

Environmental Cognition, Environmental Behavior Participation and Environmental Governance Satisfaction—— Empirical research based on CGSS2021 data

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Abstract. With the amazing economic development in China, environmental problems are becoming more and more serious, and people's attention to environmental issues is gradually increasing. At the same time, the government's attention to environmental issues is also increasing. Therefore, it is of great practical significance to study the relationship among environmental awareness, environmental behavior participation and environmental governance satisfaction. Based on the data of CGSS2021, this paper discusses the relationship between environmental cognition, environmental behavior participation and environmental governance satisfaction by establishing multiple linear regression, and also pays attention to the influence of personal income on the above relationship. It is found that environmental cognition has a significant positive impact on environmental behavior participation; Income level plays a negative regulatory role in the relationship between environmental cognition and environmental behavior participation, and environmental behavior participation has a significant negative impact on environmental governance satisfaction.

Keywords: environmental cognition; Environmental protection behavior participation; Environmental governance satisfaction.

1. Introduction

With the amazing economic development in China, environmental problems are becoming more and more serious. In the ranking of Global Environmental Performance Index (EPI), China dropped from 94 in 2006 (with 133 countries participating) to 118 in the 2014 report (with 178 countries participating). The lower ranking is in sharp contrast to the rapidly rising GDP, so the people of China need to pay more attention to environmental issues while achieving outstanding economic achievements. After realizing the lack of environmental protection, the China government put forward the idea of building a "resource-saving society" and an "environment-friendly society". By further perfecting environmental protection laws and regulations, establishing environmental protection departments and actively publicizing environmental protection concepts, China's environmental protection has achieved initial results. Achievements include, but are not limited to, making the proportion of excellent surface water quality in China reach 71.4% in 2019, and implementing measures such as garbage sorting in more than 200 cities across the country. At the same time, residents' cognition and participation in environmental protection can not be ignored, and residents' satisfaction with environmental governance will further affect the development and implementation of China's environmental protection policies.

The satisfaction of environmental governance can provide valuable reference for environmental protection and improvement, which can not only reflect the local endowment and natural environmental conditions, but also reflect the effectiveness of government environmental protection work in people's eyes. However, while using environmental governance satisfaction as a reference for decision-making, we must realize that environmental governance satisfaction is a subjective and variable indicator. If the influence of various factors on the satisfaction of environmental governance cannot be reasonable, it may be counterproductive to use this index for decision-making reference. Different residents may have different satisfaction with the same environmental quality because of their own factors, which can not help but make people think about what factors cause people's different satisfaction with environmental governance.

Based on this background, this paper focuses on the relationship between personal environmental cognition, environmental behavior participation and environmental governance satisfaction. It is generally believed in academic circles that income level, environmental knowledge, education level and environmental status quo have a significant positive impact on residents' environmental awareness [2]. At the same time, some articles point out that there is no stable relationship between environmental attitude (satisfaction with environmental governance) and environmental behavior [5]. In order to further find out the factors that are clearly related to the satisfaction of environmental governance, this paper will use CGSS2021 as the data base to investigate and study the influence of environmental cognition and environmental behavior participation on the satisfaction of people in China, and discuss the moderating effect of income level on environmental cognition and environmental behavior participation. In this paper, environmental cognition and environmental behavior participation are set as independent variables; Setting the satisfaction of environmental self-reliance as a dependent variable; Taking income level as a regulating variable, and using data analysis to study the correlation of various factors.

The rest of this paper is organized in the following ways: the second part introduces literature review and research hypothesis, the third part introduces data sources and variable measurement, the fourth part tests hypothesis by establishing regression model, and the fifth part is conclusion and discussion.

