



Relationship between Environmental Values and Pro-Environmental Behavior of College Students: A Chain Mediation Model

Yuan-Yuan Yan¹, Jian-Hao Huang^{2*}

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ABSTRACT

Purpose: The research explores the influence of environmental values on the pro-environmental behaviors of college students. **Method:** A valid sample of 461 Chinese college students was evaluated by adopting an environmental values scale, a new ecological paradigm scale, an environmental responsibility scale, and a pro-environmental behavior scale. **Findings:** The results revealed that environmental values have a significant positive impact on pro-environmental behaviors, while both the new ecological paradigm and environmental responsibility play a partial mediating role in the relationship between environmental values and pro-environmental behaviors and exercise a mediating chain effect on the relationship between environmental values and pro-environmental behaviors.

Implications for Research and Practice: The results offer valuable insights for studying the influence of college students' environmental values on their pro-environmental behaviors and provide environmental education in colleges with specific practical suggestions to improve the pro-environmental behaviors of college students.

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¹ Dhurakij Pundit University, Bangkok, Thailand; Weinan Normal University, Weinan, China.
ORCID: 0000-0002-3025-6774

² Dhurakij Pundit University, Bangkok, Thailand; ORCID: 0000-0002-8059-7657

* Corresponding authors: Jian-Hao Huang, Dhurakij Pundit University, Bangkok, Thailand.

Email: jianhao.hua@dpu.ac.th

Introduction

Pro-environmental behaviors generally refer to environmental-friendly behaviors or environmental behaviors. They are defined by [Stem \(2000\)](#) as human activities manifested or shaped by people intending to protect the environment or prevent environmental degradation. The interaction between the environment and human behaviors triggers the reflection of modern people on the relationship between humans and the ecological environment, making studying pro-environmental behaviors and their driving factors a crucial research project for scholars ([Wu et al., 2012](#)). The present research primarily focuses on the pro-environmental behaviors of college students.

[Stern \(2000\)](#) pointed out that values, especially environmental values, are the fundamental views of people about the relationship between external things and themselves, which affect their beliefs and then regulate pro-environmental behaviors by influencing personal norms, and environmental values, thereby playing a crucial role in the formation of these behaviors. [Stem et al. \(1999\)](#) claimed that values, especially ecosphere and philanthropic values, significantly and positively affect pro-environmental behaviors in the private sector.

The “new ecological paradigm” reported by [Dunalip & Van Liere \(1978\)](#) has been widely used as a measurement standard for environmental benefits. [Dunlap \(1980\)](#) believed that if the value orientation of the whole society does not shift to the new ecological paradigm, we will not be able to solve environmental problems. [Stem & Dietz \(1994\)](#) stated that the new ecological paradigm, an internal cognitive structure and ecological worldview affecting people’s more specific beliefs, attitudes, norms, behavioral intentions, and behaviors, is similar to environmental values in connotation.

The relationship between environmental responsibility, behavioral intention, and environmental behaviors has been studied. A strong connection exists between individual environmental responsibility and environmental behaviors; namely, the stronger the responsibility for environmental responsibility and improvement of environmental quality is, the larger the possibility of implementing environmental behaviors ([J. M. Hines et al., 1987](#); [Van Liere & Dunlap, 1978](#)). [Hsu & Roth \(1999\)](#) believed that environmental responsibility, environmental, behavioral strategy, and control source are the best variables for predicting environmentally responsible behaviors. In other words, environmental responsibility predicts pro-environmental behaviors.

The statements mentioned above have clarified the impact that environmental values new ecological paradigms, and environmental responsibility have on pro-environmental behaviors and their significance as predetermined variables of the willingness to form pro-environmental behaviors ([Uygur et al., 2017](#)). Researchers have also indicated that values and pro-environmental behaviors are not directly related, and a mediation variable exists between values and pro-environmental behaviors ([Dunlap et al., 2000](#); [Wesley, 2001](#)). [Heidemann and Khalil \(1980\)](#) pointed out that values indirectly influence an individual’s behaviors, and variables such as attitude and responsibility play a mediating role in the relationship between them. [Stern et al. \(1995\)](#) argued that the new ecological paradigm is a universal environmental belief or a “folk ecology” mediating variable between environmental values and pro-environmental behaviors. [Vargas-Rodriguez et al. \(2005\)](#) reported that

in university students, environmental values influence their pro-environmental behaviors through the new ecological paradigm and environmental responsibility in the case of measuring these behaviors. In other words, the new ecological paradigm and environmental responsibility have an intermediary chain effect on the relationship between environmental values and university students' pro-environmental behaviors (Miller & Amos, 2017).

