

Original Research

How Can Internet Use and Environmental Risk Perception Encourage Pro-Environmental Behaviors? The Mediating Role of Government Performance Perception

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Abstract

This paper explores the relationship between Internet use, environmental risk perception, government performance perception, and pro-environmental behaviors. Survey data from the Chinese General Social Survey 2013 was used to test relevant hypotheses. The results show that: (1) Internet use has significant positive effects on environmental risk perception and pro-environmental behaviors. (2) Internet use and environmental risk perception have significant negative effects on public perception about the government's environmental performance. (3) Government performance perception has a significant positive effect on pro-environmental behaviors and negatively mediates the effect of Internet use and environmental risk perception on pro-environmental behaviors. The findings suggest that increasing the government's environmental performance exposure can stimulate public engagement in pro-environmental behaviors, thus facilitating the implementation of environmental policies requiring citizen engagement.

Keywords: internet use, environmental risk perception, government performance perception, pro-environmental behaviors

Introduction

With the rapid development of the economy and the acceleration of industrialization, environmental problems are becoming increasingly prominent, devastating human life and affecting economic and social development. As the largest developing country

in the world, China is facing serious pollution of air [1], water [2], and soil [3]. The World Health Organization pointed out that nearly 2 million people in China die from air pollution each year [4]. In addition, cancer villages, named because of their particularly high incidence of cancer caused by water contamination from industries, have sprung up in certain areas [5]. In response, a series of environmental policies have been implemented in China [6]. However, as human activities, regardless of the extent of their intensity,

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will have environmental impacts on the Earth [7], the inclusion of individual pro-environmental behavior is a critical addition to governmental efforts.

“Pro-environmental behavior” includes behaviors that consciously seek to minimize the negative impact of one’s actions on the natural and built world [8, 9]. It has been shown that Internet use and environmental risk perception are important variables influencing pro-environmental behavior [10, 11]. The Internet, a mature medium of information dissemination, promotes pro-environmental behavior [12-14], and as a “social amplification station”, mass media can amplify risks [15, 16]. Out of fear that environmental degradation endangers their health, the perception of environmental risks has also been proven to motivate the public to participate in environmental protection efforts [12, 17]. Based on this, a causal framework is constructed that includes Internet use, environmental risk perception, and pro-environmental behavior.

It should be noted that government performance perception is also a predictor of pro-environmental behavior [18], which is simultaneously affected by Internet use and environmental risk perception [19, 20]. In this context, the question remains how the perception of government performance can adjust the existing causality. This is the specific focus of this paper. Moreover, the role of the Internet is often compared with traditional media [21], and research related to environmental risk perception merely focused on superficial effects [17]. It is, therefore, necessary to establish a framework that incorporates the four variables mentioned above and explore its underlying mechanism.

The contributions of this paper are described in the following. Firstly, different from previous studies, Bandura’s social learning theory is used to interpret the result that governmental performance perception exerts a significant positive effect on pro-environmental behavior. Secondly, the mediating variable of government performance perception is incorporated and its effect on existing causalities is explored. The results show that Internet use and environmental risk perception do not always achieve positive promoting effects. Thirdly, this study emphasizes that the government should fulfill its environmental responsibility and increase performance exposure as this encourages public participation in environmental protection activities, further strengthening positive outcomes. The government must also publicize efforts through the Internet and regulate available information about environmental risk within reason.

The remainder of this article is structured as follows: Section 2 presents a review of the literature and describes hypotheses. In Section 3, data sources, variables, and measurements are presented, and in Section 4, the results of this empirical study are described. The theoretical value and policy significance are discussed in Section 5. Finally, the research results

are summarized in Section 6 and the limitations of this study are discussed.

Theoretical Framework and Hypotheses

Internet Use

Network communication technology has flourished and is now widely applied throughout the world. As of January 2021, the number of people using mobile phones reached 5.22 billion, equating to 66.6% of the world’s total population, and 4.66 billion people around the world are using the Internet [22]. As of June 2021, the number of Chinese Internet users reached 1.011 billion, with an Internet penetration rate of 71.6% [23]. Information acquisition behaviors include information seeking (i.e., active and problem-oriented information acquisition) and information encountering (i.e., passive and opportunistic information acquisition) [24, 25]. The Internet has become an essential source of information for people, as more information can be obtained because of the large amount of data it covers [25, 26]. However, Internet use also exerts a subtle influence on the production activities, life, interpersonal communication, and the way of thinking, and has gradually replaced traditional media as the main channel from which the public obtains information [18, 20, 27].

