs, norms, and attitudes as factors that can drive PEBs in adolescents and adults (e.g., Brick and Lewis 2016; Giancola et al. 2023c; Markowitz et al. 2012). In contrast, there is limited evidence on how children

develop their thoughts, feelings, and actions towards protecting the environment (Jia and Yu 2021). In this context, the analysis of the intergenerational transmission of PEBs emerges as a critical area of investigation. The intergenerational transmission of pro-environmental behaviours represents a powerful social phenomenon in which eco-friendly knowledge, attitudes, norms, values, and behaviours are passed down from parents to their children (Collado et al. 2017). Addressing this process allows for understanding how social strategies can ensure a sustainable future over time (Liu and Green 2024). Sharing information on how intergenerational transmission impacts children can help in developing educational programs and policies that support community initiatives to promote more awareness of PEBs in children (Ding et al. 2024). Moreover, the investigation of intergenerational transmission of PEBs provides a profound insight into the reasons behind the enduring, evolving, or survival of specific eco-friendly practices over time (Grønhøj and Thøgersen 2009, 2012, 2017).

In the landscape of psychology, research shows that parents' and children's recycling behaviours are related, and younger children are more influenced by their parents than older children (Cheng and Monroe 2012; Collado et al. 2017). In addition, other studies emphasise that the intergenerational transmission of PEBs remains stable across human development, including adolescence and emerging adulthood (Grønhøj and Thøgersen 2009, 2012, 2017). Overall, these findings suggest that socialisation with parents allows children to acquire the necessary skills, values, and behaviours concerning the safeguarding of the natural environment in order to function effectively in a specific group and culture (Collado et al. 2017). This evidence means that offspring's PEBs are affected by the prevailing norms within their family and the extent to which their parents' behaviours demonstrate these norms.

Although the intergenerational transmission of PEBs is well-documented in the literature, only two studies have delved into the mechanisms that either weaken or enhance this process. Grønhøj and Thøgersen (2012) tested the moderating effects of the generation gap (i.e., the difference between parents and adolescents in years) and the autonomy-supportive parenting style, providing no significant results. In addition, Li and Liu (2016) found that parents' influence on their offspring's PEBs became more robust when they perceived higher levels of parental power, that is, the parent's ability to change or control adolescents' behaviours.

In contrast to past research that focused solely on contextual or parental influences in the intergenerational transmission of PEBs, the present study took a children-centred approach, examining children's moral judgment as a possible factor influencing the transmission of eco-green practices from parents to children.

In particular, previous studies indicated that moral judgment and PEBs are closely intertwined. Indeed, some studies suggested that moral judgment entails the belief that protecting the natural environment implies moral standing (Kahn 1997). PEBs also require a strong sense of morality that enables individuals to prioritise the eco-sustainability of the planet over their own narrow self-interests (Krettenauer 2017). Research on children confirmed this notion (Collado and Sorrel 2019; Rottman et al. 2015), emphasising that children tend to condemn environmentally harmful behaviours (e.g., polluting a waterway), even if such practices are considered acceptable in the local community (Hahn and Garrett 2017). Children typically view environmentally harmful actions, such as not recycling, as less acceptable compared to social-conventional transgressions, like eating salad with fingers; however, they consider moral transgressions, such as hitting another child, to be even more severe. This suggests that young children see harm to the environment as bad but harm to humans as worse (Hussar and Horvath 2011). In addition, Collado and Sorrel (2019) found that children considered environmentally harmful actions—such as not recycling—as more morally wrong than actions that infringe social-conventional norms as well as non-harmful personal choices—such as reading during recess instead of playing football. With that in mind, children who have a strong sense of morality may be more inclined to understand essential moral principles, such as justice, fairness,

and responsibility towards future generations. Such a mechanism can help them see beyond the immediate practical benefits of eco-friendly practices and appreciate the broader ethical importance of being green. This implies that children can reason about how their actions affect not only themselves but also others and the surrounding environment. For instance, they can better understand that polluting the environment may provide immediate convenience but further harm others. Through the understanding of the moral complexity and duty underpinning PEBs, children could be more prone to internalise and learn from their parents' pro-environmental behavioural model (Krettenauer 2017), fostering the intergenerational transmission of PEBs.

