

Article

Effects of Social Capital on Pro-Environmental Behaviors in Chinese Residents

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Abstract: With regard to the factors influencing pro-environmental behavior, environmental sociology has long been mired in the theoretical debate between the affluence hypothesis and global environmentalism in the West. This study explores the mechanisms influencing pro-environmental behaviors by applying social capital theory. Drawing upon the data from the Chinese General Social Survey in 2013 (CGSS2013), this study distinguishes social capital in two dimensions—individual social capital (ISC) and collective social capital (CSC)—and classifies pro-environmental behaviors into two categories: private and public. With a multiple linear regression model, the report reveals that ISC, based on network learning, social support, and social identity, and CSC, based on social norms and social trust, have significant positive effects on both private and public pro-environmental behaviors. The effect of CSC on pro-environmental behavior is much lower than that of ISC. In addition, females are more likely to perform private pro-environmental behaviors than males. This paper argues that social capital should be actively used to promote civic engagement in China's environmental protection process.

Keywords: individual social capital; collective social capital; private pro-environmental behavior; public pro-environmental behavior



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1. Introduction

The Chinese economy has experienced staggering growth over the past four decades, creating massive natural resource consumption and alarming levels of pollution. Despite huge investments in environmental protection, China's environmental conditions have not seen significant improvement. Current Chinese environmental pollution problems have only been partially resolved, with government policy continuing to have little effect on resolving the escalating destruction and ecological deficit. About one-third of Chinese cities suffer from high PM2.5 concentrations and fail to meet the National Secondary Standard. Regional heavy pollution weather occurs from time to time. The general ecological status of key river basins and the health status of typical marine ecosystems are still not optimistic [1]. Environmental protection has become an increasingly important issue for the Chinese government and residents. In the process of Chinese environmental protection, civic engagement in the environment has become a heated issue. To further promote the modernization of the ecological environmental governing system and capacity, in March 2020, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the Guidance on Building a Modern Environmental Governing System, which clearly states that the public should be unimpeded in their participation in environmental governance, and a sustainable pattern of social participation in environmental governance should be further formed. Public participation in environmental protection will largely reduce the overall cost of governance and improve efficiency. Consequently, it is particularly important to encourage the public to adopt pro-environmental behavior and improve environmental participation.

The issue of civic engagement in environmental protection began in the National Environmental Policy Act of 1969 in the United States, in which the concept of “civic

engagement” was clearly defined. Subsequently, many countries’ environmental laws and international environmental conventions, including China, have helped establish the mechanism of civic engagement, which has become an important basic principle in environmental law throughout the process of law formulation and implementation. However, a related study concluded that China’s current civic engagement in environmental protection still lacks participation, and that China’s environmental protection still relies primarily on government and state power. Only 6.3% of the public participated in environmental protection activities, and more than 40% of the public decided according to the situation at that time. On the whole, the awareness of independent participation is low, and conformity psychology is prevalent [2]. Therefore, the study on the voluntary pro-environmental behaviors of Chinese residents has important research significance. For the government, increasing Chinese civic engagement with environmental protection will largely reduce the cost of environmental management and improve the efficiency of environmental governance. A high level of civic engagement also means that the public has shifted from passive acceptance to active participation in the environmental protection process. Who is likely to voluntarily participate in environmental movements and programs? What are the factors that influence Chinese residents’ pro-environmental behavior? The study of these issues has important implications for the improvement of environmental governance in China.

Existing studies have mainly investigated the factors influencing pro-environmental behaviors in terms of individual factors, cognitive factors, and the factor of social structure. Individual factors mainly include the social characteristics of individuals, such as gender, income, and other aspects [3–5]. In contrast to individual factors, cognitive factors can be considered as internal attributions of individuals [6,7]. At the social level, studies of social hierarchies and forms of social differentiation reveal the impact of changes in the social environment on human pro-environmental behavior [8,9]. It can be said that the existing literature studies pro-environmental behavior in terms of internal and external mechanisms of the individual (cognitive and individual factors) or the separation and integration of society and nature (social structural factors).