In today’s digital age, the intensity and scope with which people participate in environment-related social interactions have significantly increased, which affects people’s perception of the current situation of environmental issues [27]. Generally, risk perception is not acquired through direct experience but rather, is activated by media reports [28]. The relationship between mass media and the social amplification of environmental risk has been explored [16, 29, 30]. As a “social amplification station”, mass media can amplify risk perception [15, 16]. The Internet offers the potential to significantly increase public awareness of environmental problems and associated risks [31]. Thus, the following hypothesis is proposed:

H1a: Internet use has a significant positive effect on environmental risk perception.

Negativity bias theory states that negative news or events are more likely to stimulate emotions and attract attention than positive information [32]. Many websites therefore present a significant proportion of negative news to garner more attention and achieve a higher click rate [27]. Moreover, the “gatekeeper” of content that once defined traditional media no longer exists on new media platforms and opposing voices as well as critical thoughts cannot be easily controlled and filtered [33]. As the information recipient, the public tends to focus on passive news and is more susceptible to negative information [34, 35]. The news reported on the Internet on government information significantly affect the trust the public places in the government and their satisfaction with government policies or works [36, 37].

The people who see negative environmental news on the Internet, such as pollution or specific pollution incidents caused by weak government regulation, are more likely to be dissatisfied with the environmental governance of the government [18, 20]. In this study, "government performance perception" is used to represent the public's satisfaction with the government's environmental governance work. Thus, the following hypothesis is proposed:

H1b: Internet use has a significant negative effect on government performance perception.

The Internet has accelerated the dissemination of laws and knowledge related to environmental protection, thus enabling people to quickly obtain information related to both the causes and hazards of environmental pollution as well as effective environmental protection measures [14]. The social pressure thus created encourages individuals to engage in pro-environmental behaviors out of fear of being isolated from society [38]. Appeals from various media for environmental protection could also enhance individuals' willingness to participate in environmental protection actions [39]. Furthermore, newspapers, television, radio, and the Internet have all been shown to influence people's pro-environmental behavior [13, 14, 40-42]. The higher the Internet use frequency, the more willing the public is to act pro-environmentally [11-13, 43]. Thus, the following hypothesis is proposed:

H1c: Internet use has a significant positive effect on pro-environmental behaviors.

Environmental Risk Perception

Environmental risk perception represents whether the public perceives environmental problems, which is a major variable in explaining government performance perception. The stronger the public's perception of environmental risk, the worse their evaluation of environmental governance [44]. If people worry about local and global environmental degradation, they may think that the government has failed to provide the best living conditions. Moreover, their perception of local and global environmental problems is negatively correlated with their evaluation of the government [45]. The public generally assumes that governments hold the chief responsibility to address environmental problems. Thus, when the public becomes aware of environmental pollution, they will be less satisfied with the government's environmental governance [19]. Consequently, the following hypothesis is proposed:

H2a: Environmental risk perception has a significant negative effect on government performance perception.

Protection motivation theory (PMT) discusses health behaviors from the perspective of motivation factors and indicates that appraised severity in the cognitive mediating process can explain changes in behavior. Individuals with high perceived severity have strong protective motivation [46]. Environmental risk perception motivates individuals worrying that

the deterioration of the environment may harm them to engage in pro-environmental behavior [10, 12, 17, 47]. Faced with climate change, risk perception is significantly positively associated with behavioral intention to participate in environmental action [48]. Concerning residential environments, encountering environmental pollution in this environment may also encourage individuals to engage in pro-environmental behavior [49, 50]. Individuals with high environmental risk perception are more likely to adopt risk coping actions ranging from benign (e.g., petitions and street protests) to more radical actions (e.g., violent incidents) [51]. Thus, the following hypothesis is proposed:

H2b: Environmental risk perception has a significant positive effect on pro-environmental behaviors.

