

# Does Family Well-being Enhance Children's Pro-environmental Behaviour? Empirical Study on the Mediating Effect of Natural Connectedness.

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**Abstract:** It is well-known that human behavior is a key factor contributing to environmental degradation, with activities such as excessive waste generation resulting in increased environmental pollution. Therefore, it is crucial to understand and promote ecological behavior among humans. This study aimed to explore how family well-being (FWB) and nature connectedness (NC) affect children's pro-environmental behavior (PEB). A total of 342 children between the ages of 11 and 14 were included in the study. The findings revealed that there is a positive correlation between the family well-being and PEB displayed by the children. Moreover, NC is an influential factor that mediates this relationship. The study provides crucial implications and recommendations for future research considering the family's role in enhancing pro-environmental behavior.

**Keywords:** Family well-being, nature connectedness, pro-environmental behavior, children

## 1. Introduction

With the rapid economic development and urbanization in China, there is a growing concern regarding the escalating environmental issues, including water pollution, global warming, deforestation, energy scarcity, and desertification. Environmental psychologists have been working towards promoting sustainable living by encouraging pro-environmental behavior (PEB), which involves a series of intentional and voluntary actions undertaken to protect and preserve the natural environment [1,2]. However, the majority of research conducted on pro-environmental behavior has primarily concentrated on adults, overlooking the crucial role that children play in the environment conservation [3]. Children are vulnerable to the negative consequences of environmental problems and are also an important target group to achieve sustainable development. Therefore, it is important to study the development process of children's early ecological practice. Additionally, while individual-level factors have been extensively studied, few studies explore how family dynamics impact children's pro-environmental behavior. Given this, we consider it important to explore the factors and mechanisms that play a role in influencing children to adopt pro-environmental behavior within their family context.

### **1.1. Family well-being, nature connectedness, and pro-environmental behavior**

Family well-being (FWB) is a wide-ranging concept encompassing various aspects of an individual or family's living conditions. It can be measured subjectively by individual's perception of their contentment with different kinds of family connections [4]. Overall, family plays an essential role in fostering individual and societal health and well-being [5]. Living in a happy family promotes health and well-being, leading to more pro-social behavior, including pro-environmental behavior and actively engaging in environmental organizations [6]. According to the research conducted by Sulemana [7], it was discovered that individuals who were happier tended to express a greater willingness to engage in activities aimed at environmental protection. However, it is unclear whether and how family well-being improves pro-environmental behavior. Nature connectedness (NC) refers to the extent to which individuals feel an emotional attachment and feeling of belongingness to the natural world [8]. Research has indicated that people who have a stronger NC are more willing to participate in PEB [9]. Individuals with a profound affinity towards nature tend to exhibit a greater interest in preserving natural resources and demonstrate a higher propensity for engaging in pro-environmental actions [10]. It is widely recognized that nature connectedness has a strong correlation with subjective well-being [11]. Individuals who experience higher levels of well-being often have a greater sensitivity and awareness of their environment surroundings, leading to an increased environmental awareness [12]. According to the biophilia hypothesis [13], humans have a natural inclination to connect with nature, and fulfilling this need brings about various benefits to one's well-being [14]. We speculate a happy family can provide people with more activities that are connected to nature. For example, outdoor picnics and camping activities can enhance the emotional connection among family members, and also allow people to better appreciate and feel nature.

### **1.2. The Present Study**

The objective of this study is to address the lack of research on the factors that influence PEB at the family level. Specifically, our research focuses on examining the connection between FWB and PEB in children. Additionally, we aim to explore whether nature connectedness acts as a mediator in this relationship. The chosen sample consists of children for two reasons. First, as future environmental decision-makers, they have the right to be involved in it [15]. Second, their environmental attitudes and behavior increase until the age of 10 and then level off at 14 [16], indicating that they have acquired sufficient cognitive development and information processing skills [17]. Our hypothesis is that stronger family well-being in children will result in more pro-environmental behavior (H1). Furthermore, we expect that nature connectedness will act as a mediator between family well-being and pro-environmental behavior in children (H2).

## **2. Materials and methods**

### **2.1. Participants**

A total of 342 children who were in the age bracket of 11 to 14 years ( $M = 12.79$  years,  $SD = 0.73$  years) participated the study. Also, an equal number of boys and girls were part of the study.

## 2.2. Measures

To ensure the accuracy and consistency of the measurement tools, this study opted to utilize the measurement scales that have been used in previous literature.

### 2.2.1. Pro-environmental behavior

The General Ecological Behavior Scale [18] was utilized to assess PEB, and it was adjusted to fit the participants aged from 9 to 21 years old [19]. For the present study, a total of 12 items were utilized to assess children's PEB (e.g., "I will reuse shopping bags"). Participants rated their responses using a rating scale that ranged from 1 (never) to 7 (always). The reliability coefficient Cronbach's alpha of PEB scale was 0.71.