In order to better understand which facet of moral judgment affects the intergenerational transmission of PEBs, in this study, children's moral judgment was evaluated considering general moral judgment (i.e., moral transgressions, social-conventional transgressions, and non-harmful personal choices) and domain-specific environmental moral judgment (i.e., harmful actions with no specific victim, harmful actions to animals, and harmful actions to plants/trees) (Collado and Sorrel 2019; Hussar and Horvath 2011).

The current research sought to explore the facilitating mechanisms involved in the intergenerational transmission of PEBs, advancing children's moral judgment as a potential moderator of the association between parents' and offspring's PEBs. Accordingly, the main hypothesis of this research is that moral judgment moderates the relationship between parents' and children's PEBs, making the influence of parents stronger. Figure 1 displays the moderating model proposed in the current study.

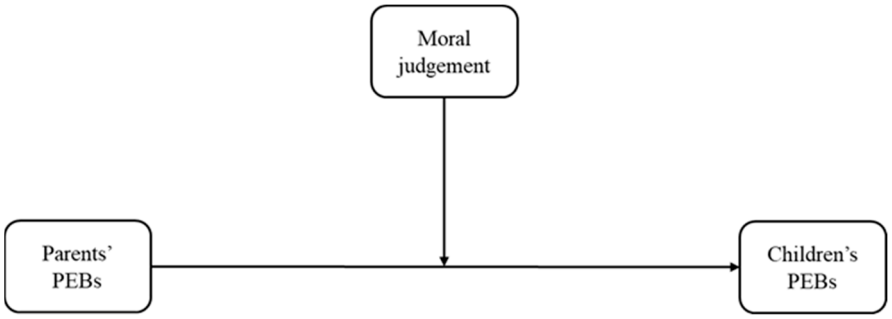

Figure 1. The theoretical model advanced in the current research. Note. *PEBs* = pro-environmental behaviours.

2. Materials and Methods

2.1. Sample Size

In this research, the minimum required sample was computed by an a priori sample size analysis using G*Power 3.1.9.7 software (Faul et al. 2007) based on multiple regression with 8 predictors (1 independent variable, 1 moderator, 1 interaction, and 5 covariates). The parameters were entered in G*Power as follows: test family: "*F* test analysis", statistical test: "Linear multiple regression: fixed model, R^2 deviation from zero", type of analysis: "A priori: Compute required sample size—given α, power and effect size", α err prob = 0.05, power (1-β err prob) = 0.95, mean effect size f^2 = 0.15 (medium effect), and a maximum number of predictors = 8. The G*Power software revealed that the recommended minimum sample size was N = 160.

2.2. Measures

Pro-environmental behaviours. PEBs were evaluated using an adapted version (Jia and Yu 2021) of the General Ecological Behaviour Scale (GEB; Kaiser and Wilson 2004). This version has been used in previous research addressing the intergenerational transmission of PEBs identifying common PEBs that both parents and children can usually act in their daily life (Jia and Yu 2021). The scale relies on 23 items (see Appendix A) anchored on a 5-point Likert scale from 1 (never) to 5 (always). A mean score was computed for children, fathers, and mothers, and higher scores indicate higher levels of PEBs. Notably, in order to provide

a more comprehensive evaluation of the effect of parents' PEBs on children's PEBs, in the current study both mothers' and fathers' PEBs were collected. Given the high correlation between fathers' and mothers' PEBs ($r = 0.88$, $p < 0.01$), a mean score of parents' PEBs was computed. Overall, this 23-item-based version of the GEB has shown good psychometric properties in previous research (e.g., Jia and Yu 2021). In this study, the internal consistency reliability was as follows: children's PEBs—Cronbach's $\alpha = 0.80$, McDonald's $\omega = 0.79$; mothers' PEBs—Cronbach's $\alpha = 0.85$, McDonald's $\omega = 0.85$; fathers' PEBs—Cronbach's $\alpha = 0.85$, McDonald's $\omega = 0.86$.