Government Performance Perception

Government performance perception reflects the public's subjective evaluation of the government's environmental governance work. Existing research explored the relationship between residents' evaluation of the government's work and their pro-environmental behavior. If people perceive the quality of the government to be high, they are more willing to support the government's environmental spending, pay environmental taxes, conduct recycling activities, and participate in pro-environmental behaviors in the public sphere [52-55]. Those who perceive government power as high are more likely to behave pro-environmentally [56, 57]. Clearly, the evaluation of the government by the individual will influence public behavior related to environmental protection work. This study explores this influence through social learning theory.

In their social learning theory, Bandura and Walters pointed out that "after observing the behaviors of others, people assimilate and imitate that behavior, and develop similar behaviors." Furthermore, four necessary conditions are needed in the modeling process: attention, retention, reproduction, and motivation [58]. The first two are cognitive processes, while the latter two explain the behavioral processes of observers from a cognition and motivation perspective. Thus, complete modeling consists of two parts: one is acting and being perceived by observers, and the other is the action observers take in response. In environmental protection, the former part is often reflected by the public's evaluation of the government's environmental performance, while the latter part is their pro-environmental behavior. Modeling strategy, which demonstrates a desired pro-environmental behavior to a target population to trigger observational learning [59], can promote the public's pro-environmental behavior [60-62]. The higher the public's perception of government environmental performance, the more willing they are to adopt pro-environmental behaviors themselves [18]. Based on a review of previous studies and relying on Bandura's social learning theory, the following hypothesis is proposed:

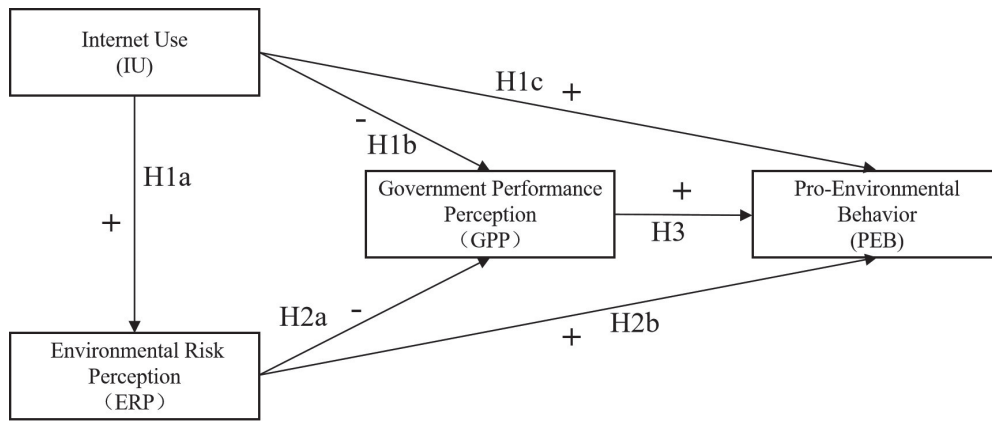


Fig. 1. Conceptual model.

Note: + indicates a positive effect, and – indicates a negative effect.

H3: Government performance perception has a significant positive effect on pro-environmental behaviors.

The conceptual model constructed in this study is shown in Fig. 1.

Based on the conceptual model and literature review, the relationship between variables is further explored. By applying environmental risk perception and government performance perception as intermediary variables, the following four intermediary hypotheses are proposed:

H4a: Environmental risk perception plays a mediating role between Internet use and government performance perception, and the mediating effect is positive.

H4b: Environmental risk perception plays a mediating role between Internet use and pro-environmental behaviors, and the mediating effect is positive.

H4c: Government performance perception plays a mediating role between Internet use and pro-environmental behaviors, and the mediating effect is negative.

H4d: Government performance perception plays a mediating role between environmental risk perception and pro-environmental behaviors, and the mediating effect is negative.

Methods and Data

Sample

For this study, data from the CGSS 2013 were used. The CGSS is a nationwide social survey where different modules are set up each time, using a multi-stage, stratified random sampling design to ensure the representativeness of the sample. CGSS 2013 is the latest survey with applicable environment-related questions. The original sample size of CGSS 2013 was 11,438. After careful assessment, a considerable number

of samples with missing values had to be removed (e.g., because of refusing to answer, no opinion, or default data), decreasing the number of observations to 7144. Female samples entering the final analysis accounted for 47.70%, while male samples accounted for 52.30%. The respondents' age range was 17-93.

