

Research on the Impact of The Construction of Ecological Civilization Demonstration Zones on Public Green Behavior

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Abstract: From emphasizing environmental protection to the theory of ecological civilization construction, and then to the pilot project of ecological civilization demonstration zones, it marks the gradual transition of China's ecological civilization construction from theoretical construction to practical exploration, and opens up a new realm of "green mountains and clear waters are as valuable as gold and silver". This article explores the impact of the construction of ecological civilization demonstration zones on public green behavior based on 318 micro survey data. The results indicate that: (1) The benchmark regression results show that the establishment of ecological civilization demonstration zones improves environmental quality and helps promote the implementation of green behavior by the public. Social norms in the process of building ecological civilization will constrain the public's practice of green behavior. (2) The mediating effect indicates that the environmental quality and social norms after the establishment of the ecological civilization demonstration zone will enhance the public's sense of identity, thereby promoting the implementation of its green behavior.

Keywords: Green behavior; Ecological civilization; Mediating effect.

1. Introduction

The Chinese government has always focused on sustainable development of the environment and has been exploring the path of ecological civilization construction for many years. Since the 18th National Congress of the Communist Party of China, ecological civilization construction has been elevated to a national strategy. At the same time, the release of important documents such as the Overall Plan for Ecological Civilization System Reform marks the formal formation of China's ecological civilization system. With the continuous deepening of ecological civilization construction, existing research mainly focuses on improving green technology, industrial structure, and market segmentation to reduce carbon emissions, ignoring the promotion effect of ecological civilization construction on social behavior. Therefore, there is relatively little exploration of the specific impact of ecological civilization construction on green behavior of residents. In addition, existing research has shown that the internal psychological willingness of the public is the main factor affecting their green environmental protection behavior. Therefore, will the sense of identification generated by the establishment of ecological civilization demonstration zones to some extent affect the internal psychological willingness of the public, and thus affect their own behavior? This is not only related to the effectiveness of national ecological civilization construction, but also to the vital development interests of the people, and further exploration and answers are urgently needed.

2. Literature Review

In the study of the impact of the construction of ecological civilization demonstration zones on the environment and economy, scholars have delved into the development level and spatiotemporal evolution of ecological civilization in China (Zhang & Wu, 2022; Hu et al., 2017). They have used different methods to study the development level and regional

differences of ecological civilization from multiple perspectives, indicating that the pilot policy of provincial ecological civilization demonstration zones can curb the growth of ecological footprint and improve urban ecological efficiency (Fu & Mai, 2021; Liang et al., 2022). The construction of ecological civilization needs to balance economic benefits while protecting the environment. Therefore, some studies have examined the impact of the establishment of ecological civilization demonstration zones on green efficiency, economy, society, culture, and systems (Lu & Xiong, 2020; Shi, 2015). Research has also found that the construction of ecological civilization demonstration counties has a widening effect on the income gap between urban and rural areas, which is more pronounced in the eastern region, regions with a high proportion of non-agricultural output value, non-agricultural provinces, and regions with large fiscal revenue and expenditure gaps (Wang et al., 2022).

The research on ecological civilization demonstration zones and citizen participation mainly focuses on two aspects. Firstly, the impact of ecological civilization construction on the public. Existing research has found that the establishment of ecological civilization pilot demonstration zones can improve the health level of residents (Xie et al., 2021). However, there are not many literature directly studying the impact of ecological civilization construction on public health or behavior, mainly focusing on the impact of environmental quality on resident health (Samet, 2004; Maisonet et al., 2004). The second is the influencing factors of public participation in environmental construction. Existing literature points out that knowledge of ecological civilization and environment (Wang & Zhang, 2021), willingness to pay for ecology (Wang et al., 2021), and environmental information disclosure (Lu & Yue, 2022) are important influencing factors of public participation in environmental construction. There are also studies exploring green behavior from two aspects: individual psychological characteristics and external situational factors

(Zhang et al., 2019; Ding et al., 2021).

