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The Relationship Between Ecological Worldview and Pro-Environmental Behavior Based on Self-Report in Grade V Elementary School Students

***Nenden Permas Hikmatunisa, Muhammad Bagas Adisetyo, Hisny Fajrussalam**
Elementary School Teacher Education, Universitas Pendidikan Indonesia, Bandung, Indonesia
*Corresponding author e-mail: nendenpermas17@upi.edu

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Abstract

Evidence on whether broad ecological worldviews correspond with children's everyday pro-environmental behavior (PEB) remains mixed in upper-elementary settings. This study examined the association between ecological worldview and self-reported PEB among Grade V students in two public elementary schools in Purwakarta, West Java, Indonesia. Using a cross-sectional correlational design and purposive sampling, the sample comprised 105 students: 58 from SDN Ciwangi (an Adiwiyata-certified school) and 47 from SDN 1 Munjul Jaya (a non-Adiwiyata school). Ecological worldview was measured using a 10-item questionnaire adapted from the New Ecological Paradigm framework, and self-reported PEB was assessed using a 14-item frequency questionnaire. Spearman's rank correlation served as the primary analysis, with 1,000 individual-level bootstrap resamples to estimate a 95% confidence interval. The overall association was negligible and statistically uncertain (r_s = .051, 95% CI [-.149, .238], p = .607), indicating that higher ecological-worldview scores were not consistently accompanied by higher self-reported PEB scores. Score distributions did not support a pronounced ceiling-effect interpretation, and exploratory school-specific correlations were treated descriptively rather than as Adiwiyata effects. Broad ecological worldview should not be assumed to function as a direct proxy for children's reported environmental behavior, within the limitations of a cross-sectional self-report design across two schools.

Keywords: Ecological worldview; Elementary school students; New ecological paradigm; Pro-environmental behavior; Self-report.

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INTRODUCTION

Environmental education is expected to support the development of environmental knowledge, attitudes, intentions, and behavior among children and adolescents, but these outcomes should not be treated as interchangeable. Reviews of K-12 environmental education have documented positive but diverse outcomes across knowledge, dispositions, competencies, behavior, and other student characteristics (Ardoin et al., 2018), while conservation-focused synthesis has emphasized that direct behavioral or environmental outcomes are less commonly measured than cognitive and affective outcomes (Ardoin et al., 2020). Meta-analytic evidence likewise indicates that environmental education can improve environmental knowledge, attitudes, intentions, and mostly self-reported behavior, with substantial heterogeneity across studies (Van De Wetering et al., 2022); a more recent meta-analysis focused on low- and middle-income countries also reported positive average effects but meaningful variation across intervention and participant characteristics (Hu et al., 2025). Importantly, a meta-analysis of interventions targeting children's pro-environmental behavior found stronger effects when actual rather than self-reported behavior was measured, while also noting that direct behavioral

measures remain comparatively scarce (Świątkowski et al., 2024). Developmental studies further show that environmental attitudes and behaviors change across childhood and adolescence rather than following a single stable trajectory (Evans et al., 2018; Fränkel et al., 2019; Krettenauer et al., 2020; Otto et al., 2019). These findings make upper-elementary students an important population for examining whether favorable environmental beliefs are accompanied by corresponding everyday actions.

A central issue is that ecological worldview and pro-environmental behavior (PEB) are related but not identical constructs. The New Ecological Paradigm (NEP) framework was developed to assess broad beliefs about humanity's relationship with nature, ecological limits, the balance of nature, human exemptionalism, and the possibility of ecological crisis (Dunlap et al., 2000). PEB, in contrast, refers to concrete actions that reduce environmental harm or support environmental protection, and its measurement can range from broad self-report scales to domain-specific reports, observations, and behavioral tasks (Lange & Dewitte, 2019; Larson et al., 2015). The attitude-behavior correspondence principle proposes that associations are generally stronger when attitudes and behaviors correspond in specificity, target, context, and time (Ajzen & Fishbein, 1977). This distinction is particularly relevant to child research because broad environmental beliefs should not automatically be treated as direct indicators of specific behavior. A review of the child-adapted NEP literature concluded that the usefulness of an overall NEP score for predicting children's PEB remains uncertain and that comprehension and construct representation require careful attention (Rosa et al., 2022). More generally, a comparison of NEP with a behavior-oriented environmental scale found unequal predictive performance, although that evidence was obtained from adult consumers and is used here only to underscore the importance of measurement specificity rather than to infer the child-level relationship directly (Freire et al., 2021).