Variables

Internet Use

Internet use (*IU*) was taken from the A28 option of CGSS 2013. Participants were asked to answer the following two questions: "in the past year, how often did you use the Internet (including mobile Internet)" and "in the past year, how often did you use customized messages on your mobile phone." Possible answers were "never," "rarely," "sometimes," "often," and "always," to which values of 1, 2, 3, 4, and 5 were assigned, respectively. The frequency of Internet use is the mean score of the two questions. The higher the score, the higher the frequency of Internet use.

Environmental Risk Perception

Environmental risk perception (*ERP*) was taken from the B21 option of CGSS 2013. In this option, researchers showed participants 12 types of environmental pollution and asked them if they had observed these kinds of pollution. If they answered "yes," the respondents were asked to answer the following question: "how serious is this kind of pollution in your area." Possible answers were "very serious," "relatively serious," "less serious," "not serious," "normal," "no concern/unclear," and "no such problem," to which values of 1, 2, 3, 4, 5, 6, and 7 were assigned, respectively. To ensure consistency of the research, values of 0, 1, 2, 3, 4, and 5 were assigned to responses of "do not know/ no such problem/ no concern," "not serious," "less serious," "normal," "relatively serious," and "very serious," respectively. Finally, the mean score of the 12 environmental

problems was used to measure environmental risk perception. The higher the above score, the higher the degree of environmental risk perception.

Government Performance Perception

Government performance perception (*GPP*) was taken from the B23 and B24 options of CGSS 2013. The respondents were asked to answer the following questions: “how do you think the central government has done in environmental protection over the past five years” and “how do you think the local governments have done in environmental protection over the past five years.” Possible answers were “attention was one-sided to economic development and environmental protection work was neglected,” “attention was insufficient, investment in environmental protection was insufficient,” “efforts were made, but the results were not satisfactory,” “great efforts were made and certain results were achieved,” and “great achievements,” to which values of 1, 2, 3, 4, and 5 were assigned, respectively. Finally, the mean score of the two questions was used to measure government performance perception. The higher the above score, the higher the degree of government performance perception.

Pro-Environmental Behavior

Pro-environmental behavior (*PEB*) was extracted from the B22 option of CGSS 2013. *PEB* was measured using a 10-item questionnaire, in which respondents were asked to report how often they take pro-environmental behaviors. Representative examples of these behaviors were “waste sorting,” “discussing environmental issues with friends and relatives,” “reusing plastic bags,” “donating for environmental protection,” and “maintaining forest or green land at one’s own expense”. To the answers “never,” “occasionally,” and “frequently” values of 1, 2, and 3 were assigned, respectively. A higher mean score of these questions indicated that the public was actively practicing environmental behavior.

Control Variables

Control variables included gender, age, education, income, health status, social attitude (*SA*), and environmental knowledge (*EK*). Gender was a dummy variable where a value of 1 indicated “male” and a value of 0 indicated “female”. Age is the year of the interview (2013) minus the year of birth. Education was a categorical variable coded as 1, 2, 3, 4, or 5 representing “elementary school and below,” “junior high school,” “technical secondary school, higher vocational school, senior high school, and technical school,” “college (adult education), and college (higher),” or “graduate or above,” respectively. To reduce collinearity, the logarithm of the total personal income in 2012 was used to describe income. Health status was extracted from

options A15, A16, and A17 of CGSS2013. Respondents were asked to answer three questions, “how do you feel about your current physical condition,” “in the past four weeks, how often have your work or other daily activities been affected by health issues,” and “in the past four weeks, how often did you feel depressed.” Possible answers were “very unhealthy/always,” “relatively unhealthy/often,” “normal/sometimes,” “relatively healthy/rarely,” and “very healthy/never,” to which values of 1, 2, 3, 4, and 5 were assigned, respectively. The mean score of these three questions was used to measure the health status of respondents. The higher the score, the more the respondents feel that they are physically and mentally healthy.

