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Knowledge or Responsibility? The Role of Media Use on Citizens’ Willingness to Pay for Environment Governance

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Abstract: It is not that the public is unwilling to participate in environmental protection, but rather that they lack the appropriate information. The media offers an alternative explanatory pathway to understanding citizens’ willingness to pay (WTP) for environmental governance, but the existing literature still lacks empirical studies on this topic and the intermediate mechanisms. Adopting an environmental communication perspective, this paper divided the environmental effects of media into two dimensions: knowledge growth and responsibility cultivation, and conducted an empirical analysis on whether, and how, media use affected citizens’ WTP, based on data from the China General Social Survey 2018 (hereafter, CGSS2018). The findings found that the frequency of media use significantly increased citizen’s WTP, in which individual environmental responsibility rather than environmental knowledge played a mediating effect; i.e., media use increased individuals’ WTP by increasing the public’s environmental responsibility. Furthermore, this study discovered that traditional media use had a significant effect on the citizens’ WTP, again verifying the mediating effect of individual environmental responsibility, while new media use did not have such a communication effect. This study extends the theories related to pro-environmental behaviors, and provides practical implications for the government to promote environmental governance and sustainability.

Keywords: media use; willingness to pay (WTP); environmental knowledge; environmental responsibility; traditional media; new media

1. Introduction

China has witnessed a period of rapid economic development in the past 40 years, but it has also paid a serious environmental price. How to achieve sustainability is a major challenge for this country. Air pollution, represented by PM$_{2.5}$, is receiving increasing attention from the public and the mass media. The treatment of air pollution also requires a high economic cost, for which the central government has set up special funds for air pollution governance, and has been increasing the amount of funding continuously. However, environmental governance is a coproduction field that requires not only government initiatives, but also active citizen participation [1], such as reducing car use, purchasing electric cars, and using public transportation. In addition, the public can also share the costs of environmental governance with the government through financial payments such as compensation for damages and restoration. Many developed countries established environmental funds such as “emission reduction funds” and “carbon funds” as early as the late 1980s, to bring social resources into air pollution control. This kind of reasonable sharing of pollution-control costs with the public is an important measure to ensure the provision of funds and the formation of a multi-governance situation. As a result, scholars have been actively engaged in monetizing the impact of environmental pollution on the public and guiding the public to participate in environmental governance through economic payments.

Governance emphasizes the collaborative participation of multiple actors [2]. Specifically, it is the process by which the state launches and implements environmental initiatives,
businesses fulfill their environmental responsibilities, and citizens perform positive pro-
environmental behaviors, etc. The process in which multiple subjects work together to
serve the goals of environmental protection and sustainable development is understood
as environmental governance [3]. Willingness to pay (WTP) for environment governance
refers to the economic price the public is willing to pay for a certain degree of environmen-
tal improvement [4]. This paper uses it as a dependent variable for two reasons: firstly,
most of the existing studies on pro-environmental behaviors have focused on the two ex-
tremes of the pro-environmental behaviors, i.e., pro-environmental behaviors in the private
sphere (such as sorting household waste) and extreme environmental protests in the public
sphere (such as participating in Not In My Back Yard protests); WTP, as a non-contested
pro-environmental behavior in which citizens interact with the government and participate
in the public sphere, lacks a research perspective on media use [5]. Secondly, the gap
between willingness and behaviors has long made it impossible to measure the citizens’
willingsness to predict their true behaviors, especially in the environment field. However,
compared to other measures of willingness, WTP for the environment governance places
more emphasis on money, which needs citizens to evaluate more carefully and thus can
effectively predict the public’s true pro-environmental behaviors [6,7]. Based on this, this
paper focuses on citizens’ WTP for environmental governance and conducts an in-depth
analysis of its influencing factors.

Existing studies have analyzed citizen’s WTP for environmental governance from the
perspectives of demographic characteristics and individual psychological mechanisms.
Specifically, the former argued that demographic characteristics such as gender, age, and
income affected the people’s WTP [1,8,9], while the latter contended that variables such as
perceptions and attitudes had an impact on the public’s WTP [10–13]. In addition to these
variables, we need to recognize that public perceptions and attitudes are not innate, but are
profoundly influenced by the social environment. As Verba et al. suggest, the reason why
people do not engage in political activities may be because they are not asked [14]. This
also brings to light the fact that lack of information may be an important factor influencing
the public’s pro-environmental behaviors, which also suggests that the media assumes a
key role in mobilizing public participation in environmental protection [15–17]. Therefore,
based on communication theory, this paper introduces media use into the study of the
citizen’s WTP for environmental governance and addresses research question: does media
use have an impact on WTP? If it does, what are the internal mechanisms between media
use and WTP?