Previous child-focused research shows that environmental attitudes and behavior are embedded in multiple individual, social, and contextual processes. Systematic reviews identify attitudes and values, self-efficacy, environmental education, family socialization, and contact with nature among recurring correlates or intervention targets in children's sustainable behavior research (Hosany et al., 2022; Liu & Green, 2024). At the individual and nature-contact level, studies have linked environmental behavior with outcome expectancy, connection to nature, and direct experiences of nature, while showing that effect sizes and pathways vary across measures and populations (Collado & Evans, 2019; Hughes et al., 2018; Mackay & Schmitt, 2019; Soga & Gaston, 2024; Whitburn et al., 2020). Context-sensitive evidence similarly indicates that environmental knowledge, affiliation with nature, and PEB can vary in their relationships across cities and social settings (Jia & Wang, 2024), while recent evidence from elementary-school children in Jakarta found that connection to nature did not mediate the relationship between nature experiences and PEB (Wulandari et al., 2025). More behavior-specific research with school-age children has also reported positive links among values, environmental identity or personal norms, and domain-specific self-reported behaviors such as energy conservation and climate-conserving behavior (Karpudewan, 2019; Zeiske et al., 2021). Family studies further show that children's environmental actions are associated with parent-child engagement and intergenerational processes, and that the opportunities available for specific actions such as recycling can depend on family and setting characteristics (Jia & Yu, 2021; Kong & Jia, 2023; Salazar et al., 2022; Schill et al., 2020; Singh et al., 2020). Indonesian studies provide additional but non-uniform evidence: (Kusuma et al., 2020) reported relationships between particular NEP- and behavior-related dimensions among students in Adiwiyata elementary schools, whereas (Febriyanti & Rahmandani, 2024) found no significant relationship between environmental knowledge and PEB in an Adiwiyata elementary-school context. Taken together, these studies differ in constructs, measurement models, behavioral domains, and school sampling. Consequently, the unresolved issue addressed here is the more specific question of how strongly a broad ecological worldview

corresponds with self-reported everyday PEB among upper-elementary students when the two constructs are measured separately and at different levels of specificity.

Accordingly, the present study examines the relationship between ecological worldview and self-reported PEB among Grade V students in two public elementary schools in Purwakarta Regency, West Java, Indonesia. SDN Ciwangi is an Adiwiyata-certified school, whereas SDN 1 Munjul Jaya is a non-Adiwiyata school. Because each school context is represented by only one school, Adiwiyata status is treated as a contextual characteristic rather than as an exposure whose independent effect can be estimated. In this study, ecological worldview is conceptualized with reference to the Revised NEP framework (Dunlap et al., 2000) covering beliefs regarding ecological limits, the balance of nature, human exemptionalism, and ecological crisis, whereas self-reported PEB encompasses everyday behavioral frequencies across waste management, water and energy conservation, reduction of disposable materials, care for living organisms, participation in environmental activities, and peer or family cooperation informed by (Larson et al., 2015). The study addresses three research questions: (1) What is the descriptive profile of ecological worldview among Grade V students in the two participating elementary schools? (2) What is the descriptive profile of self-reported PEB among these students? and (3) Is ecological worldview significantly associated with self-reported PEB among the participating Grade V students? The primary hypothesis is that higher ecological-worldview scores are positively associated with higher self-reported PEB scores. School-specific correlations are examined only as exploratory analyses to describe the observed pattern within each participating school, not as formal tests of an Adiwiyata effect or school-level moderation.

METHOD

Research Design

This study employed a quantitative, cross-sectional correlational design to examine the association between ecological worldview and self-reported PEB among Grade V elementary-school students. A cross-sectional correlational approach was selected because the research objective was to describe how broad environmental beliefs co-vary with reported everyday environmental actions in naturalistic school settings without introducing an instructional intervention (Lange & Dewitte, 2019; Rosa et al., 2022). Both variables were measured during the same data-collection period using structured questionnaires administered directly in the participating classrooms, and no experimental treatment or manipulation was introduced.