To explain the relationship between economic development and pro-environmental behavior, there are two diametrically opposed paths in the West: one is the economic affluence hypothesis, and the other is global environmentalism. The former indicates a positive correlation between socioeconomic status and pro-environmental behavior. If a country’s economy develops, or an individual has an increase in socioeconomic status, people’s demand for environmental quality will also increase. It is possible to invest more budget and resources to improve the ecological environment due to economic affluence. Therefore, the affluence hypothesis theory emphasizes that the wealth of a society is positively related to its public concern for the environment and people’s pro-environmental behaviors [3]. Similarly, Inglehart’s “post-materialist values” hypothesis suggests that when societies become affluent, the public will shift from “materialist values” to “post-materialist values” [4]. This will lead to an increase in environmental concern and pro-environmental behavior. Empirical studies, including those by Gelissen [5] and Meyer [6], have validated the affluence hypothesis.

Global environmentalism argues that environmental issues have become globalized, and environmental concerns, which exist in both rich and poor countries, are not the product of a post-materialist turn in values. Environmental concerns and pro-environmental behaviors in poor countries are as common or even more frequent than in rich countries [7]. Two key lines of evidence support this argument. The first is that disadvantaged individuals tend to be more directly dependent on their local environment and more vulnerable to environmental problems. As a result, they have an incentive to protect the environment, as evidenced by the vibrant grassroots environmentalism in many less developed regions [8,9]. The second line of evidence is that previous empirical studies have revealed a negative correlation between economic development and environmental issues, especially at the national level, where studies have found that residents of wealthy countries are less concerned about the environment in general [10].

A synthesis of the two theories can be achieved through the diffusion of innovation theory [11], but whether their findings can adequately explain Chinese pro-environmental behaviors remains to be examined. For the causes of pro-environmental behaviors in China, an interest-based approach has been used to explain attitudinal and behavioral variations in civil engagement: it regards civil engagement as a form of collective action taken by individuals to realize or defend their shared interests [12]. However, this interest-based explanation is limited for the Chinese case, not because Chinese individuals do not share an interest in living in a desirable environment, but because “shared interests” are culturally defined and structurally organized in a different way from the West [13].

“Guanxi” plays an important role in the functioning of Chinese society. The nature and forms of guanxi influence are contingent upon whether guanxi is a tie of connectivity, a sentimental tie, a sentiment-derived instrumental tie, an instrument-particular tie, or an obligational tie that facilitates power and money exchanges. To a large extent, public consciousness is nonexistent or extremely weak when matters of interest are beyond the worlds of intimacy, but social influence is most effective within the confines of relation-defined network circles in Chinese society [14]. The related studies are based on the economic affluence hypothesis or the theory of global environmentalism; the commonly selected variables are gender, moral values, personal income, political identity, and so on, which are mostly attribute-level variables. Social attribute variables tend to ignore the influences on the behavior of social actors imposed by social relationships among individuals, assuming that social actors are independent of each other and do not influence each other. Granovetter regarded this tendency as a sign of over-socialization [15]. Therefore, the perspective of social networks and social capital is more suitable for studying pro-environmental behaviors in China than in Western societies. However, most of the existing studies on pro-environmental behaviors in China have examined the influence of individual factors such as environmental concern, environmental values, and demographic characteristics on pro-environmental behaviors [16]. This paper examines pro-environmental behaviors in China from the perspective of social capital, which is rarely seen in the existing literature.

2. Literature Review and Research Hypothesis

2.1. Social Capital

Social capital has been conceptualized by different sociologists [17–19] and mainly consists of two aspects: (a) Individual Social Capital (ISC) and (b) Collective Social Capital (CSC). ISC emphasizes how individuals invest in social relationships to obtain and use resources embedded in social networks [20]. CSC focuses on the formation of group trust, group participation, and group reciprocity, and mainly emphasizes how a particular group develops or maintains a certain stock of social capital as a public good and how this public good improves the quality of life of group members [21]. These two types of social capital vary with their functions in different social contexts. Accordingly, it is important to identify their different effects in pro-environmental behavior research.