To this end, a chain mediating effect model was built in this study with a new ecological paradigm and environmental responsibility employed as mediating variables for exploring the impact of environmental values on pro-environmental behaviors. Meanwhile, empirical evidence has been provided for environmental values to determine the mediating mechanism that affects pro-environmental behaviors and to promote research in the field of pro-environmental behaviors. This study intends to cultivate positive environmental values in college students and guide them to realize the vital role of the new ecological paradigm as personal beliefs, establish correct ideas, and form positive environmental behaviors.

Literature Review

Environmental Value and Pro-Environmental Behaviors

According to Schultz & Zelezny (1998), values are the cognition, understanding, judgment, or choice people make based on their thoughts and senses. Stern & Dietz (1994) introduced this theory into the study of pro-environmental behaviors and proposed that pro-environmental behaviors can also be regarded as pro-social behaviors activated by some internal values. Individuals who blame themselves for environmental damage tend to present pro-environmental behaviors.

Schultz & Zelezny (1998) found that ecological values significantly and positively affect the environmental behaviors of university students in many countries. Stern et al. (1999) further reported that values that care about the happiness and interests of others (altruistic values) are only one of those values endowed with the potential effect on environmental care and pro-environmental behaviors. There are two other values: caring about self-interests and the interests of the entire ecosphere. Stern et al. (1999) found that ecological values positively impact pro-environmental behaviors. Xu (2008) observed that people with ecosphere values exhibit more pro-environmental behaviors. Therefore, the first hypothesis can be proposed as follows: H1: Environmental values significantly positively affect pro-environmental behaviors.

New Ecological Paradigm Plays a Mediating role in the Relationship between Environmental Values and Pro-Environmental Behaviors

The new ecological paradigm is a widely used measurement standard for environmental benefits (Dunlap & Van Liere, 1978). Dunlap et al. (2000) believed that the view of ecological balance, anthropocentrism, human exceptionalism, ecological crisis, and growth limit should all be covered in the new environmental paradigm and that the wording and specific content are more reasonable. According to Stern & Dietz (1994), the new ecological paradigm is related to the fundamental values of individuals and should be determined based on their core value orientation. Another empirical research found that the new ecological paradigm positively impacts altruistic and ecosphere values (Schultz &

Zelezny, 1998; P. C. Stern & Dietz, 1994; Wesley, 2001). A new ecological paradigm has been widely used to explain many specific environmental-friendly behaviors in the private or public sector, such as green consumer behaviors, biodiversity conservation, tourism behaviors, sustainability behaviors, and policies supporting a friendly environment (Rideout et al., 2005; Wesley, 2001; Wüdegren, 1998). The new ecological paradigm positively affects pro-environmental behaviors (Derdowski et al., 2020).

The relationship between environmental values and pro-environmental behaviors is not direct, and a variable mediates this relationship (Dunlap et al., 2000; Wesley, 2001). Edgell (1989) found that the new ecological paradigm is the mediator in the abovementioned relationship. Vargas-Rodriguez et al. (2005) indicated that environmental values influence university students' pro-environmental behaviors through the new ecological paradigm while measuring these behaviors. The new environmental paradigm has been fully recognized and widely used to test the relationship between personal values, attitudes, beliefs, and environmental-friendly behaviors (Liu et al., 2018). Therefore, the second hypothesis can be proposed as follows: H2: The new ecological paradigm mediating the relationship between environmental values and pro-environmental behaviors.

Environmental Responsibility Plays a Mediating Role in the Relationship between Environmental Values and Pro-Environmental Behaviors

Schwartz (1977) reported that a person's awareness of the consequences of actions depends on their ecological worldview, which also determines their responsibility attribution for actions. In other words, the higher an individual believes in the new ecological paradigm, the stronger their awareness of environmental responsibility will be. In an empirical study, Hines (1980) found that environmental responsibility significantly affects pro-environmental behaviors and that responsibility awareness is a crucial indicator of behavioral intentions. Tan (2011) showed that individuals aware of the impact of environmental issues are more likely to engage in pro-environmental behaviors if they have a sense of responsibility.