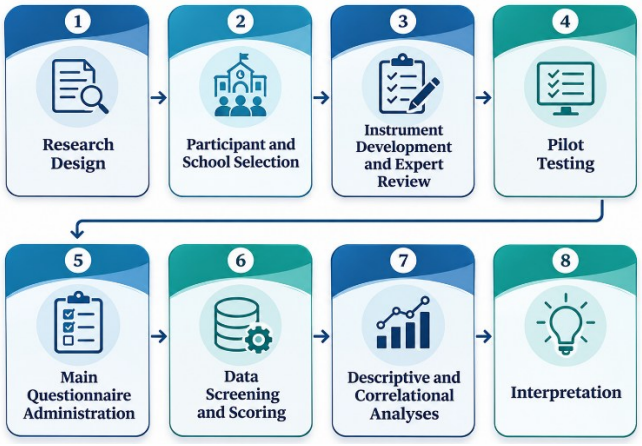

Figure 1. Methodological stages of the study

Consequently, the design supports the estimation of rank-order and linear associations between the measured constructs but does not establish temporal precedence, causal effects, or mediating mechanisms. The study procedure encompassed eight sequential stages: research design formulation, purposive school and participant selection, instrument adaptation and two-validator expert review, pilot testing with an independent upper-elementary group, main

classroom questionnaire administration, anonymous data screening and total-score calculation, descriptive and bootstrap correlational analyses, and cautious substantive interpretation within the methodological boundaries of the sample. The complete sequence of methodological stages is summarized in Figure 1.

Participants and Sampling

The final analytic sample consisted of 105 Grade V students drawn from four intact classes across two public elementary schools in Purwakarta Regency, West Java, Indonesia. Participating students were in the upper-elementary age range of approximately 10–11 years. SDN Ciwangi, an Adiwiyata-certified elementary school, contributed 58 participants from two Grade V classes, comprising 29 students from Class 5A and 29 students from Class 5B. SDN 1 Munjul Jaya, a public elementary school without Adiwiyata certification, contributed 47 participants, comprising 22 students from Class 5C and 25 students from Class 5D. All Grade V students present in the four participating classes during the scheduled administration completed the questionnaires and were retained in the analytic dataset. The two schools were purposively selected to represent two recognizable elementary-school contexts in Purwakarta Regency while examining the primary student-level association. Because only one school represented each school context, the sampling structure was not designed to support population-level comparisons between Adiwiyata and non-Adiwiyata schools, and school-specific analyses were treated strictly as exploratory and descriptive. Based on the achieved sample size of $N = 105$, a two-sided sensitivity calculation at $\alpha = .05$ and approximately .80 statistical power indicated that the study was better positioned to detect correlations of about $|r| = .27$ or larger than very small associations. This calculation characterizes the resolution of the achieved sample rather than an a priori sample-size justification.

Instrument and Procedure

The ecological-worldview questionnaire was developed with reference to the New Ecological Paradigm framework, particularly the Revised New Ecological Paradigm Scale of (Dunlap et al., 2000). Whereas the original revised scale contains 15 items representing multiple facets of ecological worldview, the instrument used in the present study was constructed as a context-appropriate Indonesian adaptation informed by the NEP framework rather than a direct translation of the original 15-item adult scale or a previously published children's NEP scale (Dunlap et al., 2000; Rosa et al., 2022). An initial pool of 36 Indonesian-language items was drafted and evaluated by two expert validators using a five-point feasibility scale ranging from 1 (not feasible) to 5 (highly feasible), accompanied by qualitative revision notes. Following expert review, 24 items were retained for pilot testing with 22 Grade VI students who were not part of the main Grade V analytic sample. Based on pilot response distributions and item-total reliability screening, 10 items were retained for the main study using a five-point agreement scale from 1 (Strongly Disagree) to 5 (Strongly Agree), yielding a theoretical total-score range of 10 to 50, where higher scores indicate stronger endorsement of ecological-worldview beliefs.

The self-reported PEB questionnaire was developed with reference to the multidimensional conceptualization of pro-environmental behavior described by (Larson et al., 2015), which served as a conceptual foundation for behavioral domains rather than a pre-existing child instrument. This approach aligns with measurement literature distinguishing domain-general and domain-specific self-reports from observational and behavioral-task paradigms (Lange & Dewitte, 2019). An initial pool of 36 behavioral statements covering waste management, water and energy conservation, reduction of disposable materials, care for living organisms, participation in environmental activities, and peer or family cooperation underwent the same two-validator review, retaining 24 items for pilot testing with the same 22 Grade VI students. Following pilot item screening, 14 items were retained for the main study on a five-point frequency scale from 1 (Never) to 5 (Always), producing a theoretical total-score range

of 14 to 70. In the main sample (N = 105), corrected item-total correlations ranged from .381 to .692 for the ecological-worldview items (Cronbach's α = .781) and from .412 to .724 for the self-reported PEB items (Cronbach's α = .824), supporting internal consistency within the present sample without claiming comprehensive factor-analytic construct validity (Table 1). Formal permission to conduct the classroom survey was obtained from the principals of SDN Ciwangi and SDN 1 Munjul Jaya prior to data collection. Students were briefed on the questionnaire before participating, and all analytic records were stored anonymously using student codes. The original data-collection procedure did not include parent or guardian written informed consent; this procedural boundary is reported transparently without claiming retrospective consent.