Considering that the public goods of the environment are not available in a market
scenario to obtain real preferences for individual behaviors [18,19], this paper chooses the
contingent valuation method (CVM), which was a recognized tool for estimating monetary
non-market values [4]. Specifically, the CVM uses questionnaires to ask people directly
about their willingness to pay (WTP) for an improved function of an ecosystem service in a
simulated market, or their willingness to accept (WTA), to reveal the respondents’ prefer-
ences for environmental goods and services, and ultimately to obtain the non-use economic
value of public goods [20–23]. Based on CVM, this paper found that the frequency of media
use could significantly increase the citizen’s WTP, using data from the CGSS2018, in which
environmental responsibility played a mediating effect. On the contrary, individual envi-
ronmental knowledge did not have such a mediating effect. Thus, this paper argues that
media use increases citizens’ WTP by increasing individual perceptions of environmental
responsibility. Furthermore, this paper found that traditional media, but not new media,
significantly increased citizens’ WTP, again confirming the mediating effect of individual
environmental responsibility.

The contributions of this paper are that firstly, it adds citizens’ WTP for environmental
governance to the existing literature on media use and pro-environmental behaviors.
Secondly, previous research has confirmed that media use is an important factor influencing
citizens’ pro-environmental behaviors, but has not opened the “black box” in the process.
This paper divides the role of the media into two categories, and discusses how the media
influences the public’s WTP from the perspectives of knowledge growth and responsibility cultivation, enhancing the theoretical explanatory depth in the field of environmental communication. Thirdly, empirical evidence from China broadens the explanatory scope of citizens’ WTP for environmental governance [24]. The rest of this paper is organized as follows: the next section presents the research hypotheses based on the literature review; the next section gives the data sources and methods; the fourth section shows the results; the last section concludes with the research discussion and conclusions of this paper.

2. Literature Review and Hypothesis Development

2.1. Media Use and WTP

In the environmental field, the citizen’s pro-environmental behaviors can be placed on a continuum [8]. Stern simplified this continuum by distinguishing three types of pro-environmental behaviors: the first one is behaviors in the private sphere [13]. The public’s green living and consumption on an individual or household basis, such as using clean energy, recycling goods, sorting waste, buying green foods, and using environmentally friendly and energy-efficient appliances in daily life. The second one is radical environmental behaviors in the public sphere. For example, the citizen joins environmental protection organizations, puts forward environmental protection petitions, or organizes demonstrations. The third one is non-radical environmental behaviors in the public sphere, where the citizen supports or accepts public environmental policies and indirectly promotes the control of environmental pollution. For example, people support the introduction of environmental protection laws and regulations, and are willing to pay higher taxes for environmental protection.

Most of the existing literature focuses on the first and second categories of environmental behaviors, with the former mostly using survey methods to discuss factors that influence the public’s individual pro-environmental behaviors, and the latter using qualitative methods to focus on environmental protest events. This paper chooses the third category of pro-environmental behaviors, specifically the citizens’ WTP for environmental protection.

The studies that have been conducted on WTP for the environment fall into three broad categories [25–29]. The first category of literature focuses on demographic data, such as age and gender. Shahsavar et al. used CVM, asking Czech people “how much more would you be willing to pay for an eco-friendly sofa?” The items were coded as different levels of amounts, and the results showed that age and marital status had a significant effect on WTP [30]. The second category of literature was economic factors that were closely related to WTP, such as personal or household income [31]. Shao et al. used data from the China Social Survey 2010 (CGSS2010) to examine the effect of income on residents’ WTP for environmental protection. The authors used the two contingent valuation survey questions of “in order to protect the environment, to what extent are you willing to pay more?” for (1) more expensive but more environmentally-friendly products and; (2) higher taxes. The results found that the middle-income class had the strongest WTP [31]. The third category of literature focused on psychological variables, such as public environmental perceptions, awareness, and attitudes [32]. Rekola asked respondents, “do you accept the proposal for higher taxes for forest regeneration?” and “what is the maximum you would pay for this proposal?” The author found that citizens’ attitudes and perceived behavioral control had significant effects on WTP. Other scholars brought in the government, a key subject of environmental governance, to discuss the impact of national environmental goods provision on WTP [33,34]. Based on a questionnaire in Ghana, Nketiah et al. found that government involvement influenced citizens’ WTP through attitudes and subjective norms [34].

It is important to note, however, that in addition to demographic variables, the existing literature was based on the premise that the public is aware of the importance of environmental protection, or already has attitudes and perceptions of environmental protection, although there are differences in the degree of these psychological variables. In reality, people are often not aware of the issue of environmental protection, or even do not have
information about environmental governance. This points directly to another important factor that influences the public’s WTP—the media. Especially with the development of the internet, people rely more on the mass media to obtain environmental information, perceive environmental changes, and develop environmental awareness.

