

Media Use and Perceived Pollution: Does a Reinforcing Spiral Exist in China?

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Despite the growing concern about perceived environmental quality, less is known about how media use relates to it over time. This study investigates the longitudinal relationships between Internet preference and perceived pollution by using a three-wave nationwide sample from the China Family Panel Studies data and employing the random intercept cross-lagged panel model to separate the within-person process from between-person differences. Results do not support the reinforcing spiral model but show that an individual's perceived pollution can significantly enhance preference of the Internet over TV and newspapers. This finding suggests that traditional media, working as the mainstream news channels in China, are losing their audiences in the process of environmental degradation. Overall, this study argues that perceived pollution facilitates individuals' alienation from traditional media as a result of selective exposure, which may cause unexpected problems in China, like the erosion of political legitimacy.

Keywords: media use, perceived pollution, Internet preference, reinforcing spiral model, random intercept cross-lagged panel model

Perceived environmental pollution has become a major concern for both scientists and policy makers since it can substantially affect an individual's well-being (Song, Zhou, & Zhang, 2020; Sulemana, James, & Valdivia, 2016), health (Han, 2020; Rocha, Pérez, Rodríguez-Sanz, Obiols, & Borrell, 2012), and social attitudes (Huang, Zheng, Tan, Zhang, & Liu, 2016; Liu, Wu, & Che, 2019). Recent studies have shown that an individual's subjective perception of environmental pollution is not simply proportionate to the objective level of environmental quality but may be intensified or mitigated by some socioeconomic factors (Kim, Yi, & Kim, 2012). Furthermore, an emergent body of literature has devoted significant attention to the role of media use in shaping individuals' perceptions of environmental pollution. For example, some researchers have explored how news media exposure tends to amplify the public's perceived risk of air pollution (Guo, & Li, 2018; Huang, 2020) and climate change (Thaker, Zhao, & Leiserowitz, 2017).

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Although the findings of these studies are insightful, our understanding of the relationship between media use and perceived pollution remains incomplete owing to three fundamental issues. First, most prior studies focus on how media use impacts perceived pollution while overlooking their mutual relationship over time. According to the literature on selective exposure (Stroud, 2014), media use can be endogenous, that is, media use can be both antecedent and outcome of an individual's perception. It is reasonable to assume that the relationship between media use and perceived pollution is complex and dynamic rather than a simple and unidirectional effect. Second, prior literature on selective exposure has largely focused on the selectivity of media content while paying less attention to individual preference of media channels. With the fast development of a high-choice media environment, channel preference has become an increasingly important type of selective exposure. The final issue is related to the research design and the analytical methods adopted. A longitudinal design is essential if researchers aim to identify their causal relationship with observation data. Since most prior research is cross-sectional, it is still not clear whether media use affects perceived pollution or vice versa.

To address these gaps, this study conceptualizes "Internet preference" as an individual's preference of the Internet over traditional media. According to Stroud (2014), it is more compelling to take selective exposure as a preference for seeking like-minded information, which manifests itself in not only the specific content selected when using a specific medium but also the specific medium chosen to use as it is thought to offer the information of interest in a more effective and convenient way. By denoting a partial mode of media use, this concept of Internet preference gets a better grip of channel selectivity in the high-choice media environment. Then, this study investigates how Internet preference is longitudinally related to perceived pollution by adopting the reinforcing spirals model (RSM; Slater, 2007, 2015) as the theoretical framework as it provides a general framework for conceptualizing media use as part of a dynamic, endogenous process combining selective exposure and media effects. The random intercept cross-lagged panel model (RI-CLPM; Hamaker, Kuiper, & Grasman, 2015) is employed as the analytical approach because it "separates the within-person process from stable between-person differences through the inclusion of random intercepts" (Hamaker et al., 2015, p. 102), allowing us to reveal whether media channel selectivity is associated with subsequent changes in perceived pollution over time or vice versa.

The remainder of this article is structured as follows. Section 2 provides a brief review of existing literature and proposes concrete research questions. Section 3 presents the data, measurements, and analytical approach. Section 4 gives the main results of empirical analysis, and Section 5 discusses them. Section 6 closes with a conclusion and an outlook on future research.