Table 1. Summary of instrument development and measurement characteristics.

Variable	Conceptual basis	Initial items	After expert review	Pilot sample	Final items	Score range	Alpha
Ecological worldview	Revised NEP framework (Dunlap et al., 2000)	36	24	22 Grade VI students	10	10–50	.781
Self-reported PEB	PEB framework (Larson et al., 2015)	36	24	22 Grade VI students	14	14–70	.824

Data Analysis

Descriptive statistics were calculated for ecological-worldview and self-reported PEB total scores across the overall sample and separately for the two participating schools, including observed score range, mean, standard deviation, median, skewness, and kurtosis. Empirical score frequencies and the proportions of observations approaching the theoretical upper limits (50 for ecological worldview and 70 for self-reported PEB) were also inspected to evaluate whether the observed distributions exhibited a pronounced ceiling effect. The primary inferential analysis used Spearman's rank correlation coefficient (r_s) to estimate the monotonic association between ecological worldview and self-reported PEB across all 105 students. Spearman's rank correlation was selected to match the rank-order research question and the ordinal-summated questionnaire structure rather than relying on normality testing alone. Statistical significance was evaluated using a two-sided criterion of α = .05, and 95% confidence intervals were estimated using 1,000 individual-level bootstrap resamples to characterize sampling uncertainty around each point estimate without claiming correction for class- or school-level clustering. Additional Spearman correlations were calculated separately for SDN Ciwangi and SDN 1 Munjul Jaya strictly as exploratory school-specific descriptions rather than formal tests of moderation, school equivalence, or an Adiwiyata program effect. Finally, a Pearson product-moment correlation (r) was calculated for the overall sample as a sensitivity check to verify whether the substantive conclusion remained consistent across estimators.

RESULTS AND DISCUSSION

Descriptive Profiles and Score Distributions

Descriptive statistics for ecological worldview and self-reported PEB are presented in Table 2. Across the full sample (N = 105), ecological-worldview total scores ranged from 35 to 49, with a mean of 42.42 (SD = 3.14) and a median of 42. Self-reported PEB total scores ranged from 31 to 69, with a mean of 53.24 (SD = 5.84) and a median of 52. The overall ecological-worldview distribution was approximately symmetric (skewness = 0.01, kurtosis = -0.48), whereas the self-reported PEB distribution was also nearly symmetric overall (skewness = -0.08) but displayed greater tail concentration (kurtosis = 1.32). At the school level, SDN Ciwangi (n = 58) recorded a mean ecological-worldview score of 42.10 (SD = 3.20) and a mean self-reported PEB score of 54.66 (SD = 5.98), whereas SDN 1 Munjul Jaya (n = 47) recorded

a mean ecological-worldview score of 42.81 (*SD* = 3.04) and a mean self-reported PEB score of 51.49 (*SD* = 5.20). These school-level figures are strictly descriptive and are not interpreted as causal effects of Adiwiyata certification. Inspection of the empirical score frequencies did not support a pronounced ceiling-effect interpretation. No student reached the theoretical maximum ecological-worldview score of 50; only six students (5.7%) scored 48 or 49 (at least 95% of the theoretical maximum), and 31 students (29.5%) scored 45 or higher. Similarly, for self-reported PEB, no student reached the theoretical maximum of 70; two students (1.9%) scored at least 67 and seven students (6.7%) scored at least 63. Figures 2 and 3 illustrate these distributions, confirming an upper-positioned but non-truncated ecological-worldview distribution and a moderately dispersed PEB distribution.

Table 2. Descriptive statistics of ecological worldview and self-reported PEB.

Group / Variable	*N*	Observed range	Mean	*SD*	Median	Skewness	Kurtosis
Overall: Ecological worldview	105	35–49	42.42	3.14	42	0.01	-0.48
Overall: Self-reported PEB	105	31–69	53.24	5.84	52	-0.08	1.32
SDN Ciwangi: Ecological worldview	58	35–48	42.10	3.20	42	-0.07	-0.37
SDN Ciwangi: Self-reported PEB	58	31–69	54.66	5.98	54	-0.62	3.53
SDN 1 Munjul Jaya: Ecological worldview	47	37–49	42.81	3.04	43	0.19	-0.75
SDN 1 Munjul Jaya: Self-reported PEB	47	43–63	51.49	5.20	51	0.58	-0.44