2. Literature review and research hypothesis

Environmental cognition represents a person's attitude towards the natural environment and whether he is aware of the existence of environmental problems. By referring to [7], we can see that this paper thinks that environmental cognition and environmental behavior participation have a positive impact. It means that a person who is more aware of environmental problems will participate in environmental protection activities more actively, because the former is a prerequisite for the latter to some extent. However, the current research also points out that the positive relationship between the two is not strong, because this paper will use CGSS2021 as the updated data to further verify its correlation. After analyzing the relevant research abroad, it is pointed out that "environmental cognition-environmental attitude-environmental behavior intention-environmental behavior" is one of the research threads followed by most scholars when reviewing with limited questionnaire reports.

Based on this, this paper makes the following research hypotheses: H1: Environmental cognition has a significant positive impact on environmental behavior participation.

The level of income often represents the gap of a person's economic status in society, and this gap may lead to different environmental cognition of different income groups and thus affect the participation of environmental protection behavior. We can see that the social and economic status related to income has a significant impact on environmental protection behavior participation [7], and the different information brought by economic status, such as access to environmental cognition, has an indirect impact on environmental protection behavior participation. Some studies have pointed out that the participation of environmental protection behavior will have a negative impact on the production behavior of higher economic status groups, so there may be a negative regulatory relationship. However, compared with personal psychological factors, the relationship between statistical data such as income itself and environmental protection behavior participation is not clear.

Based on this, this paper makes the following research hypotheses: H2: Income level plays a negative regulatory role in the relationship between environmental cognition and environmental behavior participation.

Compared with people with low environmental behavior participation, higher environmental behavior participation may make participants more fully aware of the shortcomings and deficiencies of current environmental governance, thus resulting in lower satisfaction with environmental governance. However, some research [8] also pointed out that environmental behavior participation may have a positive impact on environmental governance satisfaction, because more environmental

behavior participation can make residents understand the complexity and limitations of environmental protection measures, thus reducing their expectations of environmental quality. Lower expectations lead to higher environmental quality satisfaction.

Based on this, this paper makes the following research hypotheses: H3: Environmental behavior participation has a significant negative impact on environmental governance satisfaction.

Academic circles pay less attention to the willingness of environmental behavior, but more attention to it as an important influencing factor or high-order latent variable [1]. Therefore, it is necessary to further analyze and test the relationship among environmental cognition, environmental behavior participation and environmental governance satisfaction.

3. Data sources and variable measurement

3.1 Data sources

In this paper, China Comprehensive Social Survey in 2021 is adopted as the data source, China Comprehensive Social Survey (CGSS), China Renmin University and academic institutions all over the country are led and implemented, and the creation goal is to systematically and regularly collect data from all aspects of China and China society and infer the long-term trend of social changes. As the first comprehensive and continuous large-scale social survey project in China, the survey promoted the openness and sharing of social science research in China, and the survey results also provided useful data for government decision-making. Since 2003, the survey has conducted a rigorous and scientific survey and sampling of up to 10,000 households every year, so the data obtained can truly reflect and represent the actual situation of the respondents.

3.2 Variable measurement

3.2.1 Independent variable

The independent variables of this paper are public participation in environmental protection behavior and environmental cognition. Environmental cognition is measured by the following indicators: H12. We want to know your general views on the relationship between human society and the environment. How much do you agree with the following statement? -1 The current population is approaching the limit that the earth can bear; 2 people are the most important, and they can change the natural environment to meet their own needs (reverse); The destruction of nature by human beings often leads to disastrous consequences, and so on (see Table 1 for detailed measurement topics). The corresponding options are: 1- totally disagree, 2- comparatively disagree, 3- indifferent agree disagree, 4- comparatively agree, 5- totally agree.