A review of the extensive research on media use and citizen pro-environmental behaviors has focused mostly on the field of environmental communication. In environmental communication theory, the media are not only an important source of environmental information for the public, but also play a crucial role in shaping social opinion on environmental issues. The existing environmental communication literature discussed the content, discourse, and rhetorical analysis of the media more from the perspective of journalism and communication, less from the perspective of the effects of the mass media, and less from the discussion of intermediate mechanisms. Moreover, due to the nature of the media, too much academic attention has been paid to environmental protest events, neglecting non-radical pro-environmental behaviors. Moreover, compared to the academic enthusiasm for environmental communication in western countries, academic research on environmental communication in the Chinese context is very limited. It can be argued that current academic research on environmental sustainability needs empirical evidence on pro-environmental behaviors in the Chinese context, especially on the public’s WTP for environmental governance, and environmental communication is certainly a very good theoretical starting point.

The existing literature presented two conflicting arguments regarding the relationship between media use and pro-environmental behaviors. Some scholars argued that media use increases pro-environmental behaviors, while other scholars contended that media use has a negative effect. Specifically, scholars argued that the media shape the public’s values by focusing on and appealing to environmental issues, thereby increasing the willingness to engage in environmental activities. In addition, media propaganda creates social norms and public pressure about environmental protection, and the public chooses to abide by this social value and engage in pro-environmental behaviors out of fear of being ostracized and feared by others [35–37]. Furthermore, scholars have affirmed that mass-media use helps predict citizens’ pro-environmental attitudes and behaviors, based on the theory of planned behavior, the media dependence theory [38], and the presumed media influence model [39].

On the other hand, critics argued that increased media attention is not sufficient to induce actual pro-environmental behavior and that even direct exposure of the public to traditional media such as television and newspapers reduced pro-environmental behaviors [40]. Because of the negative and anti-government nature of television, the public’s reliance on television for news had a negative impact. The high frequency of media use by the public may prevent them from going outside their homes to participate in environmental affairs. At the same time, with the development of the internet, more and more voices are pointing out that new media have a negative impact on public awareness and behavior. Some scholars further argued that the role of the media depends on the content of the programs rather than the media itself: viewing news stories and nature programs had a significant positive association with pro-environmental behaviors, while viewing commercial and entertainment programs had a negative impact [41,42].

This paper argues that media use positively predicts the citizen’s environmental WTP for two main reasons: on the one hand, similar to other pro-environmental behaviors, the media shape the public’s values by focusing on and appealing to environmental issues, and also promoting positive social norms for environmental protection, thus promoting the citizen’s WTP for the environment. On the other hand, there have been conflicting findings on media use and pro-environmental behaviors, one reason being that citizens who use media too frequently were reluctant to go outside their homes to participate in environmental affairs. However, because the dependent variable is the citizen’s WTP, people only need to pay a fixed amount for environmental protection, and there is no additional cost in time and effort. Therefore, this paper proposes Hypothesis 1.
Hypothesis 1: The higher the level of media use of citizens, the larger the amount they are willing to pay for environmental governance.

2.2. The Mediation Effects

In general, the media has three functions: informing, educating, and making decisions [43], which are reflected in the field of environmental protection and correspond to the growth of environmental information, the perception of environmental responsibility, and the citizens’ WTP for environmental protection [44,45]. Currently, few studies have placed the three variables in one analytic framework to discuss how media use affects the citizen’s WTP for environmental governance through increased environmental knowledge and individual perceptions of environmental responsibility.

Environmental knowledge refers to the capacity of individuals to recognize a variety of cues, ideas, and behavioral patterns associated with environmental preservation [45,46]. Compared to environmental education in schools and interpersonal communication limited by individual social networks, the advantage of the media in improving individual environmental knowledge lies in its ability to provide the entire audience with up-to-date environmental knowledge. The mass media provides the public with a comprehensive understanding of environmental issues by frequently disseminating environmental information to the public and providing a wide range of information about environmental protection. It has also been shown that television media coverage of environmental issues contributes to the level of environmental knowledge of the public [42,47]. In addition, media use has been shown to significantly increase the public’s information-seeking behavior [48].

In addition, since the WTP belongs to the public domain for pro-environmental behaviors, it needs to share the responsibility of environmental governance with the government. In terms of government environmental policy decisions, mass media can technically guarantee the public’s right to expression and information by expressing a public opinion and disseminating policy information. In terms of policy implementation, the implementation of public policy requires public support and cooperation. The government also, through considerations of public transparency, chooses to announce, interpret, and publicize relevant environmental protection-related policies through mass media such as television, newspapers, and the internet, which also improves the citizens’ knowledge base of the policies. Therefore, this paper proposes Hypothesis 2.