Moral judgment. Moral judgment was evaluated using the Moral Judgments Task (MJT; Collado and Sorrel 2019; Hussar and Horvath 2011). In this task, children have to assess the level of morality in hypothetical situations presented in a series of cartoons. These hypothetical situations rely on two main domains: general moral judgment and domain-specific environmental moral judgment (Collado and Sorrel 2019; Hussar and Horvath 2011). General moral judgment entails actions such as (1) moral transgressions, including actions that harm people such as grabbing money from a classmate's desk; (2) social-conventional transgressions, including actions that disrupt the social order such as eating a salad with fingers; (3) non-harmful personal choices, such as reading during recess instead of playing football. On the other hand, domain-specific environmental moral judgment encompasses (1) harmful actions with no specific victim, such as failing to recycle; (2) harmful actions to animals, such as throwing pebbles at a squirrel; (3) harmful actions to plants/trees, such as taking leaves from a tree. As in previous studies (e.g., Collado and Sorrel 2019), actions were coded as follows: "ok" = 1, "little bad" = 2, and "very bad" = 3. In this research, a reversed coding was used so that higher scores indicated higher levels of moral judgment and a mean score was computed.

Demographic variables. Based on previous evidence on the involvement of children's age and gender as well as parents' age and gender in the intergenerational transmission of PEBs (e.g., Chawla and Cushing 2007), in the current research, these variables were considered potential covariates. Gender for parents and children was dummy coded (0 = female; 1 = male). Additionally, past research suggested that children from rural areas spent significantly more time in nature than those from urban areas (Collado and Sorrel 2019). As children's nature exposure triggers their PEBs, we asked parents to indicate in which city area they lived with their family (0 = urban; 1 = rural), and we also considered this variable as a further potential covariate.

2.3. Procedure

The experiment was conducted in December 2022 and took place in an Italian primary school located in Ascoli Piceno (Marche, Italy). This study comprised the following phases. First, researchers requested a meeting with the school principal in order to explain in detail the nature and main procedures of the research. Second, after the assent of the school principal, parents/legal guardians received a consent note detailing the topic of the research as well as the main aims, procedures, and assessment. The note also explained that the participation of themselves and their children was voluntary and that anonymity was guaranteed for all participants.

Third, after obtaining written consent, researchers sent a brief battery of questionnaires to parents/legal guardians, which they were required to complete and send back to researchers. The battery included a series of questionnaires about socio-demographic information, such as age, gender, and city area of residence as well as PEBs. Finally, children who were authorised by their parents/legal guardians were evaluated at school. In particular, children were organised into groups of approximately twenty and were asked to complete a short demographic questionnaire, the GEB, and the MJT in the presence of their teacher and a trained research assistant (C.Z.). Children were told that a group of researchers wanted to understand children's opinions about nature as well as actions they think are helpful to safeguard the natural environment.

This study refers to an extensive research project addressing children's pro-environmental education in different contexts, such as family and school, and was conducted in accordance with the Declaration of Helsinki. The University Research Ethics Committee ethically approved this study on 27 September 2022.

2.4. Statistical Analysis

Data were analysed using SPSS Statistics version 24 for Windows (IBM Corporation, Armonk, NY, USA). Descriptive statistics were used to evaluate the main characteristics of the sample; normality tests, common method bias, and correlation analysis were performed to preliminarily explore the study variables. In addition, moderation analysis was computed through the PROCESS macro for SPSS (version 3.5; Hayes 2017), selecting Model 1. In the PROCESS procedure, the moderation effect is denoted by a significant 95% confidence interval (CI), bootstrapped based on 5000 samples. Bootstrapping is a non-parametric approach that bypasses the problem of non-normality and provides an accurate evaluation of the mediating and moderating effects in small- to medium-sized samples (e.g., Giancola et al. 2023a, 2023d). The significance of results is provided if the range of the bootstrapped CI does not include the value of zero (Preacher and Hayes 2008). All significance in this study was set to $p < 0.05$.