Table 1 Environmental cognition scale

variable	Measurement topic
Environmental cognition	The current population is approaching the limit that the earth can bear.
	Man is the most important, and can change the natural environment to meet his own needs (reverse).
	The destruction of nature by human beings often leads to disastrous consequences.
	Thanks to the wisdom of human beings, it is entirely possible (in reverse) to improve the environmental conditions of the earth.
	At present, mankind is abusing and destroying the environment.
	As long as we know how to develop, the natural resources on the earth are abundant (reverse)
	Animals and plants have the same right to exist as human beings.
	Nature's self-balancing ability is strong enough to cope with the impact of modern industrial society (reverse)
	Although human beings have special abilities, they are still dominated by the laws of nature.
	The so-called "environmental crisis" is an exaggerated statement (reverse)

	The earth is like a spaceship, with limited space and resources.
	Human beings are born masters and want to rule other parts of nature (the reverse).
	The balance of nature is very fragile and easily disturbed.
	Humans will eventually know more about the laws of nature, and thus have the ability to control nature (reversely).
	If everything continues as it is, we will soon suffer a serious environmental disaster.

The measurement indicators of environmental behavior participation are: H14. To what extent are you willing to make the following efforts to solve various problems in garbage disposal? -often classify and put the garbage produced by family life; Recycling household items; Willing to discuss the garbage sorting plan with other residents; Willing to participate in the public welfare work of maintaining a clean and tidy environment as a volunteer on a regular basis, etc. (See Table 2 for detailed measurement topics). The corresponding options of indicators are: 1- Very unwilling, 2- Not willing, 3- Neither willing nor unwilling, 4- More willing, 5- Very willing.

Table 1 Environmental behavior participation scale

variable	Measurement topic
Environmental protection behavior participation	Garbage generated from family life is often classified and put into use.
	Recycling household goods
	Willing to discuss the waste sorting plan with other residents.
	Willing to participate in public welfare work to maintain a clean and tidy environment as a volunteer on a regular basis.
	I am willing to accept a reasonable tax increase if the government's tax increase can be used exclusively to improve the urban garbage disposal problem.
	If there is an opportunity, take the initiative to negotiate with the government, environmental protection organizations, experts, garbage disposal parties and other relevant departments about garbage disposal.

3.2.2 Control variables

This paper selects gender, age, nationality, religious belief, education level, political outlook and registered permanent residence as control variables. At the same time, the control variables are processed separately. The coding mode of gender is: 0- female, 1- male; The encoding method of age is: 2021- year of birth; The coding methods of ethnic groups are: 0- minority, 1- Han nationality; The coding methods of religious belief are: 0- no religion, 1- religious belief; The coding methods of education level are: 0- no education at all, 3- literacy classes, 6- primary schools, 9- junior high schools, 13- vocational high schools, 12- ordinary high schools, 13- secondary schools, 13- technical schools, 14- specialist adult higher education, 15- specialist formal higher education, 16- undergraduate adult higher education and 17- undergraduate. The encoding methods of political outlook are: 0- non-communist party member, 1- communist party member; The coding method of the registered permanent residence is: 0- rural, 1- city.

3.2.3 Dependent variable

The dependent variable of this paper is the satisfaction of environmental governance, and its measurement index is: H8. How do you think the local government has done in solving the environmental problems in your living area in the past five years? The corresponding options are: 1- paying attention to economic development unilaterally, ignoring environmental protection; 2- paying insufficient attention and investment in environmental protection; 3- trying hard, but the effect is not good; 4- making great efforts, achieving certain results; 5- making great achievements. See Table 3 for the measurement methods of all variables involved in this paper.