3. Theoretical Basis and Research Hypothesis

3.1. The direct effect of ecological civilization demonstration zone construction on green behavior

The ecological environment is the foundation for human survival and sustainable development, and it is also an important source of human well-being. With the improvement of quality of life, environmental quality is increasingly valued by the public. As the main body of social life, the environment of public life will become their first impression of the city or region, and also reflect information on behavioral norms in the region. From the perspective of social information processing theory, as an important component of environmental information, the quality of the environment will have a certain impact on the public's green behavior(Xu & Tu, 2021). Specifically, in daily life, individuals consider the environmental quality of their external environment as an external environmental signal and judge social norms based on the interpretation of the signal, that is, which behaviors are acceptable, in order to choose their own behavior(Lang et al., 2010).

According to the new theory of institutional economics, the binding force of informal institutions is usually stronger than that of formal institutions, as informal institutions are more easily accepted and disseminated(Lucio et al., 2020). Therefore, when formal institutions are unable to effectively manage environmental issues, the social normative role played by informal institutions cannot be ignored(Pavitra, 2022). In Chinese society, the government's regulatory power for public environmental protection is relatively weak. To solve the living environment problems of residents, it is not only necessary to rely on formal institutions such as government environmental protection departments, but also on informal institutions such as civil organizations and groups. Non formal institutions represented by social norms play an important role in the lives and interpersonal communication of residents through the "resident autonomy system" and "social network". In summary, this article proposes the following assumptions:

H1a: The improvement of environmental quality in ecological civilization demonstration areas has a positive impact on public green behavior;

H1b: Social norms in ecological civilization demonstration areas have a positive impact on public green behavior;

3.2. The mediating role of identity in driving green behavior in ecological civilization construction

Identity has become an important concept in sociological research. It reveals the relationship between individuals living in society and society, and can also be seen as a result of the internalization of the social stratification system at the psychological level of actors. As the construction of ecological civilization has become a national strategy, local governments have increasingly attached importance and invested in environmental pollution prevention and ecosystem restoration, which has improved China's extensive development of "high energy consumption and high

emissions" at the cost of sacrificing the environment for a long time. The quality of the ecological environment has been significantly improved(Li & Zheng, 2016), and changes in environmental quality will change individual work time and labor productivity from both physiological and psychological levels(Viard & Fu, 2015; Chen & Lu, 2019), this will further affect individual environmental satisfaction and economic income. In addition, social norms have a significant impact on consumer consumption habits and behaviors. On the one hand, prohibitive regulatory information can significantly enhance the public's perception of the social value of green products, thereby promoting consumer green consumption behavior. On the other hand, descriptive norms can inform consumers through the green behavior and consequences of others that implementing green behavior is welcomed and accepted by society, and can cause other individuals to imitate and follow, thereby encouraging more individuals to adopt low-carbon consumption behavior. When the government issues policies and regulations to encourage enterprises and the public to practice green behavior to improve the quality of ecological civilization construction, the effect of environmental improvement satisfies the public. The public will actively identify with the policies, regulations, and green behavior in order to maintain the status quo, and promote the establishment of ecological civilization demonstration zones through the implementation of green behavior and environmental supervision. Based on this, the following assumptions are proposed:

H2a: The environmental quality of the construction of ecological civilization demonstration zones has a positive impact on the public's sense of social identity;

H2b: The social norms for the construction of ecological civilization demonstration zones have a positive impact on the public's sense of social identity.

4. Data source and Processing

4.1. Data source

Design corresponding scales based on qualitative research, with research data sourced from questionnaire surveys. Select residents of prefecture level cities or municipalities directly under the central government in provinces such as Shandong, Henan, Liaoning, Jiangsu, Shanghai, and Shenzhen to distribute online questionnaires. The scales used in the study were all Likert level five scales. Before conducting formal research, in order to ensure the reliability and validity of the survey questionnaire used in this article and obtain scientifically reliable research conclusions. This article first distributes a portion of the questionnaire for pre research. Based on the feedback and research results of the research subjects, the final questionnaire is formed by modifying some semantically inappropriate and overly terminologized items. A total of 318 valid questionnaires were obtained in this study.