2.2. Environmental Behavior

Although different scholars have different ways of conceptualizing pro-environmental behavior, they all emphasize the active participation of individuals to prevent or solve environmental problems through social actions. Hines defines pro-environmental behaviors as “a conscious behavior based on personal responsibility and values that aims to avoid or solve environmental problems in advance” from an individual perspective [22]. Kollmuss regards pro-environmental behavior as the behavior of people who minimize the negative effects on the ecological environment through their own activities [23]. Stern first distinguished three types of pro-environmental behaviors: pro-environmental behavior in the private sphere, radical pro-environmental behavior in the public sphere, and non-radical pro-environmental behavior in the public sphere [24]. Hunter merged the latter two and divided pro-environmental behaviors into private pro-environmental behaviors and public pro-environmental behaviors [25]. Pro-environmental behaviors

in the private sphere include green consumption, saving energy in buildings, etc., while pro-environmental behaviors in the public sphere consist of donating to environmental organizations and appealing on environmental issues. This paper draws on Hunter's classification to distinguish pro-environmental behaviors into two categories: private and public pro-environmental behaviors.

2.3. Social Capital and Environmental Behavior

There are four gaps in current research on the relationship between social capital and pro-environmental behaviors in China. Firstly, there is limited research based on a social network perspective; for example, social capital has rarely been used as a core independent variable to explore the effects on pro-environmental behavior. Secondly, the measurement of social capital is not clearly defined, and different levels of social capital are grouped together. For instance, social participation and social trust are considered as ISC and CSC, respectively. Thirdly, how social capital influences different categories of pro-environmental behaviors has not been explored. Fourthly, some studies at the individual level ignore the influence of macro-level factors. The environmental problems facing China are characterized by large geographical differences, with various levels of socioeconomic and cultural development in different regions. Thus, it is important to pay attention to the variations caused by geographical differences in the data analysis.

The mechanisms of obtaining resources through social networks to create pro-environmental behaviors consist of social network learning, social identity, and social support (see Figure 1). Oreg and Katz-Gerro argued that environmental concerns, along with other variables, affect people's motivational acquisition of pro-environmental behaviors and ultimately influence the production of pro-environmental behaviors [26]. Network learning, based on the action of information acquisition, helps individuals learn environmental knowledge, which in turn helps generate pro-environmental behaviors in individuals' daily lives. For example, individuals reduce the frequency of private car use due to the acquisition of knowledge related to carbon emissions. Therefore, it is assumed that network learning may contribute to the generation of private pro-environmental behaviors. As a relational resource, social support comes from the material and emotional support provided by members of the family, relatives, friends, neighbors, etc. Social identity as a spiritual resource is established in the process of analogization, identification, and comparison. The stronger the individual's sense of belonging to the community, the more likely he or she is to adopt behavior that protects the community environment. For example, community residents with a sense of ownership actively participate in the development of the neighborhood council's environmental protection plan.

Putnam's view of social capital emphasizes some of the features of social group organization mapped behind social capital that can improve social efficiency through cooperative behavior, and social capital is typically characterized as a general public resource [27]. Voluntary cooperation is more likely to occur within a community that has inherited a large amount of social capital. Pretty and Ward argue that people act collectively to protect the environment and that social norms can be used to cause changes in citizens' environmental attitudes and increase their willingness to cooperate in pro-environmental behavior. Social norms not only drive individuals to engage in private pro-environmental behaviors according to legal and moral guidelines but also promote cooperative public pro-environmental behaviors among community members. The more individuals trust the community and the government, the more likely individuals will respond to the call for public and private pro-environmental behaviors within the community. This study aimed to test the following hypotheses:

Hypothesis H1: *The higher the ISC, the greater the access to environmental knowledge and information. Thus, it positively influences the generation of private environmental behavior.*

Hypothesis H2: *ISC positively predicts environmental behavior in the public sphere. The higher the level of individual social support and social identity provided, the more likely it is that public environmental behavior will occur.*

Hypothesis H3: *The higher the CSC, the more binding the social norms will be, and private environmental behavior will be more likely to occur.*

Hypothesis H4: *High levels of public social trust are associated with high occurrence of environmental behavior, and CSC is a positive predictor of environmental behavior in both the public and private spheres.*