Social attitude was extracted from the A33 and A35 options of CGSS 2013. The respondents were asked to answer the following two questions: “generally speaking, do you agree that most people in this society can be trusted” and “generally speaking, do you think that today’s society is fair or unfair.” To the answers “strongly disagree/totally unfair,” “relatively disagree/relatively unfair,” “hard to say,” “relatively agree/relatively fair,” “totally agree/completely fair” values of 1, 2, 3, 4, and 5 were assigned, respectively. Social attitude was measured by the mean score of the two questions. The higher the score, the more positive the respondents’ social attitude.

Environmental knowledge was extracted from the B25 option of CGSS 2013. Ten items were designed to measure the environmental knowledge of respondents. The items involved were “automobile exhaust will not cause harm to human health,” “excessive use of fertilizer and pesticides will exert a threat on the environment,” and “the increase in carbon dioxide in the air will become a factor in climate warming”. Participants were asked to choose between “True,” “False,” and “Do not Know”. Items 2, 4, 6, 8, and 10 were true, while the others were false. Answers were assigned one point whenever an item was answered correctly and zero points otherwise. A higher total score on these questions indicated better environmental knowledge.

Descriptive Statistics

Descriptive statistics for all variables are shown in Table 1. The mean score of Internet use ($M = 1.889$ of 5) was lower than the midpoint, suggesting that respondents reported a relatively low Internet use frequency. Respondents also reported low environmental risk perception ($M = 1.655$ of 6) and pro-environmental behavior ($M = 1.543$ of 3), as compared with government performance perception ($M = 3.144$ of 5). This shows that the public is not very sensitive to environmental risks, and the public’s environmental protection behavior is lacking. However, the public is relatively satisfied with the government’s environmental governance.

Table 1. Descriptive statistics of the variables.

Variable	Mean	Std. Dev.	Min	Max
Gender	0.523	0.500	0	1
Age	48.49	15.52	17	93
Education	2.196	1.084	1	5
Income	8.639	3.145	0	13.82
Health	3.902	0.842	1	5
SA	3.175	0.833	1	5
EK	4.956	2.744	0	10
IU	1.889	1.161	1	5
ERP	1.655	1.069	0	5
GPP	3.144	1.042	1	5
PEB	1.543	0.332	1	3

Note: The number of observations is 7144.

Results

Multiple Linear Regression

STATA version 16 was used to test hypotheses, and the results of multiple linear regression are listed in Table 2. In the first multiple regression model, the relationship between Internet use and environmental risk perception was tested. The results show that Internet use has a significant positive effect on environmental risk perception ($\beta = 0.117$; $p < 0.001$), which is consistent with H1a. The more frequently the public uses the Internet, the stronger their perception of environmental risks will be. As is shown in Table 2, gender, age, and health status did not significantly affect the public's perception of environmental risks. People with higher education levels, higher income, and better environmental knowledge have a stronger perception of environmental risk. Social attitudes are negatively correlated with environmental risk perception.

In Model 2, Model 3, and Model 4, the potential variables affecting government performance perception were tested. In the second regression analysis model, the relationship between Internet use and government performance perception was tested. The results in Model 2 show that Internet use has a significant negative effect on GPP ($\beta = -0.061$; $p < 0.001$), which is consistent with H1b. In Model 3, the relationship between environmental risk perception and government performance perception was tested. The results show that environmental risk perception was negatively correlated with government performance perception ($\beta = -0.187$; $p < 0.001$), which is consistent with H2a. In Model 4, Internet use and environmental risk perception were also confirmed to have significant negative effects on government performance perception ($\beta = -0.040$,

$p < 0.01$; $\beta = -0.183$; $p < 0.001$). Gender, age, education level, and income level had no significant effect on government performance perception. People who score high on environmental knowledge are less satisfied with the government's environmental work. However, health status and social attitude have positive effects on government performance perception.