Hypothesis 2: The higher the level of media use of citizens, the higher their level of environmental knowledge.

The media behavior of the public also changes their perception of environmental responsibility. Environmental responsibility refers to the emphasis on the citizens’ judgment and understanding of elements such as the subject of responsibility for air pollution. The mass media shape public opinion by setting the news agenda, specifically by determining what attracts the public attention as news through what they report and what they do not report, and also by determining the status and importance of that news, through the way it is reported. Specifically, mass media publicity about environmental protection increases citizens’ attribution of responsibility for air pollution, especially when the government tends to involve citizens more in environmental protection, and directs public opinion through multi-media platforms, for example, by increasing coverage of the harsh consequences of air pollution; this further shapes social norms for citizen participation in environmental protection, and thus increases citizens’ individual responsibility for environmental protection. Therefore, this paper proposes Hypothesis 3.

Hypothesis 3: The higher the level of media use of citizens, the higher their public environmental responsibility.
Furthermore, an environmental knowledge-base and environmental awareness play a decisive role in citizens’ pro-environmental behaviors [49,50]. Individuals cannot participate in various environmental behaviors if they do not have appropriate environmental knowledge. The more people know about environmental issues and action strategies, the more likely it is that pro-environmental behaviors will be put into practice. A number of studies have been conducted to show that environmental knowledge is one of the important factors influencing individuals’ pro-environmental behaviors [51,52]. The level of environmental knowledge has also been found to have a positive effect on individual pro-environmental behavior [53]. In addition, the perception of environmental responsibility also predicts citizens’ pro-environmental behaviors. The norm activation theory suggests that when personal norms are activated by outcome awareness and responsibility attributions, normative dysregulation occurs, which leads to feelings of guilt, and guilt motivates individuals to act in response to a moral obligation to compensate society [54]. Specifically, when individuals perceive that the consequences of environmental pollution are caused by their own daily lives, reinforcing the individual attribution of responsibility for pollution, individuals will have a moral obligation to compensate for environmental pollution, which can be directly reflected in money, i.e., citizens are willing to pay more for environmental protection.

Overall, the media can facilitate citizens’ learning of environmental knowledge and influence their environmental responsibility [55], which in turn can increase the amount of money citizens are willing to pay for environmental management. In this regard, the government, as the main subject of environmental management, uses multiple media channels to publicize and explain its environmental policies, which makes citizens who use the media more frequently receive policy-related knowledge and thus become more willing to take the main responsibility of environmental protection together with the government, and show higher WTP for environmental protection. In addition, the communication of environmental protection through the media promotes a social atmosphere for environmental protection, which continues to reinforce individual responsibility for environmental pollution problems and can lead to a moral impulse for citizens to compensate for pollution, highlighted by WTP for environmental governance. As a result, this author proposes Hypotheses 4 and 5.

**Hypothesis 4:** Citizens’ environmental knowledge plays a mediating role between media use and the amount citizens are willing to pay for environmental governance.

**Hypothesis 5:** Citizens’ environmental responsibility plays a mediating role between media use and the amount citizens are willing to pay for environmental governance.

The analytical framework of the paper is shown in Figure 1, where media use is considered in this paper as the independent variable that influences citizens’ WTP for environmental governance, where individual environmental knowledge and individual environmental responsibility are two different mediating variables. The paper aims to verify whether and how media use affects WTP through environmental knowledge and environmental responsibility. The paper further compares the two pathways to analyze the logical mechanism of media use on the dependent variable. Finally, this paper opens up media use to analyze whether and how traditional media, represented by television, radio, newspapers, and magazines, and new media, represented by the internet and cell-phone customized messaging, affect citizens’ WTP through the two mediating variables.
Figure 1. Analytical Model.

3. Data and Measures

3.1. Data

The data of this study were obtained from the China General Social Survey (CGSS, http://cgss.ruc.edu.cn, accessed on 20 October 2022). Currently, CGSS data are widely used in scientific research, education, and government initiatives [56–61]. The survey was conducted in a total of 100 counties (districts) in 29 provinces across China, and within each county (district), four communities or villages were randomly selected, from which 25 households were then randomly surveyed. One person from each household was again randomly selected for an interview, making the data highly representative of the whole nation. Among them, the China General Social Survey 2018 (CGSS2018) randomly asked some residents about energy-related issues. This paper obtained a total of 2950 valid samples, after removing missing and illogical observations.