4.2. Variable setting and description

Based on the theoretical model setting, a total of four latent variables were set, namely environmental quality, social norms, sense of identity, and transformation of green behavior. When measuring, a combination of scales and non scales is used. The scale indicators are mainly measured using the Likert five level scale, while non scale questions are assigned values based on the differences in options. The specific descriptions of each variable are shown in Table 1.

Table 1. Definition of main variables

Variable category	Variable	Measurement items	Assignment
dependent variable	Green Behavior (GB)	Under the construction of ecological civilization demonstration zones, I pay attention to the transformation from non green behaviors to green behaviors	1=completely inconsistent; 2=Not compliant; 3=average; 4=Compliant; 5=fully compliant
		Under the construction of ecological civilization demonstration zones, I have increased the frequency of implementing green behaviors	
		Under the construction of ecological civilization demonstration zones, I actively participate in environmental supervision and effectively maintain the environment	
independent variable	Environmental Quality (EQ)	The construction of ecological civilization demonstration zones has effectively improved air quality	1=completely disagree; 2=disagree; 3=average; 4=identification; 5=fully agree
		The construction of ecological civilization demonstration zones has effectively improved water quality	
		The construction of ecological civilization demonstration zones effectively reduces waste emissions and other related issues	
		The construction of ecological civilization demonstration zones makes the living environment cleaner and more hygienic	
		The increase in vegetation area such as green parks makes the environment more pleasant	
	Social Norms - Descriptive norms (SN)	People around you adopt green transportation methods	1=completely inconsistent; 2=Not compliant; 3=average; 4=Compliant; 5=fully compliant
		The people around you have adopted waste recycling methods	
		The people around you have adopted garbage sorting and disposal measures	
		People around you have already purchased energy-saving appliances and organic products for green consumption	
	Social Norms - Prohibitive norms (SN)	People around you believe that residents should adopt green transportation methods	1=completely inconsistent; 2=Not compliant; 3=average; 4=Compliant; 5=fully compliant
		People around you believe that residents should engage in waste recycling	
		People around you believe that residents should adopt garbage sorting and disposal measures	
		People around you believe that residents should adopt green consumption	
Mediating variables	Identity (ID)	Implementing green behaviors can enhance my sense of social participation in environmental protection	1=completely inconsistent; 2=Not compliant; 3=average; 4=Compliant; 5=fully compliant
		Implementing green behaviors can realize self-worth	
		Implementing green behaviors can enhance my personal image	
		The policies related to ecological civilization construction match my values and concepts	
		I agree with restrictive regulatory policies on non green behavior	
		I agree with the role of environmental policies in improving the environment	
control variable	Gender	Your gender	
	Age	Your age	
	Education	Your highest education level	
	Income	Your personal monthly income	
	Profession	Your profession	
	Party member	Are you a party member	

4.3. Reliability and validity test

The reliability and validity of the scale were tested using the multivariate statistical analysis software SPSS 22.0, and the results are shown in Table 2. The Cronbach's α values in this study are all greater than the critical value of 0.7, and the combined reliability (CR) is greater than 0.75, indicating that

the scale has good reliability. Use confirmatory factor analysis to test the structural validity of the initial scale. The standardized load coefficients of latent variables corresponding to each question item are all greater than 0.6, and the average variance extraction (AVE) of all latent variables is generally above 0.5, indicating good convergence validity.