Similarly, in Panel 5-11 in Table 2 (Models 5-11), the potential variables affecting pro-environmental behavior were tested. In Model 5, Model 6, and Model 7, the effects of Internet use, environmental risk perception, and government performance perception on pro-environmental behavior were tested, respectively. The results of Model 5 show that Internet use has a significant positive effect on pro-environmental behavior ($\beta = 0.043$, $p < 0.001$). Furthermore, Model 8, Model 9, and Model 11 show the same result ($\beta = 0.036$, $\beta = 0.044$, $\beta = 0.037$, respectively; $p < 0.001$), which is consistent with H1c. In Model 6, environmental risk perception significantly positively affects pro-environmental behavior ($\beta = 0.059$, $p < 0.001$). This result is also obtained in Model 8, Model 10, and Model 11 ($\beta = 0.056$, $\beta = 0.064$, $\beta = 0.061$, respectively; $p < 0.001$), which is consistent with H2b. Government performance perception has a significant positive effect on pro-environmental behavior in Model 7 ($\beta = 0.016$, $p < 0.001$). This conclusion was also found in Model 9, Model 10, and Model 11 ($\beta = 0.018$, $\beta = 0.028$, $\beta = 0.029$, respectively; $p < 0.001$), which is consistent with H3. The results of the final model (i.e., Model 11) show that women with higher levels of education, higher income, and better health are more likely to participate in environmental work. Social attitude and environmental knowledge have significant positive effects on pro-environmental behavior.

Table 2. Multiple linear regression results.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
	ERP	GPP	GPP	GPP	PEB	PEB	PEB	PEB	PEB	PEB	PEB
Gender	-0.015 (0.024)	0.013 (0.024)	0.011 (0.024)	0.011 (0.024)	-0.060*** (0.007)	-0.059*** (0.007)	-0.060*** (0.007)	-0.059*** (0.007)	-0.060*** (0.007)	-0.059*** (0.007)	-0.059*** (0.007)
Age	0.002 (0.001)	0.001 (0.001)	0.003** (0.001)	0.002 (0.001)	0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)	0.002*** (0.000)
Education	0.162*** (0.014)	-0.043** (0.015)	-0.030* (0.014)	-0.013 (0.015)	0.072*** (0.004)	0.078*** (0.004)	0.092*** (0.004)	0.063*** (0.004)	0.073*** (0.004)	0.079*** (0.004)	0.064*** (0.004)
Income	0.019*** (0.004)	0.000 (0.004)	0.003 (0.004)	0.004 (0.004)	0.007*** (0.001)	0.007*** (0.001)	0.008*** (0.001)	0.006*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.006*** (0.001)
Health	-0.019 (0.015)	0.040** (0.015)	0.035* (0.015)	0.036* (0.015)	0.009* (0.004)	0.011* (0.004)	0.010* (0.005)	0.010* (0.004)	0.008 (0.004)	0.010* (0.004)	0.009* (0.004)
SA	-0.117*** (0.014)	0.244*** (0.014)	0.221*** (0.014)	0.222*** (0.014)	0.010* (0.004)	0.017*** (0.004)	0.006 (0.004)	0.016*** (0.004)	0.005 (0.004)	0.011* (0.004)	0.010* (0.004)
EK	0.080*** (0.005)	-0.048*** (0.005)	-0.034*** (0.005)	-0.033*** (0.005)	0.024*** (0.001)	0.020*** (0.001)	0.026*** (0.001)	0.019*** (0.001)	0.025*** (0.001)	0.021*** (0.001)	0.020*** (0.001)
IU	0.117*** (0.014)	-0.061*** (0.014)		-0.040** (0.014)	0.043*** (0.004)			0.036*** (0.004)	0.044*** (0.004)		0.037*** (0.004)
ERP			-0.187*** (0.012)	-0.183*** (0.012)		0.059*** (0.004)		0.056*** (0.004)		0.064*** (0.004)	0.061*** (0.004)
GPP							0.016*** (0.004)		0.018*** (0.004)	0.028*** (0.004)	0.029*** (0.003)
_cons	0.898*** (0.097)	2.590*** (0.100)	2.686*** (0.096)	2.755*** (0.099)	0.984*** (0.030)	0.996*** (0.029)	1.021*** (0.030)	0.934*** (0.029)	0.937*** (0.031)	0.922*** (0.030)	0.855*** (0.031)
N	7144	7144	7144	7144	7144	7144	7144	7144	7144	7144	7144
r2	0.178	0.086	0.114	0.115	0.208	0.226	0.199	0.234	0.211	0.233	0.241
F	193.727	84.138	115.106	103.285	233.757	260.949	221.603	242.413	211.472	240.813	226.920