3.2. Measures

3.2.1. Dependent Variable

Considering that the public goods of the environment are not available in a market scenario to obtain real preferences for individual behaviors [18,19], this paper chooses CVM to measure citizen’s WTP for environment governance, which has been widely used in studies of public environmental goods [4,20,21,62–64]. Respondents are generally provided with a scenario, mainly relevant information about the valued resource before carrying out the contingent valuation survey [18,23,65,66]. In this paper, the question on citizens’ WTP for the environment in CGSS2018 was measured as, “How much would you be willing to pay per month for the government to ensure that it increases the number of days with excellent air quality by 1 day per month in 2018 through certain governance means (e.g., shutting down factories, etc.)?”

3.2.2. Independent Variable

The CGSS2018 questionnaire measured citizens’ media use by asking respondents, “in the past year, how did you use the following media?” The options included newspapers, magazines, radio, television, internet, and cell-phone customized messages, and the answers were coded on a five-point Likert scale (1—never, 5—very often). The frequency of use of the six media was added up, to obtain the citizen’s media-use score.

3.2.3. The Mediating Variables

The mediating variables included individual environmental policy knowledge and individual environmental responsibility. Among them, the questionnaire measured citizens’ knowledge of the following energy policies, by asking them, “how well do you know them?” To measure citizens’ knowledge of environmental energy policies, a total of 13 energy policies were asked, namely Coal to Gas, Coal to Electricity, High-Quality Coal Replacement (subsidized anthracite coal instead of bituminous coal), High-Efficiency Stove Subsidy, Tiered Electricity Tariff, Peak and Valley Electricity Tariff, Residential Photovoltaic-Power-Plant Subsidy, Electricity Subsidy for Poor Families, Electric Vehicle Purchase Subsidy, Peak and Valley Electricity Tariff for Home Electric-Vehicle Charging-Piles, Natural Gas Tiered-Price, Rural Biogas Pond Subsidy, Photovoltaic Subsidy, Rural Biogas Digester Subsidy, and Photovoltaic Poverty Alleviation. Answers were coded using a five-level
Likert scale (1—completely know, 5—not at all know). Respondents’ responses were added up, to obtain the level of citizens’ knowledge of environmental policies.

Individual environmental responsibility was obtained by asking respondents, “how much do you agree with the following statements?”, including “people should sacrifice some economic benefits to protect the environment”, and “individuals have a very limited role in controlling energy consumption”. The answers were coded on a five-point Likert scale (1—strongly agree, 5—strongly disagree). Respondents’ responses were added up to obtain a score for citizens’ responsibility for environmental protection.

3.2.4. Control Variables

This paper used gender, age, province of residence, and marital status as control variables, where gender (1 for male and 0 for female), province of residence, marital status (1 for being in a marriage and 0 for others), and education level (1 for elementary school and below, 2 for middle school, 3 for high school, 4 for junior college, 5 for undergraduate, and 6 for graduate and above) were categorical variables, and age was a continuous variable. The logarithm of total household income in 2017 measured respondents’ annual household income.

4. Results

4.1. Descriptive Statistics and Correlation Analysis

As Table 1 shows, the results show that the mean value of the amount citizens are willing to pay for environmental governance is RMB 14.686. The mean value of citizens’ media-use score is 12.912, which is at a medium level. The average age of the sample is 49.432; the percentage of males is 46.20%; the percentage of married is 75.80%; the education level is 2.348, which is approximately between middle school and high school education levels; and the average annual household income is 11.134.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WTP</td>
<td>14.686</td>
<td>47.994</td>
<td>0</td>
<td>999</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. media use</td>
<td>12.912</td>
<td>3.723</td>
<td>7</td>
<td>27</td>
<td>0.097***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>3. knowledge</td>
<td>24.079</td>
<td>8.953</td>
<td>13</td>
<td>65</td>
<td>0.050***</td>
<td>0.296***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>4. responsibility</td>
<td>7.217</td>
<td>1.352</td>
<td>2</td>
<td>10</td>
<td>0.071***</td>
<td>0.091***</td>
<td>0.028</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>5. age</td>
<td>49.432</td>
<td>16.521</td>
<td>17</td>
<td>93</td>
<td>-0.081***</td>
<td>-0.266***</td>
<td>-0.094***</td>
<td>-0.048***</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>—</td>
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<tr>
<td>6. square of age</td>
<td>2716</td>
<td>1666</td>
<td>289</td>
<td>8649</td>
<td>-0.071***</td>
<td>-0.254***</td>
<td>-0.092***</td>
<td>-0.052***</td>
<td>0.984***</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>7. male</td>
<td>0.462</td>
<td>0.499</td>
<td>0</td>
<td>1</td>
<td>0.027</td>
<td>0.071***</td>
<td>0.089***</td>
<td>0.02</td>
<td>0.022</td>
<td>0.03</td>
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<tr>
<td>8. married</td>
<td>0.758</td>
<td>0.428</td>
<td>0</td>
<td>1</td>
<td>-0.014</td>
<td>-0.004</td>
<td>-0.019</td>
<td>0.040***</td>
<td>0.093***</td>
<td>0.017</td>
<td>-0.015</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9. education</td>
<td>2.348</td>
<td>1.345</td>
<td>1</td>
<td>6</td>
<td>0.011***</td>
<td>0.508***</td>
<td>0.295***</td>
<td>0.061***</td>
<td>-0.443***</td>
<td>-0.405***</td>
<td>0.096***</td>
<td>-0.148***</td>
<td>—</td>
</tr>
<tr>
<td>10. income</td>
<td>11.134</td>
<td>1.868</td>
<td>4.61</td>
<td>16.12</td>
<td>0.086***</td>
<td>0.254***</td>
<td>0.147***</td>
<td>0.033*</td>
<td>-0.187***</td>
<td>-0.167***</td>
<td>0.004</td>
<td>-0.088***</td>
<td>0.347***</td>
</tr>
</tbody>
</table>