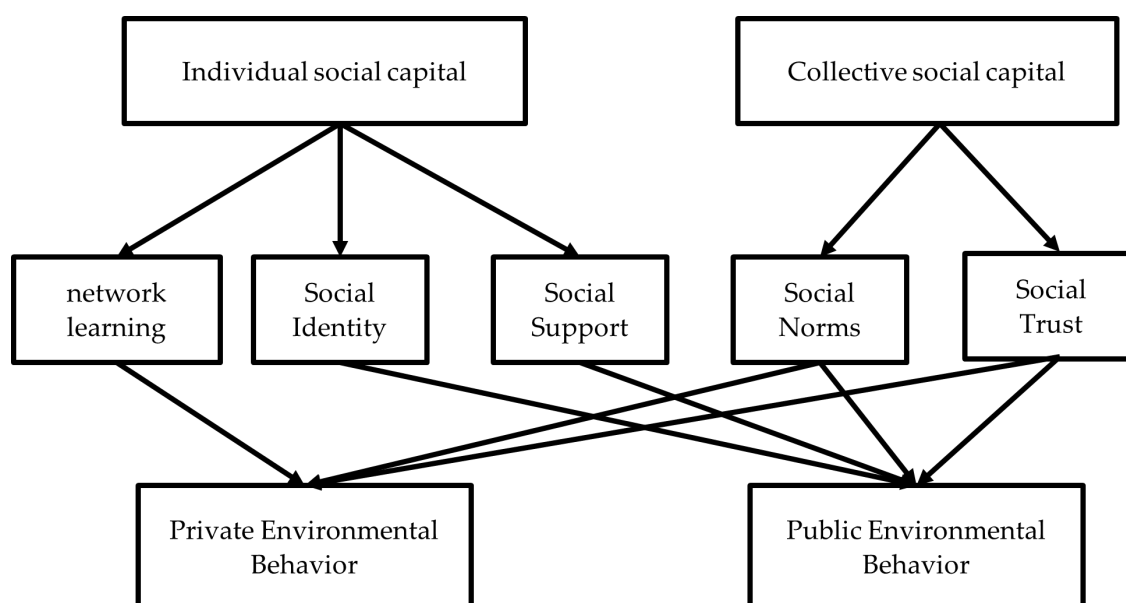


Figure 1. Mechanisms of social capital's influence on private and public environmental behavior.

3. Materials and Methods

3.1. Data

This study employed the 2013 China General Social Survey conducted by the China Survey and Data Center of Renmin University of China. Launched in 2003, the CGSS is the earliest national continuous survey and aims to systematically monitor the changing relationship between social structure and the quality of life in both urban and rural areas of China. The CGSS2003–2006 and CGSS2010–2013 used China's fifth census in 2000 and the 2010 national population census data as a sampling frame with a multi-stage stratified design. The sample size of CGSS 2013 was 11,438, with 4416 samples from rural residents and 7022 from urban residents. The variables selected according to the data analysis were eliminated by the case-by-case method, and the samples with omitted values of the variables were deleted. Finally, 8910 valid samples were obtained.

3.2. Measures

3.2.1. Dependent Variable

Public pro-environmental behavior is the dependent variable in the study and is measured in the CGSS2013 by 10 questions. Exploratory factor analysis was conducted on these 10 questions, revealing two different pro-environmental behavior components [28]. The first is the private pro-environmental behavior factor based on previous research, including separating and putting out garbage and reusing plastic bags, as indicated in items 1–5 (Table 1). The second is the public pro-environmental behavior factor, such as donating money for environmental protection, asking for resolution of complaints, and appeals on environmental issues, as shown in items 6–10 (Table 1). The Cronbach

coefficients obtained from testing the reliability of these two measures were 0.669 and 0.748, respectively. Therefore, in this study, the frequency of “never adapting such behavior” (simplified as “never” in the charts) was assigned a value of 0, the frequency of “occasionally adapting such behavior” (simplified as “occasionally” in the charts) was recoded as a value of 1, and the frequency of “often adapting such behavior” (simplified as “often” in the charts) was assigned a value of 2 for each question. The values of questions 1, 2, 3, 4, and 6 were summed to obtain the score of private pro-environmental behavior, and the values of the remaining questions were added for the score of public pro-environmental behavior. Both private and public pro-environmental behaviors are continuous variables with values ranging from 0 to 10. Table 1 shows the descriptive statistics of pro-environmental behavior.

Table 1. Distribution statistics of environmental behavior (%).