Table 3 Variable measurement

Variable type	Variable name	Measurement topic	measure
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dependent variable	Environmental governance satisfaction	H8. How do you think the local government has done in solving the environmental problems in your living area in the past five years?	1- One-sided emphasis on economic development, ignoring environmental protection. 2- Insufficient attention, insufficient investment in environmental protection 3- Although efforts have been made, the effect is not good. 4- Great efforts have been made and some results have been achieved. 5- Great achievements have been made
dependent variable	Environmental protection behavior participation	H14. To what extent are you willing to make the following efforts to solve various problems in garbage disposal?	1- Very reluctant 2- Not very willing 3- neither willing nor unwilling 4- more willing 5- Very much.
independent variable	Environmental cognition	H12. We'd like to know your general views on the relationship between human society and environment. How much do you agree with the following statement?	1- totally disagree 2- Disagree more 3- It doesn't matter whether you agree or disagree. 4- Agree more 5- Totally agree
regulated variable	income	A8a. What was your personal total income last year (2020)?	continuous variable
	gender	A2. Gender	0- female, 1- male
	age	A3. What's your date of birth?	continuous variable
	nation	A4 What is your nationality?	0- ethnic minorities, 1- Han nationality
	Religious belief	A5. What is your religious belief?	0- not religious, 1- religious
Control variable	Degree of education	A7a. What is your current highest education level?	0- completely uneducated 3- Literacy classes 6- Primary school 9- junior high school 13- Vocational High School 12- Ordinary High School 13- technical secondary school 13- technical school 14- College Adult Higher Education 15- Specialized formal higher education 16 Undergraduate Adult Higher Education 17 undergraduate formal higher education 20- Graduate students and above
	Political status	A10. The current political situation is:	0- Non-Communist party member, 1- Communist party member.
	Location of household registration	A18. What is your current household registration status?	0- rural, 1- urban

3.3 Descriptive statistics

Table2Descriptive statistics of variables

variable	quantity	average value	standard deviation	minimum value	maximum
Environmental governance satisfaction	2524	3.7096	0.9842	one	five

Environmental cognition	1916	3.4185	0.5081	1.8667	five
Environmental protection behavior participation	2448	3.8224	0.7437	one	five
income	7333	51241.1	332375.7	0	9999990
gender	8148	0.4515	9.4977	0	one
age	8148	51.6437	17.5739	18	99
nation	8148	0.9264	0.2612	0	one
Religious belief	8148	0.0750	0.2634	0	one
Degree of education	8148	9.7541	4.3325	0	20
Political status	8148	0.1186	9.3233	0	one
household registration permit	8055	0.3989	0.4897	0	one

It can be seen from the data in the above table that the number of men in this selected sample is slightly less than that of women, but the two are basically the same; At the same time, the age of the survey is mainly middle-aged people and the coverage is wide. The minimum participant is 18 years old and the maximum participant is 99 years old. The average education level of survey participants is at the junior high school level; People's average satisfaction with environmental governance is 3.7096, which can be considered that people are more recognized for their efforts in environmental governance, but people also think that the results are slightly poor. It is worth noting that the standard deviation of this index is large, reaching 0.9842, which shows that some people have great differences in environmental governance satisfaction; The average environmental cognition index is 3.4185, which shows that most people have realized the existing environmental problems but are not worried about the severity of the problems. The average participation index of people's environmental protection behavior is 3.8224, and the higher average indicates that most people are willing to make efforts to protect the environment from a personal perspective.

4. Data analysis

According to the above research hypothesis, this paper constructs the following three regression models, model 1 is used to test hypothesis 1, model 2 is used to test hypothesis 2, model 3 is used to test hypothesis 3, and the detailed results of the regression models are shown in Table 5.

Table 3Regression result

variable	Model 1 Environmental protection behavior participation	Model 2 Environmental protection behavior participation	Model 3 Environmental governance satisfaction
Environmental cognition	0.1294*** (3.66)	0.1602*** (3.91)	
Environmental protection behavior participation			-1.5416*** (5.51)
income		1.1141* (1.90)	
Environmental awareness *		-3.1036* (-1.89)	
income			
gender	0.0045 (0.14)	0.0098 (0.28)	0.0061 (0.15)
age	0.001 (0.907)	0.0008 (0.59)	-1.5416 (5.51)

nation	-0.1540 (0.015)	-0.1588 (-2.30)	0.0061 (-0.07)
Religious belief	-0.0522 (0.453)	-0.0465 (-0.63)	0.1996 (2.30)
Degree of education	0.0059 (0.282)	0.0074 (1.24)	-0.008 (-1.23)
Political status	-0.0034 (0.000)	0.2790 (5.26)	0.0817 (1.25)
Location of household registration	-0.0034 (0.928)	-0.0264 (-0.66)	-0.0173 (-0.37)
constant term	3.4103*** (20.74)	3.2872*** (17.42)	2.8736*** (16.39)
R2	0.038	0.0399	0.0344
N	1829	1630	2264

Note: *P<0.1, **P<0.05, * * p < 0.01, and t value is in brackets.

