

The Mediating Role of Basic Psychological Needs Fulfillment in the Relationship Between Natural Connection and Pro-environmental Behavior Among High School Students

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Abstract: ***Objective:** To investigate the influence of high school students' connection to nature on pro-environmental behaviour and the mediating role of basic psychological needs fulfilment. **Methods:** Employing cluster random sampling, a questionnaire survey was conducted among 601 students at a senior high school in Maoming City. Measurements were taken using the Connection to Nature Scale, Basic Psychological Needs Fulfilment Scale, and Pro-Environmental Behaviour Scale. Pearson correlation analysis and the Bootstrap method via the Process macro were utilised to test the mediating effect. **Results:** Significant positive correlations were found between natural connectedness, basic psychological needs fulfilment, and pro-environmental behaviour ($p < 0.01$). Basic psychological needs fulfilment partially mediated the relationship between natural connectedness and pro-environmental behaviour, accounting for 44.83% of the total effect. The findings indicate that natural connectedness among secondary school students not only directly influences behavioural choices but also enhances pro-environmental behaviour levels by satisfying fundamental psychological needs such as autonomy, competence, and relatedness. This research provides theoretical support for understanding the psychological mechanisms underlying adolescents' pro-environmental behaviour and offers practical recommendations for environmental education curriculum design.*

Keywords: Natural Connectedness, Pro-Environmental Behavior, Basic Psychological Needs Satisfaction, High School Students.

1. Introduction

Against the backdrop of increasingly severe global environmental issues such as climate change and biodiversity loss, effectively promoting pro-environmental behavior has become a research hotspot in interdisciplinary fields including psychology, environmental science, and sociology. Traditional intervention approaches, such as policies, regulations, and economic incentives, although effective to some extent, often address symptoms rather than root causes and struggle to inspire sustained and self-driven environmental actions. Within this context, psychological research is gradually shifting its focus from external interventions to exploring internal motivations, emphasizing the core role of individuals' emotional connection to nature and internal psychological processes in driving pro-environmental behavior.

Nature connectedness refers to an individual's sense of unity and belonging with the natural world in terms of emotion, cognition, and experience [1]. Studies have shown that individuals with higher levels of nature connectedness tend to be more concerned about environmental protection and exhibit more pro-environmental behaviors in their daily lives [2]. High school students are in a critical period of forming values and behavioral habits; their attitudes and behaviors toward the natural environment not only impact current ecological conservation but may also shape future societal patterns of sustainable development. According to Self-Determination Theory, individuals have three basic psychological needs: autonomy, competence, and relatedness. When these needs are satisfied in daily life, individuals are more likely to engage proactively and consistently in

pro-environmental behaviors [3]. Nature contact and nature connectedness may further promote the emergence of pro-environmental behavior by enhancing individuals' sense of psychological need satisfaction.

Although prior research supports the positive relationship between nature connectedness and pro-environmental behavior [2], empirical evidence focusing specifically on high school students remains relatively scarce. Furthermore, existing literature predominantly examines direct correlations, with insufficient exploration of the underlying mediating mechanisms. The specific pathway through which the satisfaction of basic psychological needs operates is particularly unclear. Given the distinctive psychological developmental characteristics of high school students, who are often under academic pressure and significant social influence, investigating how nature connectedness indirectly influences their pro-environmental behavior via basic psychological need satisfaction is warranted. Such an investigation would not only deepen the understanding of the environmental psychological mechanisms in adolescents but could also provide a theoretical basis for designing environmental education curricula.

In summary, this study aims to examine the relationship between nature connectedness and pro-environmental behavior among high school students, as well as its underlying mechanism, with a specific focus on analyzing the mediating role of basic psychological need satisfaction in this relationship (as shown in Figure 1). By revealing the psychological pathway through which nature connectedness influences pro-environmental behavior, this research seeks to provide both theoretical support and practical implications for promoting positive environmental behaviors among

adolescents.