Environmental activities or behavior	Never	Occasionally	Frequently
1. Sorting garbage	55.8	31.9	12.3
2. Discussing environmental issues with your relatives and friends	51.1	41.0	7.9
3. Bringing your own shopping bags when purchasing daily necessities	24.1	35.6	40.3
4. Reusing plastic bag for packaging	18.7	31.1	50.2
5. Paying attention to environmental issues reported by media	83.2	15.0	1.8
6. Donating for environmental protection	50.0	36.9	13.1
7. Actively participating in environmental awareness-raising activities	77.8	18.3	3.9
8. Actively engaging in environmental activities organized by environmental groups	84.0	13.7	2.4
9. Maintenance of woods or green areas at your own expense	85.5	10.8	3.8
10. Active participation in environmental complaints	91.2	7.4	1.4

3.2.2. Independent Variable

ISC focuses on resources mobilized by individuals through their network of relationships with others. In contrast to CSC, the mobilization of individual social network relationships relies mainly on social interactions to obtain resources and information. Therefore, this study selected two questions from the CGSS 2013 questionnaire to measure ISC: “How often do you engage in social and recreational activities with your neighbors, for example visiting each other’s homes, and eating together?” and “How often do you engage in social and recreational activities with friends?”. The seven options are assigned values from 6 to 0 in order of frequency, and the two scores are summed to obtain a continuous variable from 0 to 12. The higher the score, the more ISC the individual possesses.

CSC emphasizes neighborhood social resources in the form of mutual trust, solidarity, and informal social control. It reflects the influence of community structure on public behavior. Therefore, two questions from the CGSS 2013 questionnaire were selected to measure CSC: “In general, do you agree that in contemporary Chinese society, the vast majority of people can be trusted?” and “In general, do you agree that in contemporary Chinese society if you are not careful, people will try to take advantage of you?”. Five answers were assigned values from 1 to 5 in descending order according to the level of agreement, and two question scores were summed to obtain a continuous variable with values from 2 to 10 as a measure of CSC.

3.2.3. Control Variable

Based on the results of previous studies, the factors of province, age, gender, annual income, and education level were selected as control variables in this study [29–31]. Due to the various levels of socioeconomic and cultural development and environmental conditions in different provinces, the factor of “province” was controlled in this study [32]. Socioeconomic and demographic factors include age (in years), annual income (in RMB and taking logarithm), gender, and education. Quantification of the level of education ranged from 1 (no formal schooling) to 5 (higher education).

3.2.4. Analysis

Stata 16.0 was used for data analysis in this study through a two-step process. First, the main statistical variables were listed, and descriptive statistical analysis was conducted for categorical and continuous variables. Second, a least squares linear (OLS) regression model was applied, and three groups of variables, including control variables, ISC variables, and CSC variables, were sequentially included in the regression equation to investigate the mechanism of social capital’s influence on private or public pro-environmental behavior. Specifically, a nested hierarchical regression approach was adopted, including a total of 3 models. Firstly, control variables such as province were only included in model 1. Secondly, ISC score variables were added to model 2. Finally, CSC variables were included in model 3.

4. Results

Table 2 shows the descriptive statistical analysis of the main variables. The regression results are shown in Tables 3 and 4.

Table 2. Descriptive statistics of main variables.

Variables	Observations	Mean	SD	Min	Max
Dependent variable: environmental behavior					
Private environmental behavior	10039	4.24	2.36	0	10
Public environmental behavior	10039	0.91	1.58	0	10
ISC	10039	6.42	3.24	0	12
CSC	10039	6.34	1.30	2	10
Age	10039	56.95	16.11	25	105
Male (comparison: female) *	10039	0.51	0.50	0	1
Education level	10039	3.03	1.25	1	5
Annual income	10039	9.62	1.18	4.38	13.81

Note: * is a dichotomous variable and the mean value is its proportion.

4.1. Effects of Social Capital on Private Pro-Environmental Behavior

Among the controlled variables in model 1, age, income, and education all have significant positive effects on private pro-environmental behaviors (Table 3).