Some researchers have studied the relationship between environmental responsibility, behavioral intention, and environmental behaviors. They found a strong connection between individual environmental responsibility and environmental behaviors. The stronger the responsibility for environmental responsibility and improvement of environmental quality, the larger the possibility of implementing environmental behaviors. Responsibility for the environment is more likely to be engaged in environmentally responsible behaviors (J. M. Hines et al., 1987; Van Liere & Dunlap, 1978). Rahman (2016) stated that personal values drive environmental responsibility, which drives people's environmental protection behaviors. Therefore, the third hypothesis can be proposed as follows: H3: Environmental responsibility mediates the relationship between the new ecological paradigm and students' pro-environmental behaviors.

The Chain Mediation Role of the New Ecological Paradigm and Environmental Responsibility in Environmental Values and University Students' Pro-Environmental Behaviors

In an empirical study, Liu et al. (2018) confirmed that a new ecological paradigm can predict environmental responsibility. Environmental attitudes influence pro-environmental behaviors, environmental responsibility, perceived behavioral control,

and environmentally behavioral intentions (Kaiser & Gutscher, 2003). Environmental responsibility is influenced by multiple factors such as values, personal preferences, and beliefs (Feola et al., 2015). All these perspectives suggest that pro-environmental behaviors are directly or indirectly influenced by new ecological paradigms, environmental responsibility, environmental values, etc.

Stern (1977) proposed the related concepts of the Value Belief Norm (VBN) theory and concluded that personal values determine beliefs that drive people’s environmental protection behaviors. Steg et al. (2005) further indicated that a person’s values depend on their ecological worldview and choose a person’s self-responsibility, thereby leading to their pro-environmental behaviors. The normative theory of value beliefs is the theoretical basis of this research. Herein considering environmental values as values, the new ecological paradigm as an ecological worldview, and environmental responsibility as the attribution of self-responsibility, pro-environmental behaviors were determined. In other words, the new ecological paradigm and environmental responsibility may function as a chain intermediary variable in the relationship between environmental values and university students’ pro-environmental behaviors. Stern et al. (1999) pointed out that environmental values, new ecological paradigms, and environmental responsibility are all motivational mechanisms promoting the occurrence of pro-environmental behaviors (P. C. Stern et al., 1999). Therefore, the fourth hypothesis can be proposed as follows: H4: the new ecological paradigm and environmental responsibility have a chain mediation role in environmental values and university students’ pro-environment behaviors.

Methodology

Research Design

The research framework was proposed based on the previous hypotheses (Figure 1).

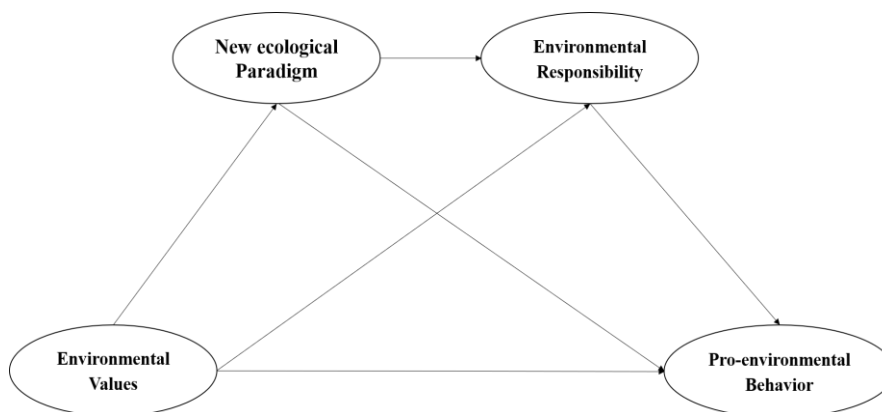


Figure1. Research Framework

Research Object

The questionnaire survey method was adopted, with students at three universities in China included as the research sample. The measurement and examination were conducted using four research tools: the environmental values scale, new ecological paradigm scale, environmental responsibility scale, and pro-environmental behavior scale.