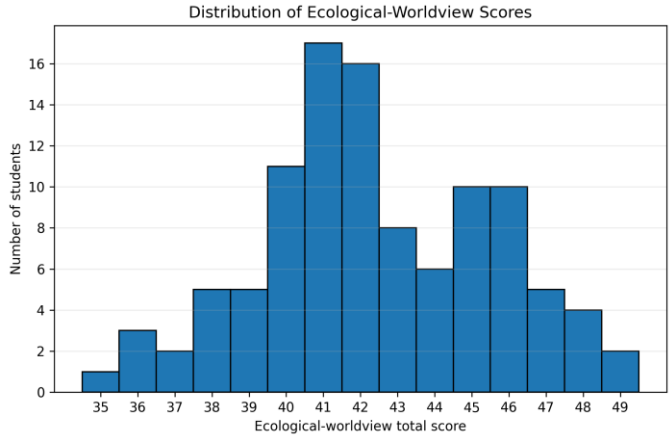

Figure 2. Distribution of ecological-worldview scores in the final sample.

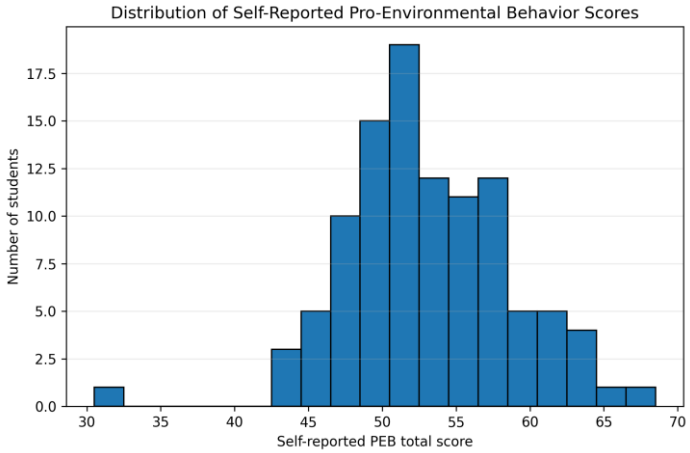

Figure 3. Distribution of self-reported pro-environmental behavior scores in the final sample.

The empirical score distributions warrant a cautious psychometric interpretation when compared with prior environmental-education research. Because no participant reached the theoretical maximum on either scale and the ecological-worldview distribution remained symmetric around its mean of 42.42, the observed data do not support the claim that a statistical ceiling effect suppressed a stronger underlying correlation. At the same time, the generally favorable endorsement of ecological-worldview items alongside wider dispersion in reported behavioral frequencies aligns with measurement literature showing that endorsing pro-environmental statements is typically less demanding than consistently enacting everyday conservation behaviors (Dunlap et al., 2000; Lange & Dewitte, 2019). Because PEB in this study was captured through student self-report rather than direct behavioral observation, the observed scores reflect students' perceived behavioral frequencies, which can differ from objective behavioral records or structured task paradigms (Lange & Dewitte, 2019). In child-focused intervention research, direct behavioral measures remain comparatively scarce and can yield substantially different effect estimates than self-report questionnaires (Świątkowski et al., 2024). School-based investigations incorporating behavioral or quasi-behavioral indicators similarly highlight the analytical value of distinguishing reported environmental dispositions from concrete action measures (Whitburn et al., 2023; Wichmann et al., 2022). Although self-reported frequencies among elementary students can be affected by recall inaccuracy, varying interpretations of frequency anchors, or socially desirable responding, social desirability was not directly measured in the present study and is therefore treated as a plausible measurement boundary rather than an empirically demonstrated cause of the observed score distributions.

Developmental and contextual processes further help explain why upper-elementary students may endorse favorable ecological beliefs while exhibiting substantial variation in everyday behavioral enactment. Longitudinal and cross-cultural studies demonstrate that environmental attitudes, connectedness to nature, and pro-environmental behavior shift across late childhood and adolescence rather than following a fixed developmental trajectory (Evans et al., 2018; Fränkel et al., 2019; Krettenauer et al., 2020; Otto et al., 2019). Research on children's contact and connection with nature has reported positive associations with conservation behavior, while showing that effect sizes and pathways vary considerably across measurement instruments and cultural settings (Collado & Evans, 2019; Hughes et al., 2018; Mackay & Schmitt, 2019; Soga & Gaston, 2024; Whitburn et al., 2020). (Chawla, 2020) similarly emphasized that children's relationships with nature develop within broader emotional, familial, and institutional contexts. For students aged 10–11 years, everyday behavioral opportunities are closely tied to household routines and adult scaffolding: parent-child engagement is positively associated with children's PEB (Jia & Yu, 2021), environmental knowledge and behavior exhibit dyadic intergenerational transmission (Kong & Jia, 2023), and household infrastructure can either facilitate or constrain children's agency in actions such as waste sorting and recycling (Salazar et al., 2022; Schill et al., 2020; Singh et al., 2020). Recent evidence from elementary students in Jakarta also indicates that pathways linking nature experiences to PEB do not necessarily operate through a single affective mediator (Wulandari et al., 2025). These studies contextualize the dispersion observed in Figure 3 without implying that unmeasured family or developmental variables were directly tested here.