3. Results

3.1. Main Characteristics of Participants

Two-hundred and thirty-seven triads of Italian school-age children, fathers, and mothers participated in this research. The z-test—using the range $\pm$ 4.0 z-scores for samples larger than 100 (e.g., Mertler and Vannatta 2005; Giancola 2022; Giancola et al. 2024)—identified 8 univariate outliers that were discarded from the dataset, resulting in a final sample of 229 triads of children (M_{age} = 8.54 years; SD_{age} = 1.46 years; $range_{age}$ 6–11 years, 130 girls and 99 boys), fathers (M_{age} = 45.73 years; SD_{age} = 5.07 years; $range_{age}$ 29–64 years), and mothers (M_{age} = 42.56 years; SD_{age} = 4.67 years; $range_{age}$ 28–57 years).

3.2. Preliminary Analysis

The normality test revealed that all continuous variables were not normally distributed (Kolmogorov–Smirnov test: $Z_{Fathers' PEBs}$ = 0.00, sig; $Z_{Moral transgressions}$ = 0.00, sig; $Z_{Social\text{-}conventional transgressions}$ = 0.00, sig; $Z_{Harmful actions with no specific victim}$ = 0.00, sig; $Z_{Harmful actions to animals}$ = 0.00, sig; $Z_{Harmful actions to plants/trees}$ = 0.00, sig; $Z_{Personal choices}$ = 0.00, sig; $Z_{Children's age}$ = 0.00, sig; $Z_{Fathers' age}$ = 0.00, sig; $Z_{Mothers' age}$ = 0.00, sig) except for mothers' PEBs (Kolmogorov–Smirnov test: $Z_{Mothers' PEBs}$ = 0.18, ns) and children's PEBs ($Z_{Children's PEBs}$ = 0.31, ns). Harman's single-factor test (Podsakoff et al. 2012) revealed that the single factor explained 23.24% of the variance, revealing that the data showed no common method bias problems (test critical threshold $\geq$ 40%).

Correlational analysis indicated that children's PEBs were positively correlated with fathers' PEBs (r = 0.15, $p < 0.05$), mothers' PEBs (r = 0.15, $p < 0.05$), parents' PEBs (r = 0.16, $p < 0.05$), harmful actions with no specific victim (r = 0.21, $p < 0.01$), harmful actions to animals (r = 0.15, $p < 0.05$), and harmful actions to plants/trees (r = 0.40, $p < 0.01$). Table 1 reports the means, standard deviations, and preliminary Spearman's correlational analysis for all study variables.

Table 1. Means, standard deviations, and inter-correlations amongst all variables. Note. $N = 229$; dummy coded variables: gender (0 = F; 1 = M) and nature exposure (0 = urban; 1 = rural); *PEBs* = pro-environmental behaviours. * $p < 0.05$ (two-tailed); ** $p < 0.01$ (two-tailed).

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Fathers' PEBs	3.87	0.26	1														
2. Mothers' PEBs	3.97	0.31	0.89 **	1													
3. Parents' PEBs	3.92	0.27	0.97 **	0.97 **	1												
4. Children's PEBs	3.65	0.35	0.15 *	0.15 *	0.16 *	1											
5. Moral transgressions	2.90	0.28	0.06	0.10	0.08	0.02	1										
6. Social-conventional transgressions	2.51	0.49	0.01	0.06	0.04	0.00	0.30 **	1									
7. Harmful actions with no specific victim	2.71	0.46	0.08	0.07	0.08	0.21 **	0.34 **	0.38 **	1								
8. Harmful actions to animals	2.58	0.54	0.02	0.00	0.01	0.15 *	0.30 **	0.30 **	0.43 **	1							
9. Harmful actions to plants/trees	1.71	0.64	0.01	0.00	0.01	0.40 **	0.19 **	0.08	0.24 **	0.32 **	1						
10. Personal choices	1.36	0.71	0.03	0.07	0.05	0.02	0.13 *	0.10	0.09	0.17 *	0.21 **	1					
11. Children's age	8.54	1.46	0.01	−0.02	−0.01	−0.03	−0.08	−0.18 **	−0.13 *	0.14 *	−0.15 *	0.07	1				
12. Children's gender			0.04	0.03	0.03	0.04	−0.11	−0.14 *	−0.10	−0.07	0.03	0.00	−0.06	1			
13. Fathers' age	45.73	5.07	0.00	0.05	0.03	0.00	−0.07	−0.03	−0.01	−0.14 *	−0.10	−0.05	0.02	0.14 *	1		
14. Mothers' age	42.59	4.67	0.04	0.00	0.03	0.03	−0.01	−0.04	0.02	−0.10	−0.06	−0.05	0.16 *	0.05	0.10	1	
15. Family nature exposure			0.15 *	0.11	0.13	0.10	0.05	0.05	−0.02	0.07	0.11	−0.03	0.03	−0.05	0.01	0.02	1