The study determined adequate data using SPSS software for data processing and statistical analysis. The structural equation model was established using AMOS for confirmatory factor analysis (CFA) and mediation model analysis.

Research Tools

A total of four scales were used in the questionnaire design of this study, including the environmental values scale with three dimensions (egoistic value, altruistic value, and ecological value) new environmental paradigm scale with five dimensions (carrying capacity, anti-anthropocentrism, the fragility of the natural balance, anti-human exception theory, and possibility of ecological risks), environmental responsibility scale consisting of one dimension, and pro-environmental behavior scale with two dimensions (public field and private field).

Environmental Values Scale

The environmental values scale, prepared by Xu (2008) and adapted from the environmental values scale revised by Stem & Dietz (1994), was adopted in this study. It consists of 12 items and three dimensions, namely egoistic values, altruistic values, and ecosphere values. Each subscale contains 4 specific items. We adopted a Likert five-point scoring method from "very unimportant" (scoring 1 point) to "essential" (scoring 5 points). A higher score indicates a higher degree of the subjects holding this value. The respondents choose the degree they think they fit from a scale of 1 "not important" to 5 "very important." The factor loading of the questions in this study is .554-.976, greater than the reference value of .400 (Guadagnoli & Velicer, 1988), while the Cronbach's value of internal consistency coefficient is .847, more significant than the reference value of .700 (Nunnally & Bernstein, 1978). This indicates that the questionnaire has good reliability and validity. This scale has also been used in many domestic studies with good reliability and validity (Cheng et al., 2012; Machorrinho et al., 2019; Pontiki et al., 2016).

New Ecological Paradigm Scale

The Chinese version of the new ecological paradigm scale, revised by Wu et al. (2012) and adapted from the NEP scale revised by Dunlap et al. (2000), was adopted in this study. The scale consists of five dimensions: the Earth's carrying capacity, anti-anthropocentrism, the vulnerability of the natural balance, anti-human exception theory, and the possibility of ecological crisis. Each dimension has 3 anti-anthropocentric items, and the scale has 15 questions. The Likert five-point scoring method from "totally disagree" (scoring 1 point) to "completely agree" (scoring 5 points) was adopted, with a higher score indicating more concerns from the subjects about the environment. The factor loading of this scale in this study is .532-.778, conforming to the standard of being more significant than .400 as proposed by Guadagnoli & Velicer (1988). The Cronbach's value of internal consistency coefficient is .821, more potent than the reference value of .700 (Nunnally & Bernstein, 1978). This indicates the excellent reliability and validity of the questionnaire. The 15 questions on the scale were coded and ranked according to their respective dimensions.

Environmental Responsibility Scale

Hsu & Roth's (1999) 4-item single-dimensional scale of environmental responsibility was adopted in this study for measuring environmental responsibility. The Likert five-point scoring method from "very unimportant" (scoring 1 point) to "very important"

(scoring 5 points) was adopted. The internal consistency coefficient of the scale is .820, and the factor loading of the scale is between .931 and .956, conforming to the standard of being more significant than .400, as Guadagnoli & Velicer (1988). The Cronbach's α value of the internal consistency coefficient is .821, more effective than the reference value of .700 (Nunnally & Bernstein, 1978). This indicates the excellent reliability and validity of the questionnaire.

Pro-environmental Behavior Scale

The self-rating scale of environmental behaviors in public and private sectors, developed by Gong (2008) and adapted from the scale of pro-environment behaviors developed by Schultz & Zelezny (1998), was adopted in this study. The scale includes two dimensions of pro-environmental behaviors, namely public and private fields, with 12 items. The participants were asked to recall whether they had engaged in the past year's behaviors listed on the scale. The behavior frequency was marked from "never" (scoring 1 point) to "often" (scoring 5 points) using the Likert five-point scoring method, with a higher score indicating a higher frequency of pro-environmental behaviors. Respondents choose the degree to which they think they fit from a scale of 1 "not important" to 5 "very important" while using the Likert five-point scoring method. The factor loading of the items in this study is .513 to .741, more significant than the reference value of .400 (Guadagnoli & Velicer, 1988), and the Cronbach's α value of internal consistency coefficient is .847, more important than the reference value of .700 (Nunnally & Bernstein, 1978). This indicates good reliability and validity of the questionnaire, and so this scale has been widely used in many studies (Liao et al., 2016; Rong et al., 2016; Wang et al., 2016)

Statistical Analysis Method

The collected data were analyzed, including descriptive statistics and correlation analysis, using SPSS software. AMOS software was used for confirmatory factor analysis and SEM data analysis. The test criterion of α lower than 0.05 was adopted.