Note: ***p < 0.01, **p < 0.05, *p < 0.1; Sample size: 2950.

From the correlation results, it can be found that citizens’ WTP and media use are closely related, and H1 is initially verified. Citizens’ media use is also significantly correlated with individual environmental knowledge and environmental responsibility, and H2 and H3 were initially tested.

4.2. Main Effect of Media Use on WTP

As Table 2 shows, Model 1 of Table 2 shows that the intensity of media use is positively associated with citizens’ WTP, i.e., for each unit increased in citizens’ frequency of media use, citizens are willing to pay an extra RMB 1.248 for better air quality. Next, this paper further included control variables in the model (Model 2). The results of this analysis show that citizens’ frequency of media use remains positive and significant (p < 0.1) for citizens’ WTP. This means that for every unit increased in the frequency of citizens’ media use, they are more willing to pay RMB 0.665 more for good environmental quality, controlling for other variables. H1 was supported. In addition, this paper finds a U-shaped relationship
between age and citizens’ WTP. In addition, citizens with higher level of household income are willing to pay more.

Table 2. The result of media use on WTP.

<table>
<thead>
<tr>
<th>Variables</th>
<th>WTP</th>
<th>S.E.</th>
<th>WTP</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media use</td>
<td>1.248 ***</td>
<td>0.255</td>
<td>0.665 *</td>
<td>0.349</td>
</tr>
<tr>
<td>Age</td>
<td>−0.701 **</td>
<td>0.336</td>
<td>0.006 *</td>
<td>0.003</td>
</tr>
<tr>
<td>Square of age</td>
<td>1.383</td>
<td>2.203</td>
<td>1.247</td>
<td>1.075</td>
</tr>
<tr>
<td>Education</td>
<td>1.296 ***</td>
<td>0.492</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>−1.428</td>
<td>5.578</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td>−1.428</td>
<td>3.203</td>
</tr>
<tr>
<td>Observations</td>
<td>3017</td>
<td>2950</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.009</td>
<td>0.018</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *** p < 0.01, ** p < 0.05, * p < 0.1; S.E.: standard errors.

4.3. The Mediation Effect of Environmental Knowledge and Responsibility

This paper then continued to analyze the impacts of media use on individual knowledge and individual responsibility. The results are presented in Models 1 and 2 of Table 3, which show that controlling for other variables, citizens’ media use shows a significant positive relationship with individual knowledge of environmental policies and individual environmental responsibility. H2 and H3 were supported.

Table 3. The mediation effect of media use on WTP.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Knowledge</th>
<th>Responsibility</th>
<th>WTP</th>
<th>WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media use</td>
<td>0.452 ***</td>
<td>0.027 ***</td>
<td>0.628 *</td>
<td>0.606 *</td>
</tr>
<tr>
<td>(0.051)</td>
<td>(0.008)</td>
<td>(0.366)</td>
<td>(0.352)</td>
<td></td>
</tr>
<tr>
<td>Responsibility</td>
<td>2.215 ***</td>
<td>(0.818)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.190 ***</td>
<td>0.004</td>
<td>−0.717 **</td>
<td>−0.711 **</td>
</tr>
<tr>
<td>(0.061)</td>
<td>(0.009)</td>
<td>(0.328)</td>
<td>(0.335)</td>
<td></td>
</tr>
<tr>
<td>Square of age</td>
<td>−0.002 ***</td>
<td>−6.10 × 10⁻⁵</td>
<td>0.006 **</td>
<td>0.006 **</td>
</tr>
<tr>
<td>(0.001)</td>
<td>(9.09 × 10⁻⁵)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.063 ***</td>
<td>0.044</td>
<td>2.022</td>
<td>2.011</td>
</tr>
<tr>
<td>(0.315)</td>
<td>(0.050)</td>
<td>(1.693)</td>
<td>(1.708)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>−0.257</td>
<td>0.129 **</td>
<td>1.404</td>
<td>1.097</td>
</tr>
<tr>
<td>(0.397)</td>
<td>(0.063)</td>
<td>(2.189)</td>
<td>(2.237)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.389 ***</td>
<td>0.015</td>
<td>1.134</td>
<td>1.214</td>
</tr>
<tr>
<td>(0.162)</td>
<td>(0.025)</td>
<td>(1.041)</td>
<td>(1.068)</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>0.203 **</td>
<td>0.008</td>
<td>1.280 ***</td>
<td>1.279 ***</td>
</tr>
<tr>
<td>(0.090)</td>
<td>(0.014)</td>
<td>(0.486)</td>
<td>(0.493)</td>
<td></td>
</tr>
<tr>
<td>(1.885)</td>
<td>(2.90)</td>
<td>(10.94)</td>
<td>(12.34)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>2950</td>
<td>2950</td>
<td>2950</td>
<td>2950</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.122</td>
<td>0.011</td>
<td>0.018</td>
<td>0.022</td>
</tr>
</tbody>
</table>