Primary Association and Attitude-Behavior Correspondence

The primary Spearman rank-order analysis indicated a negligible positive association between ecological worldview and self-reported PEB in the overall sample, r_s = .051, 95% bootstrap CI [-.149, .238], p = .607 (Table 3). Because the 95% bootstrap confidence interval crossed zero and spanned from a small negative association to a modest positive association, the data did not provide evidence of a statistically detectable monotonic relationship between the two measured variables in this sample, and the primary hypothesis was not supported. A Pearson product-moment correlation conducted as a sensitivity analysis yielded a similarly small, statistically uncertain estimate (r = .079, p = .423), confirming that the substantive

conclusion did not depend on the choice between rank-based and linear estimators. Figure 4 displays the bivariate distribution of ecological-worldview and self-reported PEB scores for individual students across the two participating schools. Consistent with the near-zero overall correlation, the scatterplot reveals substantial vertical dispersion in self-reported PEB scores across students holding comparable ecological-worldview scores, with no discernible monotonic trend. Importantly, however, this null finding should not be overclaimed as proof that ecological worldview is unrelated to children's environmental behavior in the wider population; rather, the confidence interval indicates that the present sample size excludes large correlations while leaving small negative to modest positive population associations plausible.

Table 3. Spearman associations between ecological worldview and self-reported PEB.

Analysis	*N*	Spearman r_s	95% bootstrap CI	*p*
Overall sample	105	.051	[-.149, .238]	.607
SDN Ciwangi (exploratory)	58	.214	[-.058, .436]	.106
SDN 1 Munjul Jaya (exploratory)	47	-.031	[-.350, .281]	.834

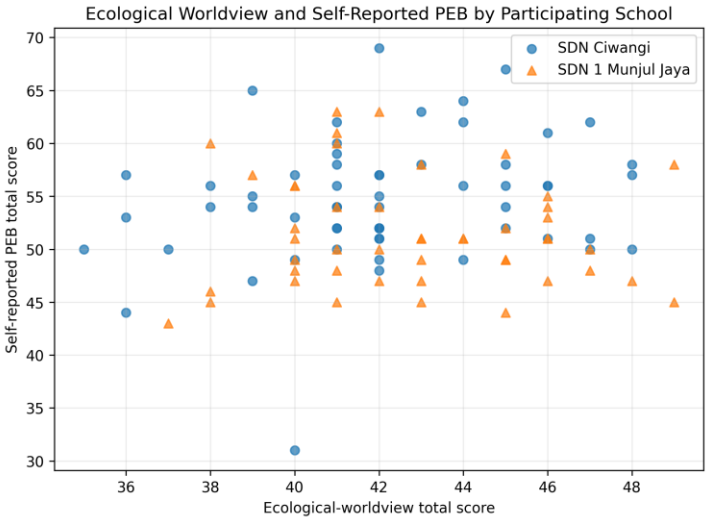

Figure 4. Ecological worldview and self-reported PEB by participating school.

The near-zero association observed in the overall sample is compatible with the theoretical distinction between general ecological beliefs and domain-specific behavioral actions. (Dunlap et al., 2000) conceptualized the NEP as a measure of broad ecological worldview and cautioned that situational constraints, institutional norms, and behavioral opportunities frequently attenuate links between general environmental beliefs and specific behaviors. (Ajzen & Fishbein, 1977) correspondence principle similarly states that attitude-behavior correlations tend to be weak when a general attitude measure is paired with concrete behaviors that differ in target, action, context, and time specificity. Empirical studies with school-age children that operationalize more behavior-specific or normative constructs have reported clearer associations. For example, (Karpudewan, 2019) documented positive relationships among values, beliefs, personal norms, and climate-conserving behaviors among Malaysian Year 5 and Year 6 students; (Zeiske et al., 2021) found that biospheric values, environmental self-identity, and personal norms were associated with children's self-reported energy-saving behaviors; and (Salazar et al., 2022) identified structured links among knowledge, attitudes, and plastic-disposal practices in schoolchildren. In adult consumer research, (Freire et al., 2021) likewise showed that a behavior-oriented environmental scale outperformed the broader NEP scale in predicting ecologically conscious behavior. Furthermore, child-focused psychometric synthesis supports caution when interpreting composite NEP scores as direct predictors of children's behavior: (Rosa et al., 2022) highlighted conceptual and comprehension challenges in applying the NEP to children, and