Results

Description of Research Objects

A total of 461 Chinese college students were tested as valid samples. The basic information of these students covers three background variables set in this study, namely their gender, major, and origin. Regarding gender distribution, 137 male and 324 female students accounted for 29.72% and 70.28%, respectively. Regarding major distribution, 388 students majored in liberal arts and 73 in science majors, accounting for 84.16% and 15.84%, respectively. Regarding origin, 155 and 306 students were from urban and rural areas, accounting for 33.62% and 66.38%, respectively.

Common Method Variance Test

To assess the variance problem of the common method, common method variance (CMV) was validated using Harman's One-Factor Test. The test results on the not rotated component matrix showed a Kaiser-Meyer-Olkin (KMO) value of 0.943 (>0.8) and a significant ($p < 0.001$) Bartlett test of sphericity. A total of nine factors were analyzed, and the explanatory force of the first factor was 14.965%, not exceeding the critical value of 50% (Podsakoff et al., 2012). This indicated that the CMV problem in this study was not

noticeable. Therefore, the data collected in this study do not have the common problem of method variation and can be further analyzed.

Variable Descriptive Statistics and Correlation Analysis

The mean and standard deviation of each variable (see Table 1) were as follows: pro-environment behaviors (M = 3.677, SD = 1.032), new ecological paradigm (M = 3.463, SD = 1.128), environmental values (M = 3.003, SD = 1.112), and environmental responsibility (M = 4.416, SD = 0.799). All four scales are 5-point scales. The findings showed that each variable was at the upper-middle performance level, and a significantly positive correlation existed among all the study variables. The correlation coefficient of each variable was between 0.175 and 0.294, smaller than 0.8. This indicated no serious collinearity among them (Lee Rodgers & Nicewander, 1988).

Table 1

Descriptive Statistics and Correlation Analysis.

Variable	M	SD	Environmental Values	New Ecological Paradigm	Environmental Responsibility	Pro-environment Behavior
Environmental Values	3.003	1.112	1			
New Ecological Paradigm	3.463	1.128	0.102*	1		
Environmental Responsibility	4.416	0.799	0.294**	0.220**	1	
Pro-environment Behavior	3.677	1.032	0.205**	0.175**	0.220**	1

Note : *p<0.05, **p<0.01

Confirmatory factor analysis

This study performed a confirmatory factor analysis (CFA) to test the fitness of each scale structure of the study data. The soundness of the overall model was estimated using multiple indicators. The CMIN/DF value was 1.375, less than the reference value of 5, and GFI, NFI, IFI, and CFI were all greater than the reference value of .900 (Hair et al., 2010). RMR was .024, less than .080, and RMSEA was .029, less than the reference value of .080 (Hu & Bentler, 1999). This indicated the good fitting performance of the model. (see Table 2).

Table 2

Fitting performance of the confirmatory factor analysis model

Fitting test index	Criteria of fitness	Data of test	Model fitness
CMIN/DF	< 5	1.375	Fit
RMSEA	< .08	0.029	Fit
RMR	< .08	0.024	Fit
GFI	> .90	0.970	Fit
CFI	> .90	0.991	Fit
IFI	> .90	0.991	Fit
PNFI	> .50	0.756	Fit

Data source: this study.

Structural equation model analysis

According to this paper's research theory and research hypothesis, the influence relationship model among variables was built, as shown in Figure 2.