In model 2, ISC had a significant positive effect on private pro-environmental behaviors. Specifically, each increase in ISC was associated with an average increase of 0.037-unit private sector pro-environmental behavior, so hypothesis 1 was supported. Through network learning, ISC played a positive role in private pro-environmental behaviors. In model 3, CSC had a significant effect on private pro-environmental behaviors, so hypothesis 3 was supported; specifically, for each increase in CSC score, private pro-environmental behaviors increased by 0.03 unit. The coefficient of determination of the model was 0.236, indicating that social capital explained 23.6% of the variance in private pro-environmental behaviors.

Table 3. Effects of social capital on private environmental behavior.

N = 8910	Model 1	Model 2	Model 3
ISC		0.037 *** (0.007)	0.036 *** (0.007)
CSC			0.039 * (0.017)
Province	Controlled	Controlled	Controlled
Age	0.011 *** (0.002)	0.012 *** (0.002)	0.012 *** (0.002)
Annual income	0.233 *** (0.025)	0.231 *** (0.025)	0.231 *** (0.025)
Male (comparison: female)	−0.505 *** (0.046)	−0.498 *** (0.046)	−0.50 *** (0.046)
Education level	0.538 *** (0.024)	0.542 *** (0.024)	0.539 *** (0.024)
Cons	0.962 ** (0.307)	0.776 * (0.309)	0.558 (0.322)
R ²	0.234	0.236	0.236

Note: (1) Standard errors of coefficients are in parentheses. (2) * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.2. Effects of Social Capital on Public Pro-Environmental Behavior

Among the control variables, compared with the factors influencing private pro-environmental behaviors, education level and income also play positive roles in influencing public pro-environmental behaviors (Table 4). However, age and gender variables become less significant in influencing public pro-environmental behaviors.

In model 2, ISC had a significant positive influence on public pro-environmental behaviors; specifically, each increase in ISC score was associated with an average increase of 0.041 in public pro-environmental behaviors. Thus, hypothesis 1 was supported. In model 3, the coefficient of CSC was significant, indicating that CSC had a significant effect on public pro-environmental behaviors. Thus, CSC had a positive influence on both private and public pro-environmental behaviors. Hypotheses H2 and H4 were supported. The coefficient of determination of the model was 0.19, indicating that social capital explained 19% of the variance in public pro-environmental behaviors.

Table 4. Effects of social capital on public environmental behavior.

N = 8910	Model 1	Model 2	Model 3
ISC		0.041 *** (0.005)	0.040 *** (0.005)
CSC			0.042 *** (0.012)
Control variables			
Province	Controlled	Controlled	Controlled
Age	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Annual income	0.072 *** (0.017)	0.070 *** (0.017)	0.070 *** (0.017)
Male (comparison: female)	0.023 (0.032)	−0.015 (0.032)	−0.020 (0.032)
Education level	0.282 *** (0.016)	0.286 *** (0.016)	0.284 *** (0.016)
Cons	−0.678 ** (0.214)	−0.885 *** (0.214)	−1.119 *** (0.224)
R ²	0.183	0.189	0.190

Note: (1) Standard errors of coefficients are in parentheses. (2) ** $p < 0.01$, *** $p < 0.001$.

5. Discussion

Firstly, our results indicate that a high level of social capital is instrumental in encouraging residents' pro-environmental behavior, which is similar to findings of previous studies in China [33,34]. We argue that the influence of social capital on pro-environmental behaviors should be taken seriously by the government, communities, and environmental organizations. The Chinese government should integrate regional economic development differences, environmental differences, and cultural heterogeneity, and take social capital into account in environmental governance. In addition, men were less likely to perform pro-environmental behaviors in the private sphere than women. This finding is consistent with the results of Gong's research in China [35]. Gong explained that the role of women as child caregivers and family caregivers in China's traditional gender socialization allows them to hold a value based on caring for life and sustainable development, and this altruistic value is more reflected in the private sphere. The level of participation in private pro-environmental behaviors is much higher than in public pro-environmental behaviors for both men and women, which is also consistent with Xiao's previous finding [36].