According to the regression results of model 1, the regression coefficient of environmental cognition is 0.1294, and the p value is less than 0.01, so it can be considered that environmental cognition has a significant positive impact on environmental behavior participation, and environmental behavior participation will increase by 0.1294 units for every unit of environmental cognition.

According to the regression results of Model 2, the regression coefficient of the interaction between environmental cognition and income is -3.1036, and the P value is less than 0.1. Therefore, it can be considered that income has a significant negative regulatory effect on the relationship between environmental cognition and environmental behavior participation. Under the same other conditions, the participation of people with high income in environmental behavior is 3.1036 units lower than that of people with low income. This is because people with high incomes usually pay more attention to the economy and less attention to the environment; People with high income usually live in a better environment, so the probability of environmental problems around them is low, so they show a lower level of participation in environmental protection activities.

According to the regression results of model 3, the regression coefficient of environmental behavior participation is -1.5416, and the p value is less than 0.01, so it can be considered that environmental behavior participation has a significant negative impact on environmental governance satisfaction, and the satisfaction of environmental governance decreases by 1.5416 units for every unit of environmental behavior participation. This is because people who have a high level of participation in environmental protection behavior often find more environmental problems, which will have a certain negative impact on the satisfaction of environmental governance.

5. Conclusion

This study discusses the relationship between environmental cognition, environmental behavior participation and environmental governance satisfaction. It is found that environmental cognition has a significant positive impact on environmental behavior participation, which may be because when a person's environmental cognition level is high, he may feel anxious about the environmental quality around him, so he is more likely to participate in environmental behavior that can improve the surrounding environment, so people who have a more comprehensive understanding of environmental behavior will be more inclined to participate in environmental behavior. But at the same time, we need to be aware of the shortcomings of this kind of questionnaire survey. Participants may subjectively exaggerate their participation in environmental behavior participation, and the influencing factors of environmental behavior participation are too complicated and influenced by both external and internal factors. However, the positive relationship between environmental

cognition and environmental behavior participation obtained from data analysis in this paper is objectively established to some extent.

Secondly, income has a significant negative moderating effect on the relationship between environmental cognition and environmental behavior participation. Compared with this paper, some academic studies [7] draw the conclusion that income and environmental cognition and environmental behavior participation have a positive moderating effect, because high-income people often have higher requirements for environmental quality, and at the same time, high-income people are considered to be more likely to purchase high-priced environmental products, and high-income people are considered to have more environmental knowledge in previous studies. This kind of research often ignores the negative impact of environmental behavior participation on the economic activities of high-income people to a greater extent. Higher environmental behavior participation and environmental awareness may greatly increase the cost of production activities of high-income people, so some high-income people will deliberately ignore and avoid environmental behavior participation when they have higher environmental awareness.

Thirdly, environmental behavior participation has a significant negative impact on the satisfaction of environmental governance. By analyzing the data of regression model 3, we can see that there is a significant negative relationship between environmental behavior participation and environmental governance satisfaction. People with higher environmental behavior participation are more aware of the shortcomings of the current environment and governance system, and people who take the initiative to participate in environmental behavior may be dissatisfied with the current environmental governance, so their environmental governance satisfaction is often lower.

This study explores the relationship between environmental cognition, environmental behavior participation and environmental governance satisfaction in detail, with a view to providing some new insights for the research on citizens' environmental cognition, environmental behavior participation and government environmental governance.

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