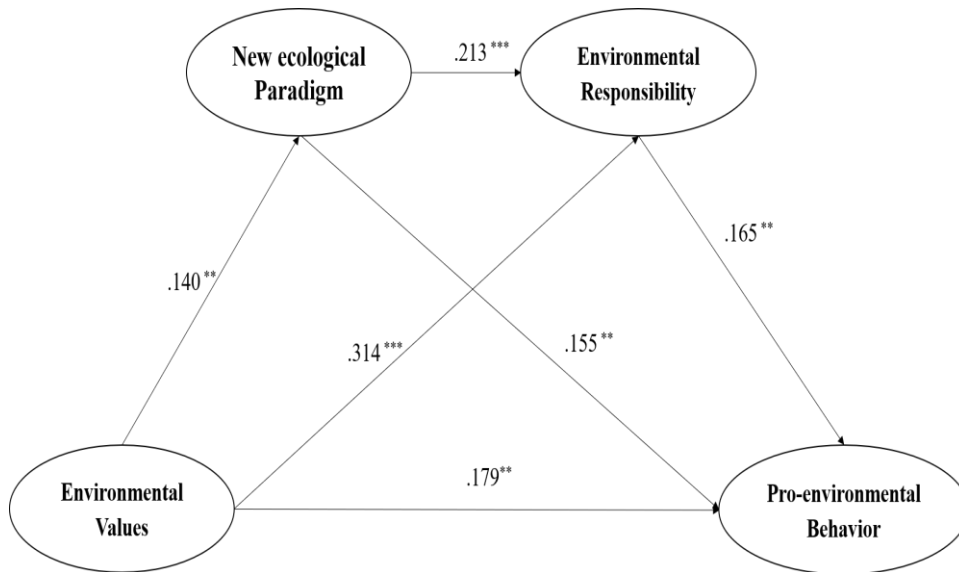


Figure 2. Roadmap of the Mediation Model

Standardized path coefficient of the model

This study used AMOS software to perform structural equation modeling on the collected data, and the running results were collated and analyzed. The influence coefficient of environmental values on the standardized path of the new ecological paradigm was 0.140 ($\beta = 2.534$, $p < 0.01$), reaching a significance level and indicating the significant positive influence of environmental values on the new ecological paradigm. The standardized path coefficient of environmental values on environmental responsibility was 0.314 ($\beta = 5.856$, $p < 0.001$), reaching a significance level and indicating the significant positive influence of environmental values on environmental responsibility. The standardized path influence coefficient of environmental values on pro-environmental behaviors was 0.179 ($\beta = 4.194$, $p < 0.01$), reaching a significance level and indicating the significant positive influence of environmental values on pro-environmental behaviors. The standardized path influence coefficient of the new ecological paradigm on environmental responsibility was 0.213 ($\beta = 2.793$, $p < 0.001$), reaching a significance level and indicating the significant positive influence of the new ecological paradigm on environmental responsibility. The standardized path influence coefficient of the new ecological paradigm on pro-environment behaviors was 0.155 ($\beta = 2.588$, $p < 0.01$), reaching a significance level and indicating the significant positive influence of the new ecological paradigm on pro-environment behaviors. The standardized path influence coefficient of environmental responsibility on pro-environmental behaviors was 0.165 ($\beta = 2.65$, $p < 0.01$), reaching a significance level and indicating the significant positive influence of environmental responsibility on pro-environmental behaviors. As shown in Table 3.

Table 3*Standardized path coefficient of the model*

Path	Standardized path coefficient	S. E.	C. R.
Environmental Values → New ecological Paradigm	0.140**	0.034	2.534
Environmental Values→ Environmental Responsibility	0.314***	0.053	5.856
New Ecological Paradigm → Environmental Responsibility	0.213***	0.082	4.194
Environmental Values → Pro-environmental Behavior	0.179**	0.044	2.793
New Ecological Paradigm→ Pro-environmental Behavior	0.155**	0.068	2.588
Environmental Responsibility→ Pro-environmental Behavior	0.165**	0.044	2.65