Note: Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1.

In this paper, media use and individual environmental knowledge were included in the same model, and the mediating effect was tested using Baron and Kenny’s causal steps approach [67], and the results are shown in Model 3 of Table 3. The coefficient of media use remains significant after controlling for individual environmental knowledge, which initially supported H4. In addition, the results of model 4 in Table 3 illustrate that the
The coefficient of media use on citizens’ WTP remains significant after controlling for individual environmental responsibility, which initially supported H5.

The causal steps approach has been criticized in recent years [68–71]. Some scholars have proposed using the bootstrap approach [68]. In this paper, following this proposal, the author analyzed the mediation effect using the bootstrap approach, and formed a robustness test.

The results of the analysis using the bootstrap approach and the procedures of Preacher et al. are presented in Table 4 [72]. When the mediating variable is individual environmental knowledge, the confidence interval contains 0, the mediating effect does not exist, and H4 was not supported. When the mediating variable is individual environmental responsibility, the confidence interval does not contain 0, and the mediating effect exists, indicating that the intensity of citizens’ media use positively affects their WTP, by influencing individual environmental responsibility. H5 was supported. Overall, the results of the analytical model on media use on individual WTP are presented in Figure 2.

**Table 4.** Results of the mediating effect of environmental knowledge and responsibility.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Effect</th>
<th>BE</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>0.040</td>
<td>0.023</td>
<td>–0.006</td>
<td>0.085</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.059</td>
<td>0.028</td>
<td>0.004</td>
<td>0.114</td>
</tr>
</tbody>
</table>


**Figure 2.** The mediating effect of responsibility between media use and WTP (**p < 0.01, * p < 0.1).**

This paper then further divides the media into traditional and new media and puts them into separate analytical models, to observe the effect on citizens’ WTP; the statistical analysis is shown in Table 5. When controlling for the effects of other variables, citizens with higher frequency of traditional media use have higher WTP (p < 0.1). However, the frequency of new media use does not significantly affect the dependent variable. Furthermore, this paper put the mediating variables of environmental knowledge and environmental responsibility into traditional media use and citizens’ WTP to examine the corresponding mediating effects, as Table 6 shows. When the mediating variable is individual environmental knowledge, the mediating effect does not exist. When the mediating variable is individual environmental responsibility, the mediating effect exists, indicating that citizens’ frequency of using traditional media positively affects their WTP, by influencing their environmental responsibility.

**Table 5.** The result of media use on pay more on WTP.

<table>
<thead>
<tr>
<th>Variables</th>
<th>WTP</th>
<th>S.E.</th>
<th>WTP</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tradition media</td>
<td>0.819</td>
<td>0.482</td>
<td>0.708</td>
<td>0.496</td>
</tr>
<tr>
<td>New media</td>
<td>8.549</td>
<td>10.95</td>
<td>7.021</td>
<td>10.79</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>Yes</td>
<td>2950</td>
<td>Yes</td>
<td>2950</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.018</td>
<td>0.017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes. Control variables: age, square of age, gender, married, education level, income; * p < 0.1; S.E.: standard errors.
Table 6. Results of the mediating effect of traditional media on WTP.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Effect</th>
<th>BE</th>
<th>LL 95% CI</th>
<th>UL 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>0.049</td>
<td>0.061</td>
<td>-0.071</td>
<td>0.169</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.069</td>
<td>0.034</td>
<td>0.002</td>
<td>0.136</td>
</tr>
</tbody>
</table>


5. Discussion and Conclusions

Using data from the 2018 China General Social Survey, this paper found that the frequency of media use significantly increased citizens’ WTP for environmental governance. In addition, this paper also discovered that environmental responsibility played a mediating effect, while, in contrast, individual environmental knowledge did not have such a mediating effect. Thus, this paper concluded that media use increased citizens’ WTP by increasing their perceptions of environmental responsibility. Furthermore, the paper discussed the environmental communication effects of traditional media and new media and found that traditional media, but not new media, significantly increased citizens’ WTP, and that individual environmental responsibility still had a mediating effect.