3.3. Moderation Analysis

Six moderation models were advanced entering parents' PEBs as the independent variable, children's PEBs as the dependent variable, and the six moral judgment dimensions (i.e., moral transgressions, social-conventional transgressions, harmful actions with no specific victim, harmful actions to animals, harmful actions to plants/trees, and personal choices) as the moderators.

When investigating the moderating effect of harmful actions to animals (Table 2, Model A), results revealed that parents' PEBs (B = 0.21, SE = 0.08, t = 2.51, CI 95% = [0.045, 0.375]), and harmful actions to animals (B = 0.13, SE = 0.04, t = 3.07, CI 95% = [0.462, 0.211]), positively predicted children's PEBs. Additionally, harmful actions to animals moderated the association between parents' PEBs and offspring's PEBs (B = 0.32, SE = 0.15, t = 2.18, CI 95% = [0.030, 0.612]) at medium (B = 0.21, SE = 0.08, t = 2.51, CI 95% = [0.045, 0.375]) and high (B = 0.35, SE = 0.11, t = 3.11, CI 95% = [0.127, 0.565]) levels (Figure 2A). Additionally, when investigating the moderating effect of harmful actions to plants/trees (Table 2, Model B), results showed that parents' PEBs (B = 0.19, SE = 0.08, t = 2.49, CI 95% = [0.369, 0.342]), as well as harmful actions to plants/trees (B = 0.22, SE = 0.03, t = 6.70, CI 95% = [0.155, 0.285]), positively predicted children's PEBs. Furthermore, harmful actions to animals moderated the parents' PEBs–children's PEBs link (B = 0.28, SE = 0.13, t = 2.16, CI 95% = [0.024, 0.531]) at medium (B = 0.19, SE = 0.08, t = 2.49, CI 95% = [0.039, 0.342]) and high (B = 0.37, SE = 0.11, t = 3.30, CI 95% = [0.147, 0.587]) levels (Figure 2B).

Table 2. Coefficients for the moderating models. *Note.* N = 229. *PEBs* = pro-environmental behaviours, *SE* = standard error, *LLCI* = lower limit of the 95% confidence interval, *ULCI* = upper limit of the 95% confidence interval. *** $p < 0.001$.

	B	***SE***	***t***	***LLCI***	***ULCI***
Model A					
Parents' PEBs	0.21	0.08	2.51	0.045	0.375
Harmful actions to animals	0.13	0.04	3.07	0.462	0.211
Parents' PEBs × harmful actions to animals	0.32	0.15	2.18	0.030	0.612
R^2 = 0.08					
F(3, 225) = 6.21 ***					
Model B					
Parents' PEBs	0.19	0.08	2.49	0.396	0.342
Harmful actions to plants/trees	0.22	0.03	6.70	0.155	0.285
Parents' PEBs × harmful actions to plants/trees	0.28	0.13	2.16	0.024	0.531
F(3, 225) = 19.21 ***					

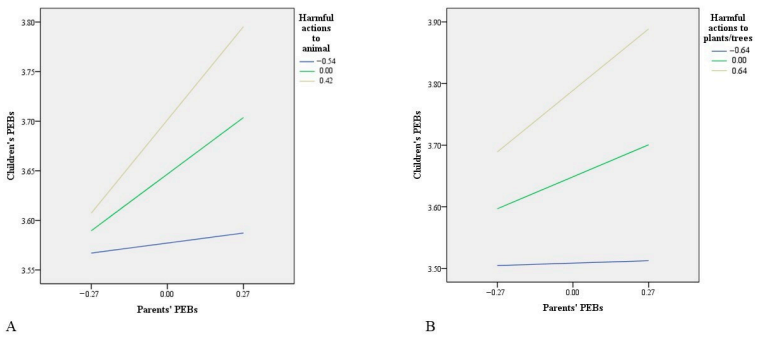

Figure 2. The moderating role of harmful actions to animals (**A**) and harmful actions to plants/trees (**B**). Note. PEBs = pro-environmental behaviours.