Note: Standard errors are shown in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tests for Mediation Effects

Mediation effects were tested using Baron and Kenny’s causal step procedure for assessing causal mediation in statistical correlations between independent variables (IV) and dependent variables (DV) [63]. The first step of this procedure is to assess the effects of IV on DV. As shown in Table 3, Internet use was statistically related to government performance perception and pro-environmental behavior ($\beta = -0.061$ and $\beta = 0.043$, respectively; $p < 0.001$), and environmental risk perception was positively related to pro-environmental behavior ($\beta = 0.059$, $p < 0.001$). The second step is to assess the effects of IV on mediators (ME). The results are presented in Table 3, showing that Internet use was statistically related

to environmental risk perception and government performance perception ($\beta = 0.117$ and $\beta = -0.061$, respectively; $p < 0.001$). The outcomes also show that environmental risk perception was negatively related to government performance perception ($\beta = -0.187$, $p < 0.001$).

The third step is to determine whether IV has a nonsignificant regression coefficient when IV and ME are used to predict DV. If so, the mediation is complete; if not, the mediation is only partial. Table 3 shows that environmental risk perception is a partial mediator of the relationship between Internet use and government performance perception. This implies that the higher the frequency of Internet use of the people, the stronger their perception of environmental risk, resulting in less satisfaction with the government’s

Table 3. Tests for mediation effects (causal step procedure).

			Regression coefficients			
					(IV+ME→DV)	
IV	ME	DV	IV→DV	IV→ME	IV	ME
IU	ERP	GPP	-0.061***	0.117***	-0.040**	-0.183***
IU	ERP	PEB	0.043***	0.117***	0.036***	0.056***
IU	GPP	PEB	0.043***	-0.061***	0.044***	0.018***
ERP	GPP	PEB	0.059***	-0.187***	0.064***	0.028***

Note: * p<0.05, ** p<0.01, *** p<0.001

environmental governance work. This is consistent with H4a. Environmental risk perception is also a partial mediator of the relationship between Internet use and pro-environmental behavior. This indicates that the more frequently the public uses the Internet, the stronger their perception of environmental risks, and the more willing they are to participate in environmental protection work. This is consistent with H4b. When direct and indirect effects have different signs, the mediating effect is negative. Clearly, there is a negative and significant mediating effect for government performance perception between Internet use and pro-environmental behavior, which is consistent with H4c. Moreover, the mediating effect for government performance perception between environmental risk perception and pro-environmental behavior is also negative. Government performance perception will inhibit the transformation of environmental risk perception into pro-environmental behavior, which is consistent with H4d.

To ensure the reliability of the above conclusions, the Bootstrap method was used for verification. For this, bootstrapping was performed at a 95% confidence interval with 5000 samples and the confidence interval of the lower and upper bounds (95% BC, 95% percentile) was calculated to test whether the indirect effects are significant. When the 95% confidence interval does not contain zero, indirect effects are significant. As shown in Table 4, the results are consistent with the conclusions of the causal step procedure.

Discussion

This paper explores the relationships between Internet use, environmental risk perception, government performance perception, and pro-environmental behaviors. Combined with the mediation model, 10 relevant hypotheses are established. Through testing, the negative mediating role of government performance perception was verified and a conceptual framework was constructed. The results indicate that Internet use and environmental risk perception affect pro-environmental behavior through government performance perception.

Internet use has a significant positive effect on pro-environmental behaviors, which is in line with past research [12-14]. Relevant content published on the Internet can create public opinion, construct environmental appeals, and accelerate the dissemination of environment-related laws and knowledge, thus encouraging the public to act environmentally [14, 38, 39]. Furthermore, environmental risk perception plays a positive mediating role between Internet use and pro-environmental behavior. It has been shown that mass media, as a “social amplification station”, can amplify risk and enhance public perception of environmental risks [27, 31]. Out of fear that environmental deterioration may harm the people, when they perceive environmental risks, they will engage in pro-environmental behavior [12, 17].

Furthermore, the variable of government performance perception was added to the analysis framework. As a subjective perception, the public’s

Table 4. Tests for mediation effects (Bootstrapping).