### 2.2.2. Nature connectedness

In order to evaluate individuals' NC, we adapted two existing scales: the Connectedness to Nature Scale (CNS) developed by Mayer and Frantz[8], and the Inclusion of Nature in Self (INS) Scale created by Schultz[20]. These scales were adapted and combined, resulting in a 15-item instrument. Participants were required to evaluate their level of compliance with phrases using a scale of 1 (strongly disagree) to 7 (strongly agree). The reliability coefficient Cronbach's alpha of nature connectedness scale was 0.82.

### 2.2.3. Family well-being

To measure family well-being, 12 items were selected from the survey conducted by Renmin University of China for China's Family Happiness Development Index [21]. Each item was rated on a 7-point scale. The Cronbach's alpha of FWB was 0.90.

## 2.3. Procedure

The research conducted received approval from the Institutional Review Board at the Chinese Academy of Sciences' Institute of Psychology. This study recruited children for participation only after obtaining consent from their parents, the children themselves, and their school teachers. Questionnaires were filled out at school, ensuring the participants' anonymity. The questionnaire required 5-10 minutes to complete.

## 2.4. Statistical methods

The data was performed using IBM SPSS 22. First, descriptive, internal consistency, and correlational analyses were executed.

The mediating effect is frequently used in statistical analysis in psychology and other social sciences research areas. It helps analyze the process and mechanism through which independent variables influence dependent variables. A regression equation that represented by path diagrams in Figure 1 and 2 can describe the relationship between variables.

$$Y = cX + e1 \quad (1)$$

$$M = aX + e2 \quad (2)$$

$$Y = c'X + bM + e3 \quad (3)$$

The coefficient  $c$  in equation (1) measures the total effect of  $X$  on  $Y$ . The coefficient  $a$  in equation (2) represents the effect of  $X$  on  $M$ , while  $b$  in equation (3) measures the effect of  $M$  on  $Y$ , while controlling for the influence of  $X$ . The coefficient  $c'$  represents the direct effect of  $X$  on  $Y$ , after accounting for the influence of  $M$ .  $e_1$ ~ $e_3$  are regression residuals.

The mediating effect in this model is equivalent to the indirect effect, which is calculated by multiplying the coefficients  $a$  and  $b$ . The relationship between total effect and direct effect is as follows:

$$c = c' + ab \quad (4)$$



Figure 1. X influences Y.

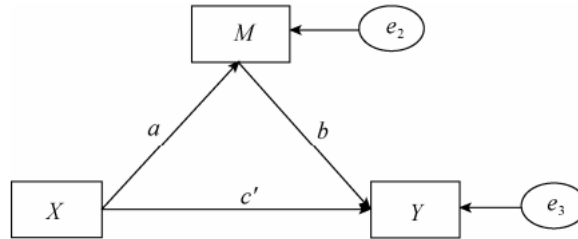


Figure 2. X influences Y through M.

To examine the importance of the indirect effect in the mediation model, we employed model 4 of the SPSS PROCESS macro[22]. This widely used model allows us to explore mediating effects. By utilizing this specific model, we were able to determine the direct relationship between FWB and PEB, as well as estimate the indirect effect of nature connectedness on PEB.

### 3. Results

#### 3.1. Mean, standard deviation and correlation of each variable

Table 1 presents findings indicating that PEB is positively correlated with FWB and nature connectedness. There is also a significant link between family well-being and nature connectedness.

**Table 1.** Correlation analysis of family well-being, nature connectedness and pro-environmental behavior ( $n=342$ )

	<i>M</i>	<i>SD</i>	1	2	3
pro-environmental behavior	5.122	0.798	1		
Nature connectedness	5.555	0.836	.509**	1	
Family well-being	5.473	1.213	.306**	.392**	1

Note. \* <0.05 (bilateral); \*\* <0.01(bilateral).

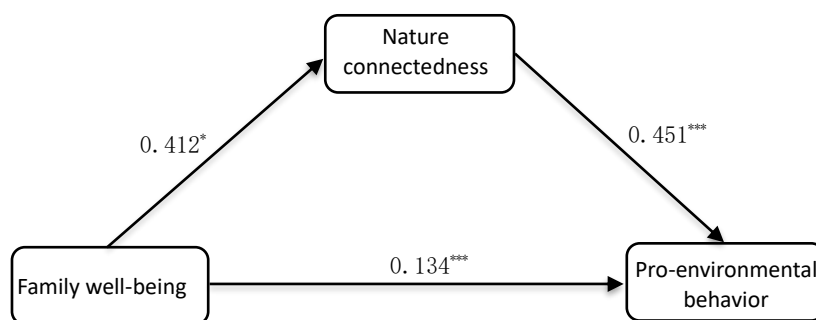
### 3.2. Relationships between family well-being and pro-environment behavior: A mediating model test