In addition, no moderating effects were found for harmful actions with no specific victim ($B = 0.09$, $SE = 0.18$, $t = 0.51$, CI 95% = [−0.266, 0.456]), moral transgressions ($B = 0.28$, $SE = 0.24$, $t = 1.17$, CI 95% = [−0.196, 0.766]), social-conventional transgressions ($B = 0.32$, $SE = 0.18$, $t = 1.80$, CI 95% = [−0.031, 0.676]), and personal choices ($B = 0.17$, $SE = 0.12$, $t = 1.43$, CI 95% = [−0.064, 0.407]).

Overall, these findings suggested that only harmful actions to animals and harmful actions to plants/trees are involved in the association between parents' PEBs and children's PEBs, promoting the intergenerational transmission of PEBs within the family context.

3.4. Post Hoc Power Analysis

A post hoc power analysis was computed in order to evaluate the power obtained from the collected data. The power values of the two significant moderating models ranged from 0.81 to 0.99, satisfying the recommended cut-off value of 0.80 (Cohen 1992).

4. Discussion

The present study analysed the intergenerational transmission of PEBs, addressing the moderating effect of children's moral judgment. This latter was evaluated considering two main categories: general moral judgment—including moral transgressions, social-conventional transgressions, and non-harmful personal choices; domain-specific environmental moral judgment—including harmful actions with no specific victim, harmful actions to animals, and harmful actions to plants/trees.

Results indicated that only two aspects of domain-specific environmental moral judgment, harmful actions to animals and harmful actions to plants/trees, moderated the interplay between children's PEBs and parents' PEBs. No moderating effects were found for the other aspect of domain-specific environmental moral judgement— harmful actions with no specific victim—or for all aspects of general moral judgement, including moral transgressions, social-conventional transgressions, and personal choices.

Overall, these results partially confirmed the research hypothesis, suggesting that the intergenerational transmission became stronger only when children showed a higher ability to evaluate and reason about domain-specific morality expressed in actions directed at natural elements, such as animals, plants, and trees. Based on these findings, moral judgment cannot be considered a universal factor that triggers the intergenerational transmission of PEBs but rather reflects a domain-specific pro-environmental response sensitivity to specific environmentally related behaviours. This domain alignment emphasises the role of moral judgment as a mechanism that connects environmental values with the behavioural transmission of domain-specific practices. This implies that morality affects intergenerational transmission when there is alignment between PEBs transmitted from generation to generation and the moral evaluation of actions towards non-human living beings. This mechanism may imply that when children feel a moral duty to protect nature and think about the moral impact of harming the environment, they better understand the environmental crisis and are more likely to internalise, learn, and adopt their parents' behaviours. This notion aligns with Social Cognitive Theory (Bandura 1991; Bandura et al. 2001) that suggests individuals with higher levels of moral reasoning are more likely to exhibit dutifulness, self-discipline, as well as a greater interest in the welfare of the majority, which can promote motivation towards change and facilitate the educational mechanisms, including the intergenerational transmission of PEBs.

Notably, within the domain-specific environmental moral judgment, no moderating effect was found considering harmful actions with no specific victim. This evidence implies that moral judgment facilitates intergenerational transmission only when specific natural elements are involved. This mechanism can be explained by considering children's human-centred perspective of the biological world (Waxman and Medin 2007). Accordingly, in the early stages of life (6–10 years old), children's moral judgment is primarily driven by human-centred reasons, that is, the mechanism through which children tend to anthropomorphise

animals attributing human characteristics to them (Ganea et al. 2014; Hahn and Garrett 2017) as well as consider plants as living things (Inagaki and Hatano 1996).