Note : *p<0.05, **p<0.01, ***p<0.001

Mediation Effect Bootstrap Test Analysis

According to Barnes-Holmes and Roche (2001), the bootstrapping method can be used to test the stability of mediation models. Based on this evidence, the present study set the sample size to 5000 in AMOS and defined a 95% confidence interval for the nonparametric percentile of bias correction. During the analysis, a mediating effect existed for a confidence interval not containing a 0, and no mediating effect was observed if 0 was included. According to the results, the total indirect effect of the new ecological paradigm and environmental responsibility was 0.078, indicating that the new ecological paradigm and environmental responsibility have a significant mediating effect on environmental values and pro-environmental behaviors, with three indirect effects involved. The first indirect impact was environmental values→ new ecological paradigms, → pro-environmental behaviors; the path effect value of which was 0.022 and the confidence interval was (0.003, 0.058), excluding 0, and this proved that the new ecological paradigm mediated the relationship between environmental values and pro-environmental behaviors and verified H2. The second impact was environmental values→ environmental responsibility→ pro-environmental behaviors, with a path effect value of 0.052 and a confidence interval of (0.005, 0.104), excluding 0. This proved the intermediary effect of environmental responsibility on the relationship between environmental values and pro-environmental behaviors and validated H3. The third impact was a new ecological paradigm → environmental values→ environmental responsibility→ pro-environmental behaviors, with a path effect value of 0.005 and a confidence interval of (0.001, 0.015), excluding 0. This proved the mediating chain effect of the new ecological paradigm and environmental responsibility on environmental values and pro-environmental behaviors and verified H4. The path effect value of the direct impact was 0.179, and the confidence interval was (0.008, 0.329), excluding 0, which proved the partial mediating role of the new ecological paradigm and environmental responsibility in environmental values pro-environmental behaviors. As shown in Table 4.

Table 4*Mediation Effect Bootstrap Test Analysis*

Path	Effect	S. E.	95% LLCI	95% ULCI
Direct effect	0.179	0.083	0.008	0.329
Total Indirect effect	0.078	0.029	0.024	0.138
Indirect effect 1	0.022	0.013	0.003	0.058
Indirect effect 2	0.052	0.024	0.005	0.104
Indirect effect 3	0.005	0.003	0.001	0.015

Note: Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

Discussion

According to H1, the study results suggested that environmental values significantly positively affect pro-environmental behaviors. Consistent with previous findings, the improvement in environmental values is closely related to the improvement in environmental-friendly behaviors (Schultz & Zelezny, 1998; P. C. Stern & Dietz, 1994; Wesley, 2001). Stern et al. (1995) reported that different environmental values affect an individual's willingness to protect the environment. In other words, individuals with higher environmental values are more likely to present pro-environmental behaviors. In contrast, those with lower environmental values are less likely to engage in pro-environmental behaviors. In this study, this positive relationship has been confirmed in the context of a college education since environmental education for college students has always been a critical issue in society. Universities are effective places for environmental education, and the environmental values of college students are in the transition period from school education to social education. The higher the environmental importance of college students, the more likely they are to engage in pro-environment behaviors.

In terms of H2, this study found that the new ecological paradigm mediates the relationship between environmental values and pro-environmental behaviors of college students, which is consistent with the findings of Schultz and colleagues (Schultz et al., 2005; Schultz & Zelezny, 1999; Schultz & Zelezny, 1998). A possible reason is that the new ecological paradigm is an intrinsic cognitive structure and is more likely to significantly impact the individual's values when external information conforms to one's worldview thereby influencing pro-environmental behaviors (Dunlap et al., 2000). Therefore, the higher the environmental value of college students is, the more inclined they are to have a positive attitude toward the new ecological paradigm, and the more likely they are to exhibit pro-environmental behaviors (Muhammad Talha et al., 2022).

In terms of H3, this study confirmed the partial mediating role of environmental responsibility in the relationship between environmental values and pro-environmental behaviors. The findings suggested that environmental responsibility does play a mediating role in the relationship between environmental values and pro-environmental behaviors, which is consistent with the results of Hsu & Roth (1999). This is because environmental responsibility, as a social ethic and code of conduct, promotes the emergence of pro-environmental behaviors (Rahman, 2016). The higher the level of belief in the new ecological paradigm among college students is, the more inclined they are to have a positive attitude toward environmental responsibility and the more likely they are to exhibit pro-environmental behaviors.