Secondly, ISC has a positive predictive effect on pro-environmental behaviors. Through the three mechanisms of network learning, social identity, and social support, ISC has a significant positive influence on both private and public pro-environmental behaviors. The stronger the role of network learning is, the more access individuals will have to environmental information and knowledge. Environmental knowledge acquired by individuals influences their private pro-environmental behaviors. This finding is consistent with the findings of relevant research conducted in the Philippines [37]. In terms of gender differences, female groups are more likely to perform private pro-environmental behaviors compared to male groups. In previous studies on gender differences in China, some studies, which did not use the NEP scale, found that female groups had higher levels of environmental concern [38,39]. However, Xiao and Hong discovered, by using the NEP scale, that male groups have stronger environmental concern and are more likely to develop pro-environmental behavior. The findings of this paper are consistent with the former [40]. A possible explanation is that women are socialized as more affectionate, compassionate, and cooperative family caregivers, while men are shaped to be more independent and competitive. Such gender norms may lead women to be more helpful and altruistic than men, which is largely consistent with early eco-feminist ideas [41].

Residents with higher social participation and closer social ties are more likely to align with others and take actions for the common good of environmental sustainability. The horizontal network of community neighbors drives participants to solve collective action dilemmas in environmental protection. For example, if all neighbors strictly follow the standard of garbage sorting and even participate in community cleaning activities voluntarily, individuals who throw trash carelessly will feel out of place among their neighbors. As a result, even if there are no social norms or legal rules, individuals will still choose to put garbage into the garbage can due to community identity and social support effects. A study in Korea also found that individual-level community relationship structure had predictive value for pro-environmental behaviors [42].

Thirdly, CSC has a positive effect on pro-environmental behavior. Through social norms and social trust, CSC significantly influences the occurrence of private and public pro-environmental behaviors. However, the effects of CSC on pro-environmental behavior are relatively low. This is possibly because most Chinese people lack channels of participating in policy decision making, unlike people in Western societies. To a certain extent, this has led to a low overall level of public pro-environmental behaviors in China [43].

Voluntary collective actions are more likely to emerge within a communal community that has inherited a significant amount of CSC. As a centralized manifestation of an honest society, social trust emerges from generalized reciprocal actions that are unrewarding and uneven at a given time, leading to shared expectations and a particularistic instrumental relationship. The use of social trust increases the resources supplied by oneself, and once members of the community have accumulated social trust to a certain extent, they are

more likely to adopt pro-environmental behaviors that contribute to the development of their communities and organizations, such as participating in community environmental awareness activities, donating money for street greening, etc. Social norm mechanisms can directly affect the occurrence of pro-environmental behavior. For instance, the regulations on waste separation and disposal in Shanghai and other places in China force individuals to comply with social norms to generate pro-environmental behavior. The greater role social norms have, the higher the CSC, meaning that people are better able to comply with social norms related to environmental sustainability. Social capital in the forms of social networks and trust facilitates cooperation and helps to overcome the free-riding problem. Furthermore, closer social ties among people create a positive "peer effect" for environmentally friendly behavior, thus promoting increased environmental concern and pro-environmental behaviors among residents.

Nevertheless, this study is not without its limitations. Firstly, due to the limit of the questionnaire questions, this study did not measure the different dimensions of ISC and CSC separately. Thus, we were unable to compare differences in the effects of various dimensions of individual or collective social capital on pro-environmental behavior. Secondly, the variables selected for this study did not involve environmental knowledge or environmental concern. Further studies could include other environmental variables such as participants' environmental knowledge and environmental concern. Finally, this study used cross-sectional data, and individual heterogeneity could not be excluded. Causal mechanisms using panel data models need to be researched in the future.

6. Conclusions

This paper reveals the potential mechanisms that influence the relationship between social capital and pro-environmental behaviors in China. The conclusions and contributions of this study can be summarized as follows. (1) It distinguishes the effects of different types of social capital on different types of pro-environmental behavior. Specifically, this report theoretically sorted two dimensions of social capital, CSC and ISC, and two types of pro-environmental behavior, private pro-environmental behavior and public pro-environmental behavior. (2) Female groups are more likely to perform private pro-environmental behaviors compared to male groups, and the level of participation in private pro-environmental behaviors is much higher than that in public pro-environmental behaviors for both men and women. (3) ISC positively influences private and public pro-environmental behavior. Social networks enable individuals to learn about environmental issues and provide them with social support, thus promoting pro-environmental behaviors through increased social capital. (4) CSC also has a positive, albeit small, effect on private and public pro-environmental behavior, which implies that CSC can be used to promote pro-environmental behaviors in China.

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