Table 2. Reliability and validity test of the scale

Latent variable	Observed variable	Normalized factor loadings	Cronbach's α	AVE	CR
Environmental Quality (EQ)	EQ -1	0.731	0.703	0.584	0.939
	EQ -2	0.793			
	EQ -3	0.759			
	EQ -4	0.815			
	EQ -5	0.788			
Social Norms (SN)	SN -1	0.722	0.677	0.577	0.872
	SN -2	0.800			
	SN -3	0.784			
	SN -4	0.737			
	SI -1	0.762			
Identity (ID)	SI -2	0.810	0.751	0.612	0.917
	SI -3	0.798			
	SI -4	0.790			
	SI -5	0.796			
	SI -6	0.769			
Green Behavior (GB)	GB-1	0.640	0.667	0.450	0.830
	GB-2	0.709			
	GB-3	0.717			

4.4. Correlation analysis

The descriptive statistical results and correlation results are shown in Table 3. There is a significant positive correlation between environmental quality and social norms ($r=0.779$, $p<0.01$), and a significant positive correlation with identity ($r=0.765$, $p<0.01$); Social norms are significantly positively

correlated with identity ($r=0.788$, $p<0.01$), and significantly positively correlated with green behavior ($r=0.729$, $p<0.01$). Green behavior is significantly positively correlated with environmental quality ($r=0.680$, $p<0.01$), and significantly positively correlated with identity ($r=0.841$, $p<0.01$). The above results preliminarily verify the relevant hypotheses of this article and meet the basic conditions of the mediation test.

Table 3. Descriptive statistics

Variable	Mean	SE	EQ	SN	ID	GB
EQ	4.014	0.626	1.000			
SN	3.962	0.652	0.779***	1.000		
ID	4.013	0.609	0.765***	0.788***	1.000	
GB	3.895	0.600	0.680***	0.729***	0.841***	1.000

Note: ***, ** and * represent the significance levels of 1%, 1% and 5% respectively.

5. Empirical Analysis and Discussion

5.1. Mediation effect test

For the identification of intermediary effects, referring to relevant research by Wen Zhonglin, a multiple intermediary model is constructed, and the stepwise regression method is used to explore the driving effect of ecological civilization demonstration zone construction on public green behavior. The specific model construction is as follows:

$$Y = cX_i + e_1 \quad (1)$$

$$M_i = aX_i + e_2 \quad (2)$$

$$Y = c'X_i + bM_i + e_3 \quad (3)$$

In formula (1), c is the estimated coefficient of the total effect of the independent variable X_i on the dependent variable Y , where X_i specifically refers to environmental quality and social norms, and Y refers to the dependent variable, namely green behavior; In formula (2), a is the estimated coefficient of the independent variable X_i on the mediator variable M , and M_i is the mediator variable, specifically referring to identity; The coefficient b in formula (3) represents the effect of the mediator variable M on the dependent variable Y after controlling for the influence of the independent variable X_i , while the coefficient c' represents the direct effect of the independent variable X on Y after controlling for the influence of the mediator M ; When the estimated coefficients a , b , and c are all significant, it indicates that there is a partial mediating effect between the independent variable X and the dependent variable Y . If the estimated coefficients a and b are significant but c is not, it

indicates that the two mediating variables play a complete mediating role between X and Y.

In order to study the impact of ecological civilization construction on public green behavior, Stata16.0 software was used to verify 318 questionnaire data. Firstly, benchmark regression was performed, that is, regression was performed on equation (1) above, and the results are shown in Table 4. Model (1) is the regression result of the environmental

quality(EQ) of the ecological civilization pilot demonstration zone on public green behavior(GB), which is significantly positive at the 1% level. Hypothesis H1a is supported; Model (2) is the regression result of social norms in the ecological civilization demonstration zone on public green behavior. The impact of social norms(SN) on GB is significantly positive at the 1% level, and hypothesis H1b is supported.

Table 4. Benchmark regression of public green behavior

Variable	(1)	(2)
	GB	GB
EQ	0.787*** (0.052)	
SN		0.648***(0.054)
Gender	0.016(0.057)	0.001(0.065)
Age	0.030(0.052)	0.058(0.059)
Party	0.016(0.060)	0.058(0.064)
Education	0.044(0.069)	0.071(0.076)
Income	-0.017(0.036)	-0.041(0.041)
Profession	-0.010(0.034)	0.008(0.042)
Constant	0.680*(0.321)	1.144**(0.390)
N	318	318
R ²	0.459	0.367

Note: ***, ** and * represent the significance levels of 1%, 1% and 5% respectively.