Literature Review

The Preference of Media Use and Perceived Pollution

Modern media, such as TV, newspapers, and the Internet, can affect the public's judgments of social issues because they offer convenient ways to disseminate information and convey what it means. Walter Lippmann (2004) argues that an individual has limited knowledge and capability to collect, understand, and interpret complex information, which means the mental image of the real world is largely

shaped by social media. He calls this media-portrayed image the “pseudoenvironment” (Lippmann, 2004). With the development of information and communication technologies, modern media, especially Internet-based media, have become increasingly prominent, penetrating the lives and businesses of more and more individuals. The media environment enables a process of social construction in which the “pseudoenvironment” is formed and used to help people perceive the external reality. Prior studies have shown that media use can affect attitudes toward environmental issues (Cox, 2012; Nelkin, 1995). First, media work as primary sources of information for the public in modern society, contributing to an increase in knowledge about environmental degradation. The increased environmental knowledge makes individuals more capable of comprehending the causes, processes, and consequences of environmental pollution. Second, the frequent and in-depth reporting of specific social problems, according to the agenda-setting theory (McCombs, 2005), can improve issue salience in the public mind, which may in turn stimulate an individual’s subsequent behavior. For example, Sampei and Aoyagi-Usui (2009) show that an increase in mass media coverage of global warming can lead to a rise in the public’s concern about climate change in Japan. Third, media use can influence an individual’s perceived pollution by changing his or her criteria for evaluation. As argued by the social comparison theory (Festinger, 1954), an individual’s subjective judgement is not fixed but depends on what references are chosen. The intensification of media-based comparison with other areas with good environmental quality may lower satisfaction with the local environment.

In the contemporary high-choice media environment, an individual usually uses multiple outlets simultaneously, and thus preference for media channels can substantially influence perception of the outside world. Compared with traditional media, like TV and newspapers, the Internet provides a vast amount of information that is from innumerable sources and is usually updated in real time, which promotes the fast dissemination of public issues and makes it harder to be controlled by the government. The Internet may be apt to provide negative news as it can be easier to hit the headlines and improve the click-through rates (Soroka, 2014). According to the negativity bias theory, negative news tends to have a stronger and more persistent impact on individuals’ psychological states than do neutral or positive news (Goldsmith & Dhar, 2013; Soroka, Fournier, & Nir, 2019). More important, in the context of China, traditional media, which are strictly censored by the authorities, tend to avoid topics that may trigger collective actions and adopt positive tones to report the performance of environmental governance. With a comparative content analysis of *China Daily* and *The New York Times*, Duan and Takahashi (2017) have found that Chinese media tend to cover air pollution with mild criticism of the government and pay more attention to the strategies and solutions used to tackle this issue. Although the Internet is also under government censorship, its pervasive and dynamic nature produces more opportunities for the public to get pollution information and engage in debates of environmental issues. As a consequence, those who take the Internet as their major information source are more likely to be exposed to coverage about environmental problems in China. Just as denoted by Lippmann’s (2004) “pseudoenvironment,” the environmental issues are socially constructed in the process of mass communication. The more critical environmental information the public gets, the more people believe environmental pollution is an urgent issue in China. A recent empirical study by Liu and colleagues (2021) has shown that Internet use increases perceived environmental pollution threats while traditional media use (TV and newspapers) does not. Thus, this study proposes the following media effect hypotheses:

H1a: The preference for the Internet over TV is positively associated with perceived pollution.

H1b: The preference for the Internet over newspapers is positively associated with perceived pollution.