(Liu & Green, 2024) systematic review emphasized the substantial heterogeneity of behavioral domains and self-report instruments used in child PEB studies. Together with broader reviews showing that direct behavioral outcomes are distinct from cognitive and affective antecedents (Ardoin et al., 2020; Lange & Dewitte, 2019; Świątkowski et al., 2024), these studies support treating construct mismatch in specificity as a plausible theoretical interpretation rather than a causal mechanism proven by the current correlation.

Exploratory School-Context Pattern

Exploratory school-specific analyses were conducted to describe the empirical pattern within each participating school without testing school-level moderation. As shown in Table 2, the descriptive profiles did not follow a uniform pattern in which one school scored higher on both constructs: ecological-worldview scores were numerically slightly higher at SDN 1 Munjul Jaya (M = 42.81, SD = 3.04) than at SDN Ciwangi (M = 42.10, SD = 3.20), whereas self-reported PEB scores were numerically higher at SDN Ciwangi (M = 54.66, SD = 5.98) than at SDN 1 Munjul Jaya (M = 51.49, SD = 5.20). Similarly, Table 3 shows that the exploratory Spearman correlation at SDN Ciwangi was small and positive (r_s = .214, 95% bootstrap CI [-.058, .436], p = .106), whereas the estimate at SDN 1 Munjul Jaya was near zero and slightly negative (r_s = -.031, 95% bootstrap CI [-.350, .281], p = .834). Both school-specific confidence intervals were wide, overlapped substantially, and crossed zero, and no formal interaction or equivalence test was performed. Moreover, because each school category (Adiwiyata versus non-Adiwiyata) was represented by only a single school, school-level institutional differences are completely confounded with unmeasured school, classroom, and neighborhood characteristics. Accordingly, these exploratory estimates provide no statistical basis for concluding that Adiwiyata certification strengthens the ecological worldview–PEB relationship.

This cautious interpretation is consistent with a broader school-based literature showing that environmental dispositions and behaviors vary across educational contexts and program implementations. Within Indonesia, empirical findings from Adiwiyata elementary schools are themselves mixed: (Kusuma et al., 2020) identified associations between specific NEP dimensions and school-based environmental behaviors among Adiwiyata elementary students, whereas (Febriyanti & Rahmandani, 2024) found no significant correlation between environmental knowledge and PEB (r_s = .103, p = .436) in an Adiwiyata elementary school and noted that students' behavioral control was shaped by school and home conditions. Internationally, multi-school research indicates that school environmental policies and socioeconomic background jointly influence students' environmental attitudes and behaviors (Mónus, 2022), while a qualitative meta-analysis of adolescents identified institutional routines, facilities, and social norms as key barriers and enablers of school-based pro-environmental action (Huoponen, 2024). Experimental and quasi-experimental school studies further show that educational interventions or behavioral nudges can improve selected environmental outcomes without guaranteeing that general worldviews and everyday behaviors shift in parallel across all student groups (Charry & Parguel, 2019; Kurokawa et al., 2023; Robina-Ramírez et al., 2020; Trott, 2020, 2022). Likewise, a citizen-science program with Chilean schoolchildren produced minimal change in most behavioral indicators despite high baseline engagement (Wichmann et al., 2022), and a nature-fieldtrip study documented only selective behavioral gains (Whitburn et al., 2023).

Methodological Limitations and Implications

Several methodological limitations define the interpretive boundaries of the present study and must be considered when evaluating the findings. First, the cross-sectional correlational design captures scores at a single time point and cannot establish temporal ordering, developmental change, or causal effects between ecological worldview and PEB. Second, the sample of 105 students was purposively drawn from four intact classes across only two public

elementary schools in one regency; although students were nested within classes and schools, the number of higher-level units was insufficient for multilevel modeling or valid school-context inference. Third, whereas the achieved sample size provided reasonable sensitivity for moderate correlations ($|r| \approx .27$), it lacked precision to distinguish very small true associations from zero, as reflected in the width of the bootstrap confidence intervals. Fourth, PEB was assessed exclusively via student self-report rather than direct behavioral observation or parent/teacher ratings, leaving responses susceptible to recall error and unmeasured social desirability. Fifth, although both adapted instruments underwent expert validation, pilot testing, item-total screening, and internal-consistency estimation, formal factor-analytic construct validation was not conducted, and external contextual variables such as household routines, school waste-management infrastructure, and perceived behavioral control were not measured. Finally, the absence of written parental or guardian informed consent in the original procedure is acknowledged as an ethical-procedural limitation.