According to the step-by-step test method, regress formulas (2) and (3) to test the mediating effect of identity between influencing factors and green behavior. On the basis of benchmark regression, the mediating variable identification was added, and the regression results are shown in Table 5. According to models (3) and (5), it can be seen that the impact of EQ and SN on ID is significantly positive at the

1 % level. According to models (4) and (6), after adding the mediating variable of ID, the impact of identity on GB is significantly positive. EQ and SN still have a significant positive impact on GB, and the coefficient decreases, indicating that identity plays a mediating role between these two explanatory variables and green behavior, assuming that H2a and H2b are supported.

Table 5. Results of stepwise regression test for mediating effects

Variable	(3)	(4)	(5)	(6)
	ID	GB	ID	GB
EQ	0.766***(0.037)	0.311***(0.088)		
SN			0.623***(0.049)	0.204**(0.067)
ID		0.622***(0.085)		0.712***(0.072)
Gender	0.042(0.043)	-0.010(0.053)	0.028(0.051)	-0.019(0.056)
Age	-0.045(0.038)	0.058(0.049)	-0.018(0.044)	0.071(0.051)
Party	-0.006(0.042)	0.019(0.056)	0.035(0.048)	0.033(0.057)
Education	0.010(0.043)	0.037(0.064)	0.036(0.057)	0.046(0.065)
Income	-0.033(0.027)	0.003(0.033)	-0.055(0.034)	-0.002(0.035)
Profession	0.004(0.025)	-0.012(0.034)	0.021(0.038)	-0.007(0.035)
Constant	0.983*** (0.221)	0.069(0.296)	1.463***(0.282)	0.103(0.291)
N	318	318	318	318
R ²	0.609	0.568	0.480	0.559

Note: ***, ** and * represent the significance levels of 1%, 1% and 5% respectively.

5.2. Robustness testing

To improve the robustness of the mediating effect, this study used the SPSS macro program process for testing, and used the Bootstrap method to repeat 5000 samples to construct a 95% bias corrected confidence interval test. The results are shown in Table 6. The 95% confidence interval for

the mediating effect of ID between EQ and GB is [0.634, 0.245], which does not include 0, indicating a significant mediating effect and further supporting hypothesis H2a; The 95% confidence interval for the mediating effect of identity between SN and GB is [0.039,0.180], and the interval does not include 0, indicating a significant mediating effect, further supporting hypothesis H2b.

Table 6. Bootstrap test results for mediating effects

Influence path	Coef.	SE	95%CI
H2a: EQ→ID→GB	0.146	0.047	[0.634,0.245]
H2b: SN→ID→GB	0.100	0.036	[0.039,0.180]

6. Research Conclusions

Against the backdrop of the country's vigorous construction of ecological civilization, this article constructs a path that influences public ecological civilization and drives public green behavior based on existing research data and ecological civilization policies. From the perspective of socioeconomics, this paper theoretically analyzes the existence of the impact path of ecological civilization construction on green behavior, constructs an intermediary model, systematically deconstructs the mechanism of promoting public implementation of green behavior, and empirically tests it using micro survey data obtained from research. The main conclusions are as follows:

(1) The benchmark regression results indicate that the improvement of environmental quality in the ecological civilization demonstration zone can directly promote public green behavior; The social norms of ecological civilization demonstration zones also have a positive impact on public green behavior.

(2) The results of the mediation effect test indicate that social identity plays a mediating role in promoting public green behavior in the construction of ecological civilization. The improvement of environmental quality in the construction of ecological civilization demonstration zones can enhance residents' sense of identity, thereby promoting the implementation of green behavior; The social norms in the construction of ecological civilization demonstration zones will enhance public identification and promote green behavior.

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