This paper shows that there are two logical pathways from media use to citizens’ WTP in the Chinese context: firstly, media use can directly influence this behavior; secondly, media use can indirectly influence citizens’ WTP through the mediating effect of perceptions of environmental responsibility. The findings of this paper can lead to further thinking and practical insights in the following two areas.

Firstly, comparing the mediating variables of environmental knowledge and environmental responsibility, this paper found that individual environmental responsibility, rather than environmental knowledge, mediated the role of media use and WTP. This result suggests that environmental responsibility promotion by the media plays a greater role in promoting citizens’ WTP for environmental management than simple information–knowledge dissemination. The money that individuals are willing to pay for better air is actually due to the media’s promotion of citizens’ environmental responsibility, which makes each citizen aware of his or her environmental responsibility as a consumer of the environment; thus, individuals engage in pro-environmental behavior more because media use improves their environmental knowledge and thus motivates them to take the initiative to contribute to environmental protection.

As a result, this paper offers a number of insights into environmental sustainability in China. In the future, information about environmental protection can be disseminated through multiple media channels. In addition, the mediating effect of individual environmental responsibility suggests that such communication needs to pay more attention to the psychological dimension of individuals, for example, through philanthropic advertising, emotional stories, and concrete people, in order to strengthen and enhance the attribution of individual environmental responsibility, and thus increase citizens’ WTP.

Secondly, the effect of environmental communication varied across different forms of media. The findings of this paper also confirm this claim that traditional media use, rather than new media, is more helpful in promoting citizens’ WTP, and that the mediating mechanism for its impact lies equally in increasing citizens’ environmental responsibility. In terms of the different communication effects of the two types of media, the possible explanation is twofold: firstly, the propaganda and education function of traditional media can subconsciously teach the public about environmental concerns and protection, raise citizens’ environmental awareness, and influence their behavioral patterns. The new media, represented by the internet, places more emphasis on the initiative of citizens to search for environmental information and thus influence their behavior. Because the active search for information relies heavily on characteristics such as citizens’ knowledge and awareness of environmental protection and individual capacity [73], the effectiveness of new media in communicating with the general public is greatly diminished. Secondly, the content
coverage of traditional media is still strictly government-driven, and the coverage is mainly a “policy narrative” represented by the interpretation of government environmental policies and the presentation of governance results, which means that traditional media exposure, represented by newspapers, radio, and magazines, helps to improve citizens’ evaluation of the government’s environmental governance efforts [74]. Citizens believe that paying more for environmental governance will lead to better results, and are willing to share the responsibility with the government. In contrast, the excessive focus on negative environmental information by new media (especially the internet) may reduce citizens’ perceptions of the effectiveness of current government environmental governance, thus making it difficult for citizens to reach a consensus on coproduction with the government, and thus reducing citizens’ enthusiasm for environmental governance.

Based on the findings of this study, this paper argues that in order to increase citizens’ WTP, the government needs to use the traditional media as a public opinion forum to continue to strengthen the cultivation of environmental responsibility and awareness, so that citizens will realize that environmental protection is an important issue for their personal survival and development. However, at the same time, with the rise of new media represented by the internet, this author also needs to think about how the unique propaganda advantages of the internet, such as more active media propaganda approaches such as key person voices and opinion guidance, can play a greater part in shaping environmental issues.

This study has three main theoretical contributions. Firstly, it adds a discussion of citizens’ WTP for environmental governance to the existing literature on media use and citizens’ pro-environmental behaviors. Secondly, previous research has confirmed that media use is an important factor influencing citizens’ environmental behavior, but has not opened the “black box” in the process. This paper discusses and compares how media influence citizens’ WTP from the perspectives of knowledge growth and responsibility cultivation, which deepens the relationship between variables, and enhances the theoretical explanatory depth of the environmental communication field. Finally, empirical evidence from China broadens the explanatory scope of citizens’ WTP for environmental governance.

The study in this paper still has some limitations, which provide more room for future research agendas. First, this study only focused on the effects of media use on knowledge and responsibility, and the literature on citizens’ WTP for environmental governance could be enriched in the future by tapping into more intermediate mechanisms. Second, the cross-sectional data in this paper cannot yield causal relationships between variables. Future research can address this issue through panel data, experimental studies, and other sophisticated methods.

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