According to H4, this study also found that the new ecological paradigm and environmental responsibility play a significant chain mediating role in the relationship between environmental values and the environmental-friendly behaviors of college students, which is consistent with the results of previous studies. For example, Stern et al. (1999) explicitly mentioned that environmental values, new ecological paradigms, and environmental responsibility are all incentive mechanisms for promoting environmental-friendly behaviors. In addition, studies similar to empirical findings have confirmed that environmental values influence environmental-friendly behaviors through a new ecological paradigm (Edgell & Nowell, 1989), while the new ecological paradigm influences environmental-friendly behaviors through environmental responsibility (Feola et al., 2015). These findings can also indirectly illustrate the existence of a chain-intermediating effect. The reason is that college students environmental values depend on their ecological worldview and environmental responsibility. Higher environmental values indicate that college students are more likely to exhibit pro-environmental behaviors. College students receive an excellent environmental education at university and have a better sense of environmental values, ecological worldview, and environmental responsibility, which will actively promote the occurrence of pro-environmental behaviors.

Conclusion

From the perspective of the mediating role of the new ecological paradigm and environmental responsibility, this study revealed the significance of environmental values in promoting college students' pro-environmental behaviors. Specifically, the following conclusions can be drawn. First, the environmental values of college students have a significantly positive predictive effect on their pro-environmental behaviors. Second, the new ecological paradigm of college students mediates the relationship between environmental values and pro-environmental behaviors. Third, the environmental responsibility of college students partially mediates the relationship between their environmental values and pro-environmental behaviors. Finally, the new ecological paradigm and environmental responsibility have a mediating chain effect on the relationship between environmental values and pro-environmental behaviors.

Recommendations

The study results also provide some practical advice. First, environmental values significantly positively impact college students' environmental behaviors. Education administrators can solve this problem in various ways, such as organizing regular courses on environmental value theory, monitoring college students' environmental behaviors, and linking universities' teaching to specific environmental behaviors. College education administrators should regularly conduct satisfaction surveys with teachers on the environmental protection behaviors of college students, find out the causes of deficiencies, and keep striving for further improvement.

Second, the new ecological paradigm, an ecological worldview, and a universal view of the relationship between man and nature, including views of environmental balance, anthropocentrism, human exceptionalism, ecological crises, and growth limits (Dunlap et al., 2000), partially mediate between environmental values and the pro-environmental behaviors of college students. To this end, cultivating a correct ecological worldview is essential. Especially in the environmental education of colleges and universities, college

education administrators should strengthen positive education and provide correct guidance about the new ecological paradigm to college students. Teachers, as educational administrators, should pay attention to the performance and causes of the ecological worldview in the teaching process, target guidance and intervention, and minimize the lack of pro-environmental behaviors caused by incorrect new ecological paradigm beliefs.

Third, the study results also showed that environmental responsibility partially mediates the relationship between environmental values and the pro-environmental behaviors of university students, making it highly crucial to raise awareness about environmental responsibility among college students. Education managers can conduct environmental responsibility education for college students from various aspects such as law, ethics, and employment, thus enhancing their awareness of environmental responsibility. This would make students more aware that environmental responsibility is closely related to their future personal development and progress.

Finally, the study results showed that the new ecological paradigm and environmental responsibility play a significant chain mediating role in the relationship between environmental values and the environmental-friendly behaviors of college students. In this case, university administrators should promote better awareness of new ecological paradigms and environmental responsibilities among college students to ensure that they have the correct environmental values and thus improve their pro-environmental behaviors. The chain mediation model developed in this study does have specific practical contributions.

Limitations

The study has some limitations. First, only convenient sampling was adopted in the present study, and the sampling method can be enriched in future studies to improve statistical capabilities. Second, this study only discussed the new ecological paradigm and environmental responsibility as mediating variables in the relationship between environmental values and the pro-environmental behaviors of college students. Whether additional mediating variables influence this process or other variables regulate the intermediary variables remains to be explored in future research. Finally, this is a cross-sectional study, so the study results only confirm the relationship among the variables at that time. Future longitudinal studies can help further understand the dynamic process of changes in the relationship among variables.

Conflict of Interest

The authors declare that the research was conducted without any commercial or financial relationships construed as a potential conflict of interest.

Authorship Contributions

Yan: Conceptualization, design, data acquisition, statistical analysis / interpretation, writing; **Huang:** Editing / reviewing, supervision, final approval.

Conflict of Interests

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.

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17GJHZ27 research on talent training model of local university art education internationalization development

Data Availability Statement

All data generated and analyzed during this study are included in this article.

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