Within these methodological boundaries, the findings carry a focused practical implication for elementary environmental education: a relatively high score on a broad ecological-worldview questionnaire should not be treated as a sufficient proxy for children's everyday pro-environmental behavior. Program evaluations and classroom assessments that rely solely on general belief scales risk overlooking whether students have the specific knowledge, habits, and situational opportunities needed to enact concrete conservation behaviors at school and at home. Separating the assessment of broad ecological beliefs from the measurement of specific behavioral outcomes aligns with systematic reviews and meta-analyses showing that environmental education produces heterogeneous effects across cognitive, affective, and behavioral domains (Ardoin et al., 2020; Hu et al., 2025; Van De Wetering et al., 2022). It also reinforces conservation and intervention syntheses emphasizing that behavioral outcomes require deliberate, domain-appropriate measurement rather than indirect inference from attitudinal scores (Ardoin et al., 2020; Lange & Dewitte, 2019; Świątkowski et al., 2024). To test how educational settings and instructional programs support the translation of ecological values into everyday action, future studies should draw on multi-school sampling designs, incorporate direct or repeated behavioral observations alongside behavior-specific attitude and control measures, and apply longitudinal or experimental frameworks modeled in recent school-based research (Kurokawa et al., 2023; Trott, 2020, 2022; Whitburn et al., 2023; Wichmann et al., 2022).

CONCLUSION

Based on the descriptive and correlational analyses, this study concludes that Grade V students in the two participating Purwakarta elementary schools endorsed relatively high ecological-worldview scores and moderate-to-high self-reported pro-environmental behavior scores overall, without evidence of a pronounced ceiling effect on either measure. However, the primary monotonic association between ecological worldview and self-reported pro-environmental behavior was negligible and statistically uncertain, so the primary hypothesis predicting a positive relationship was not supported in this sample. Exploratory school-specific analyses showed numerical differences in mean scores and correlation estimates between the Adiwiyata and non-Adiwiyata schools, but the wide confidence intervals crossing zero and the single-school-per-context design provide no statistical basis for inferring school-level moderation or an Adiwiyata program effect. Within the boundaries of a cross-sectional self-report study across two schools, these findings indicate that holding a favorable broad ecological worldview does not necessarily correspond with higher reported frequencies of everyday pro-environmental actions among upper-elementary students. Consequently, elementary environmental-education assessment should evaluate broad ecological beliefs and concrete behavioral outcomes separately rather than treating general worldview scores as a direct proxy for student behavior.

RECOMMENDATION

Several methodological barriers constrain the generalizability of the current findings, including the cross-sectional design that precludes causal inference, the reliance on self-reported behavioral frequencies without observational verification, the absence of factor-analytic construct validation, and the purposive sample of only two schools that prevents multilevel analysis of school contexts. To address these barriers, future research should employ longitudinal or experimental designs capable of tracking temporal development and testing causal mechanisms linking children's environmental beliefs to action. Methodologically, subsequent investigations are encouraged to combine self-report scales with direct behavioral observations, school-record indicators, or structured behavioral tasks, and to validate child-adapted instruments using larger samples. Furthermore, evaluating contextual influences such as the Adiwiyata program requires sampling multiple schools within each certification category to support hierarchical modeling. Finally, to clarify the conditions under which environmental beliefs translate into everyday action, future studies should explicitly measure behavior-specific attitudes, perceived behavioral control, school facilities, and family socialization practices.

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AUTHOR CONTRIBUTIONS STATEMENT

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Nenden P. Hikmatunisa	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Muhammad B. Adisetyo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Hisny Fajrussalam	✓	✓		✓			✓			✓		✓	✓	

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Authors state no conflict of interest.

INFORMED CONSENT

Participating students were informed about the purpose and classroom procedures of the questionnaire prior to participation, and all responses were recorded anonymously using student codes. As disclosed in the Method section, written parent or guardian informed consent was not obtained during the original data-collection procedure, and no retrospective consent is claimed.

ETHICAL APPROVAL

Formal institutional permission to conduct the classroom survey was obtained from the principals of SDN Ciwangi and SDN 1 Munjul Jaya prior to data collection, and all analytic records were maintained in anonymized form using student codes to protect participant privacy.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, N.P.H., upon reasonable request.

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