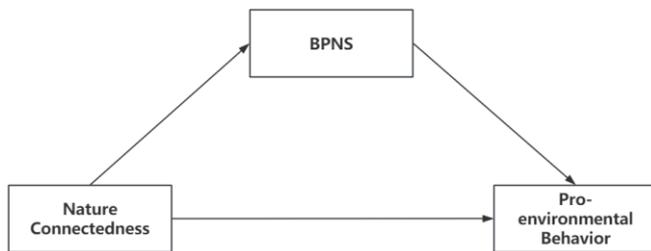


Figure 1: The Mediation Model

Note: BPNS: Basic Psychological Need Satisfaction

2. Participants and Methods

2.1 Participants

This study employed a cluster random sampling method, recruiting high school students from a secondary school in Maoming City. A total of 610 questionnaires were distributed. After screening, 9 invalid questionnaires (due to incomplete responses or obvious patterned answering) were excluded, resulting in 601 valid questionnaires and a valid response rate of 98.5%. The sample consisted of 333 male students (55.4%) and 268 female students (44.6%). Prior to the survey, informed consent was obtained from both the school and the students. The questionnaires were completed anonymously, strictly adhering to research ethics and protecting personal privacy.

2.2 Measures

2.2.1 Nature Connectedness Scale

The Nature Connectedness Scale (NCS), revised by Li Na and Wu Jianping [4], was used to assess participants' level of nature connectedness. This scale consists of 14 items and employs a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree". A higher total score indicates a greater level of nature connectedness. In this study, the Cronbach's α coefficient for this scale was 0.803.

2.2.2 Basic Psychological Need Satisfaction Scale

The Basic Psychological Need Satisfaction and Frustration Scale, revised by Liu Xin et al. [5], was used for measurement, specifically its psychological need satisfaction subscale. This subscale consists of 12 items distributed across three dimensions: competence need satisfaction, autonomy need satisfaction, and relatedness need satisfaction, with 4 items per dimension. Responses were recorded on a 5-point Likert scale, where 1 indicates "completely inconsistent" and 5 indicates "completely consistent". Higher scores indicate a greater level of psychological need satisfaction. In this study, the Cronbach's α coefficient for this subscale was 0.947.

2.2.3 Pro-environmental Behavior Scale

Pro-environmental behavior was measured using a scale based on the work of Hunter et al., which consists of 6 items [6]. Responses were recorded on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Higher scores indicate a greater level of pro-environmental behavior engagement. In this study, the Cronbach's α

coefficient for this scale was 0.875.

2.3 Statistical Analysis

Data analysis was conducted using SPSS 26.0. Bivariate relationships among nature connectedness, basic psychological need satisfaction, and pro-environmental behavior were examined using Pearson correlation analysis. The PROCESS macro (version 3.3) was employed to test the significance of the mediating role of basic psychological need satisfaction.

3. Results

3.1 Correlation Analysis Among Nature Connectedness, Basic Psychological Need Satisfaction, and Pro-environmental Behavior

The results of the correlation analysis among nature connectedness, basic psychological need satisfaction, and pro-environmental behavior (see Table 1) indicated that these three variables were positively correlated with each other.

Table 1: Descriptive Statistics and Correlation Analysis for Nature Connectedness, Basic Psychological Need Satisfaction, and Pro-environmental Behavior

Variable	M \pm SD	Nature Connectedness	BPNS	Pro-environmental Behavior
Nature Connectedness	68.78 \pm 9.76	1		
BPNS	66.29 \pm 10.96	0.55**	1	
Pro-environmental Behavior	31.02 \pm 5.92	0.49**	0.55**	1

Note: BPNS: Basic Psychological Need Satisfaction * $p < .05$, ** $p < .01$, *** $p < .001$. The same applies to the tables below.

3.2 Testing the Mediating Effect of Basic Psychological Need Satisfaction

Model 4 in the PROCESS macro (version 3.3) was employed to examine the mediating effect of basic psychological need satisfaction in the relationship between nature connectedness and pro-environmental behavior. The analysis was configured with 5,000 bootstrap samples using the bias-corrected nonparametric percentile method, with a 95% confidence interval [7]. The results of the mediation analysis (see Table 2) indicated that: Nature connectedness significantly and positively predicted pro-environmental behavior ($\beta = 0.49$, * $p < .001$).

Nature connectedness significantly and positively predicted basic psychological need satisfaction ($\beta = 0.55$, * $p < .001$).

After including basic psychological need satisfaction in the regression equation, nature connectedness still significantly and positively predicted pro-environmental behavior ($\beta = 0.26$, * $p < .001$), and basic psychological need satisfaction significantly and positively predicted pro-environmental behavior ($\beta = 0.40$, * $p < .001$).

The analysis of the effect sizes revealed a total effect of 0.29 (95% CI [0.25, 0.34]), a direct effect of 0.16 (95% CI [0.12, 0.21]), and an indirect (mediating) effect of 0.13 (95% CI [0.10, 0.17]). The mediating effect accounted for 44.83% of

the total effect. This indicates that basic psychological need satisfaction plays a partial mediating role in the relationship between nature connectedness and pro-environmental behavior.