The current study yielded some implications. From a theoretical perspective, this research extended the evidence about the main mechanisms involved in the intergenerational transmission of PEBs during school-age years. By distinguishing between general moral judgment and domain-specific environmental moral judgment, this study stressed that domain-specific moral judgment can play a critical role in the intergenerational transmission of PEBs. From an educational perspective, this study suggested the importance of considering educational programs based on some components of moral judgment, which could help promote long-term changes in terms of sustainability, ensuring a positive development of eco-green behaviours (Giancola et al. 2021a). In particular, educational programs aimed at teaching children to understand the moral implications of their actions on the natural environment can contribute to global sustainable development from the early stages of life. Beyond these theoretical and educational implications, the current research may also impact policy development. In particular, policymakers can use the findings provided by this study to advocate for integrating morality into environmental education school curricula. This approach may help nurture generations of environmentally aware individuals.

Despite these implications, the current study showed some limitations worth mentioning. First, this study relies on a cross-sectional design, which does not allow for conclusions about the causality. Future research should confirm our findings, addressing the mechanisms involved in the intergenerational transmission of PEBs through longitudinal research design. Second, data were gathered only from one region of Italy. In order to provide a more exhaustive evaluation of the effect of children's moral judgement on the intergenerational transmission of PEBs, future research should replicate our findings by including a more representative sample. Third, in this study, the potential confounding effect of prevailing local cultural orientations towards PEBs and the effect of socio-economic status in PEBs were not considered. Future research should extend the evidence on the moderating role of children's moral judgement in the intergenerational transmission of PEBs controlling for these variables. Fourth, as parents' education as well as teaching methodologies and techniques can affect the intergenerational transmission of PEBs (Scopelliti et al. 2022), future research should confirm the findings of the current research addressing these variables. In addition, findings mainly rely on self-report questionnaires that do not evaluate actual PEBs; to overcome this limitation, future research should confirm the model advanced in this study through objective and simple real-life measurements that are accessible to children. Finally, this study explored the main mechanism involved in the intergenerational transmission of PEBs, only examining moral judgment. For a more comprehensive understanding of intergenerational transmission, future research should take into account the role of parents in terms of moral judgment, contextual factors such as the quality of the parent–child relationship (Jia and Yu 2021), and children's characteristics, including cognitive processes (Giancola et al. 2022a) as well as temperament features, personality traits, and thinking styles (Giancola et al. 2022b, 2021b; Slagt et al. 2016).

In spite of these limitations, this study extends the current knowledge of the main mechanisms that could facilitate the intergenerational transmission of PEBs during infancy, also offering valuable insights for theoretical frameworks and practical interventions aimed at fostering children's environmental education.

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Appendix A

The revised version of the General Ecological Behaviour Scale.

1. I regularly participate in activities related to environmental protection.
2. I collect and recycle used plastic containers.
3. I collect and pay attention to news related to the environment.
4. I prefer buying products made from recyclables (e.g., environmentally friendly paper and notebooks).
5. If I need batteries, I use rechargeable batteries.
6. I reuse blank paper to write.
7. I minimize the use of plastic tableware.
8. I reuse my shopping bags
9. I keep the water running when I wash the dishes. (R)
10. I throw some small pieces of garbage on the street. (R)
11. I put dead batteries in the garbage. (R)
12. If I am offered a plastic bag in a store, I take it. (R)
13. When I go out with my family, I turn off all the air conditioners and air purifiers at home.
14. I don't litter when I am outside. I put garbage into the garbage can.
15. I turn off lights when not needed (e.g., leaving the room).
16. If I need a new light bulb, I use energy efficient light bulbs.
17. When I leave the public places (e.g., cinema and stadium), I will take all my garbage with me and throw it into the trash.
18. In the winter, we keep the heat on so that we do not have to wear a sweater. (R)
19. When the outdoor air has a poor quality, I keep the air purification system running. (R)
20. In the summer, we keep the air-conditioning running all day so that we don't get sweaty. (R)
21. I keep the water running when brushing my teeth. (R)
22. I try my best to travel by public transportation.
23. I turn off the TV and computer screens when they are not in use.

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