IV	ME	DV	Direct effect	Indirect effect			
				Effect	BootSE	BootLLCI	BootULCI
IU	ERP	GPP	-0.0399***	-0.0214	0.0030	-0.0274	-0.0154
IU	ERP	PEB	0.0361***	0.0065	0.0008	0.0049	0.0082
IU	GPP	PEB	0.0437***	-0.0011	0.0004	-0.0018	-0.0004
ERP	GPP	PEB	0.0638***	-0.0051	0.0007	-0.0066	-0.0037

Note: CI = 95% confidence interval for the indirect effect: if CI does not include zero, the indirect effect is considered statistically significant and is displayed in bold.

evaluation of government performance is inevitably affected by information transmitted via the Internet. This study shows that Internet use is negatively correlated with government performance perception, which is consistent with negativity bias theory and previous studies [20]. On the Internet, the lack of a content “gatekeeper” and the flood of negative information often causes people to become dissatisfied with the government’s environmental work [20, 33]. This study showed that environmental risk perception has a significant negative effect on government performance perception. If residents perceive environmental risks, they may think that the government is negligent, which diminishes their evaluation of the government’s environmental performance [19, 45]. This research also further confirms that environmental risk perception plays an important intermediary role between Internet use and government performance perception.

The relationship between the public’s evaluation of the government and pro-environmental behavior has been studied extensively [52, 56, 57, 64]. In this context, this paper focuses on environmental protection performance and highlights that government performance perception exerts a significant positive effect on pro-environmental behavior. Social learning theory developed by Bandura and Walters is employed to support this conclusion [58]. Furthermore, the mediating role of government performance perception is explored, confirming that government performance perception plays a negative mediating role between Internet use and pro-environmental behavior. A high frequency of Internet use generally yields more negative information [20], leading to a low opinion of the government, which renders the public reluctant to adopt pro-environmental behaviors. Based on this, the obtained results suggest that Internet use does not always promote pro-environmental behavior, which presents one of the innovations of the present study. Moreover, government performance perception plays a negative mediating role between environmental risk perception and pro-environmental behavior. The public’s evaluation of environmental governance inhibits the transformation of environmental risk perception into pro-environmental behaviors [44]. Environmental risk perception can directly promote pro-environmental behavior [12, 17]; however, it also decreases the public’s evaluation of government performance [19], thus weakening the willingness of the public to display pro-environmental behavior.

The results, which are based on CGSS 2013 data, show that government performance perception has a significant positive effect on pro-environmental behavior. Hence, while the government is fulfilling its environmental responsibility, increasing the exposure of government environmental performance can stimulate pro-environmental behaviors among the public, thus facilitating the implementation of environmental

policies that require citizen engagement, such as water conservation, waste sorting, and low-carbon travel. For example, the government can create official accounts on Weibo, WeChat, and other platforms to provide interpretations on policies or regulations and display the success of environmental governance. The results also indicate that government performance perception negatively mediates the influence of Internet use and environmental risk perception on pro-environmental behaviors. While it is important to make the public aware of environmental issues, it is also necessary to publicize the efforts by the government through the Internet so that the government can portray an exemplary role in environmental protection. The government should support online media to focus on environmental issues, disseminate environmental knowledge, and report adverse effects of environmental pollution to raise people’s awareness regarding environmental protection. At the same time, the construction of e-government should be strengthened, the transparency of the government’s environmental protection work should be improved, and the government should respond to the doubts and dissatisfaction of the public.

Conclusions

In this paper, the relationship between Internet use, environmental risk perception, government performance perception, and pro-environmental behavior is explored through CGSS 2013 data. The results show that Internet use and environmental risk perception not only directly affect pro-environmental behaviors, they also indirectly influence pro-environmental behaviors through the mediating effect of government performance perception. A framework model between these four variables was established.

This research has several limitations. First, secondary data was employed; therefore, variables that may affect government performance perception (e.g., political stance, environmental pollution, and public expectation of government performance) were not included in this study and data remains to be updated. Moreover, the government may be further divided into central and local governments or federal and state governments to further increase the resolution of results. Finally, potential mediating variables need to be further explored to optimize the model framework constructed in this study.

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Conflict of Interest

The authors declare no conflict of interest.

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