Table 2: Test of the Mediating Effect of Basic Psychological Need Satisfaction in the Relationship Between Nature Connectedness and Pro-environmental behavior.

Variable	Pro-environmental Behavior			BPNS			Pro-environmental Behavior		
	β	SE	t	β	SE	t	β	SE	t
Nature Connectedness	0.49	0.02	13.72***	0.55	0.04	16.00***	0.26	0.02	6.81***
BPNS							0.40	0.02	10.30***
R ²	0.23			0.30			0.35		
F	188.25			256.17			163.62		

4. Discussion

This study examined the influence of nature connectedness on pro-environmental behavior among high school students and the mediating role of basic psychological need satisfaction in this relationship. The results revealed that nature connectedness, basic psychological need satisfaction, and pro-environmental behavior were all significantly positively correlated. Nature connectedness was found to directly predict pro-environmental behavior and also indirectly promote it by enhancing basic psychological need satisfaction. The mediating effect accounted for approximately 44.83% of the total effect, indicating that basic psychological need satisfaction plays a significant partial mediating role in the relationship between nature connectedness and pro-environmental behavior.

First, the findings confirm the significant value of nature connectedness in promoting pro-environmental behavior. Nature connectedness reflects an individual's close emotional and cognitive bond with nature, which can enhance their concern for and sense of responsibility towards the environment, thereby making pro-environmental actions more likely. This finding aligns with existing research indicating that individuals with higher levels of nature connectedness demonstrate stronger intentions and behavioral tendencies towards environmental protection [1, 8, 9]. For high school students, school education and living environments may provide frequent contact with nature, potentially fostering a positive sense of nature connectedness in their daily lives, which serves as an important psychological foundation for their pro-environmental behavior.

Second, basic psychological need satisfaction played a significant partial mediating role between nature connectedness and pro-environmental behavior. According to Self-Determination Theory [10], basic psychological needs include autonomy, competence, and relatedness, and satisfying these needs can foster intrinsic motivation and self-integrated behaviors in individuals. The results of this study suggest that nature connectedness can enhance psychological need satisfaction among high school students—for instance, by providing space for autonomous exploration during interactions with nature, fostering a sense of competence through environmental actions, and building

relationships with others who share environmental concerns. When these psychological needs are satisfied, individuals are more likely to perceive pro-environmental behavior as an expression of self-worth and internalize it as a stable habit.

Furthermore, the direct effect of nature connectedness on pro-environmental behavior remained significant after introducing basic psychological need satisfaction as a mediator. This suggests that, beyond its indirect influence through need satisfaction, nature connectedness may also directly influence individuals' environmental attitudes and behavioral decisions. This result implies that when high school students experience a deep emotional connection with nature, they may engage in pro-environmental behavior driven by this affection, even if their psychological needs are not fully satisfied. This aligns with the "emotional affinity hypothesis," which posits that an emotional connection to nature can directly motivate pro-environmental actions [11].

The findings of this study hold practical implications. On one hand, schools and families can enhance students' nature connectedness by increasing opportunities for contact with nature (e.g., outdoor classes, ecological practice activities), thereby boosting their pro-environmental behavior. On the other hand, when designing environmental education activities, emphasis should be placed on satisfying students' needs for autonomy, competence, and relatedness—for example, by offering freedom of choice in participation, providing challenging yet supported tasks, and encouraging teamwork—to foster the development of environmental habits from the level of psychological needs.

However, this study has several limitations. First, the cross-sectional design precludes definitive causal conclusions. Future research could employ longitudinal or experimental designs to further validate the causal pathways between nature connectedness, psychological need satisfaction, and pro-environmental behavior. Second, the sample was drawn from high school students in specific regions, which may limit the generalizability of the findings. Subsequent studies could expand the sample scope to enhance the universality of the results. Furthermore, this study relied primarily on self-report measures, which may be subject to social desirability bias. It is recommended that future studies incorporate behavioral observations or peer-report methods to improve the objectivity of measurements.

5. Conclusion

This study demonstrates that nature connectedness not only directly influences the pro-environmental behavior of high school students but also exerts an indirect effect by enhancing their basic psychological need satisfaction. Future environmental education interventions could consider simultaneously strengthening both nature connectedness and the satisfaction of psychological needs to achieve long-term promotion of pro-environmental behaviors among adolescents.

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