Using the PROCESS Model 4 and conducting 5,000 bootstrap samples, we examined a mediation model that involved nature connectedness. Gender and age were considered as control variables. The mediation model indicates a direct and positive correlation between family well-being and children's PEB [ $\beta = 0.21, 95\% \text{ CI } (0.14, 0.28)$ ]. Our results (see Table 2) also found that family well-being was positively associated with nature connectedness,  $\beta = 0.28, 95\% \text{ CI: } [0.22, 0.35]$ . Furthermore, nature connectedness was found to predict PEB,  $\beta = 0.43, 95\% \text{ CI: } [0.33, 0.53]$ . Figure 1 displays the mediation model. Figure 3 depicts the mediation model diagram.

**Table 2.** The decomposition table of total effect, direct effect and mediation effect

	Effect	Boot SE	95% CI Lower	95% CI Upper	Effect proportion
Mediation effect of nature connectedness	0.122	0.022	0.080	0.167	58.14%
Direct effect	0.088	0.035	0.025	0.160	41.86%
Total effect	0.210	0.038	0.136	0.288	

Note. CI = Confidence interval;



**Figure 3.** The mediating correlation between FWB and PEB through nature connectedness.

Note. \*\*\*  $p < 0.001$ .

## 4. Discussion

There has been a growing concern for the environment due to the increasing environmental problems, which has led to a rise in research focusing on the factors and processes that contribute to pro-environmental behavior. Although many studies have been conducted in this area, none of them have specifically inspected the influence of FWB on children's PEB. Therefore, our aim was to fill this research gap by examining how family well-being affects children's PEB. In particular, we sought to determine if the relationship between FWB and PEB is influenced by nature connectedness.

We find that there is a positive association between FWB and children's PEB, which is consistent with previous studies. Erhabor and Oviahon [23] have confirmed that when families

function positively, children are more inclined to demonstrate care and respect for the environment. It may be that positive emotions may be more effective in motivating people to behave responsibly towards the environment [1].

As expected (H2), there is evidence indicating that nature connectedness is crucial in encouraging children to engage in PEB, particularly when they have a strong sense of family well-being. People with this connectedness consider themselves as integral components of a larger ecological system and have a profound emotional connection to it. They identify themselves as members of the natural world and believe that their own well-being is closely intertwined with the well-being of the natural world. The correlation analysis indicates a positive association between children's affinity towards nature and their propensity to adopt environmentally friendly behavior. These findings align with previous research studies [3,9], suggesting that nature connectedness is linked to pro-environmental behavior.

Our research indicates that family well-being is a significant factor that impacts the pro-environmental behavior of children. We found that when family well-being increased, children felt more connected to nature, which in turn was associated with engaging in more PEB. Exploring the function of these mediators can provide valuable information on enhancing the development and execution of nature connection interventions, ultimately leading to the promotion of pro-environmental behavior. Recognizing the positive link between enhancing children's family well-being and fostering their environmental behavior, it is crucial for future governmental environmental policies to emphasize the involvement of the public in addressing environmental challenges. By prioritizing the promotion of family well-being for the entire population, practical solutions can be found to reconcile the potential conflict between economic growth and environmental protection.

Although the aforementioned contributions have been described, it is important to note the existence of certain limitations when interpreting the findings. First, results solely rely on self-report data, and even though there is significant evidence indicating that self-reported well-being strongly relates to objective indicators, we may need to exercise more caution when relying on self-reported pro-environmentalism [24]. In addition, our survey results were from cross-sectional survey data, which means that the observed effects should not be interpreted as strictly causal. To comprehensively understand the influence of family well-being, it is necessary to conduct longitudinal research that considers changes and developments over an extended period of time. This will provide a more accurate understanding of the dynamics and long-term implications of family well-being.

Limitations aside, this study demonstrates the significance of family well-being in shaping the pro-environmental behavior of children from a theoretical perspective, including the impact of nature connectedness and its role as a mediator. To further expand on these findings, we suggest investigating the potential effects of family background (e.g., parent-child communication and interaction) on children's pro-environmental behavior. Given that children will be responsible for preserving our natural environment in the future, involving them in research on this topic is crucial.

## 5. Conclusion

The present study shows that family well-being, pro-environmental behavior and nature connectedness are all interrelated. Family well-being can improve children's pro-environment behavior, and nature connectedness plays a mediation role. This study represents the first endeavor to explore the various factors that impact children's pro-environmental behavior within the context of their family background. These findings may be significant for policy implications when seeking to promote more environmentally friendly behavior.

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