Perceived Pollution and Selective Media Exposure

In parallel with media effect research, a stream of studies highlights that media use can be endogenous and attitudes or beliefs may influence an individual's choice of media use. The most discussed among them is the theory of selective exposure (Stroud, 2014; Zillmann & Bryant, 1985). Selective exposure, in its most general sense, refers to active selection of media or information to attain individuals' specific ends. More specifically, as Klapper (1960) has argued, people tend to "expose themselves to mass communication in accord with their existing opinions and interests and to avoid unsympathetic material" (p. 19). This kind of media selectivity indicates that individuals may show preferences for like-minded, opinion-reinforcing information or more congenial media (Feldman & Hart, 2018; Stroud, 2008). This phenomenon is also interpreted as "confirmation bias" (Taber & Lodge, 2006), that is, a tendency to seek information consistent with one's preconceptions. To explain why selective exposure occurs, Festinger's (1957) cognitive dissonance theory is most often invoked. According to this theory, individuals can experience some sort of cognitive dissonance when they encounter cognitive conflict. The individual tends to adopt some measures to reduce this dissonant state, including adding consonant cognition, improving the importance of consonant cognition, or trying to deemphasize dissonant cognition. Selective exposure thus becomes a convenient tool to cope with this kind of cognitive dissonance. In the field of environmental communication, Zhao (2009) has found that media use mediated the effects of individual characteristics on perceived knowledge of global warming, which in turn predicted information seeking about the polar regions.

There are two types of selective exposure: content selectivity and channel preference. Content selectivity denotes that individuals search like-minded content when using specific media outlets. The basic tenet is that, driven by existing views on some specific issues, individuals tend to seek congenial information when watching TV, reading newspapers, or surfing the Internet. Most prior literature on selective exposure has focused on the content selectivity while paying less attention to channel preference, which refers to the preference of a specific channel among multiple media outlets when seeking information. In the contemporary high-choice media environment, individuals can freely select media channels according to information demands. Traditional media are characterized by strong unidirectivity and weak feedback, while the Internet can provide information in a much more dynamic and interactive way. With the support of information technology, the Internet can even offer personalized information according to browsing history (Pariser, 2011). More important, compared with traditional media like TV and newspapers, the Internet, with its spontaneity and prevalence, is more likely to cover negative news, such as political scandals and social problems. As a consequence, it is easier to find congenial information on the Internet to support an existing negative view about specific issues. Those who want to dig deeper into some negative news may also resort to the Internet as traditional media may tend to soft-pedal them. Prior studies have found that people prefer to use the Internet to search for information if they do not agree with the coverage provided by the mainstream outlets (Best, Chmielewski, & Krueger, 2005; Hwang, Schmierbach, Paek, Gil de Zuniga, & Shah, 2006). In the context of China, traditional media usually adopt relatively positive tones in coverage of performance of environmental governance as they are strictly censored by the authorities. In recent

years, there are many environmental events getting their first exposure on the Internet and then get attention from traditional media. Thus, it is plausible to think that perceived pollution can strengthen individuals' preference for the Internet. Focusing on channel preference, this study proposes the following selective exposure hypotheses:

H2a: Perceived pollution is positively associated with the preference for the Internet over TV.

H2b: Perceived pollution is positively associated with the preference for the Internet over newspapers.

The Reciprocal Relationship Between Media Use and Perceived Pollution Over Time

Naturally, a subsequent question is how media use and perceived pollution are mutually related. However, the exact nature of their mutual effects over time is still understudied. This is mainly because of a lack of a comprehensive theoretical framework that can be used to integrate the above two streams of literature. Recently, RSM has been developed by Slater (2007, 2015), which argues that media use and attitudes can be reciprocally related rather than associated in a simple cause-and-effect order. Three tenets distinguish the RSM from the existing theories. First, the RSM understands media selectivity and effects as the dynamic, mutually influencing process. That is, the attitudinal or behavioral outcomes of media use can be predictive of the subsequent selection of and attention to media content. These reciprocal relationships occur dynamically over time, which entails a longitudinal design with multiple assessments at different time points (Slater, 2007). Early evidence is that an adolescent's aggressiveness is likely to predict the use of violent media, which in turn increases the likelihood of aggressive behavior (Slater, Henry, Swaim, & Anderson, 2003). Second, by using a system-theory perspective, the RSM focuses on the extent to which a system is open or closed and under what conditions a dynamic system can achieve self-regulation over time. It argues that whether an individual's attitude would reach homeostasis or move toward extremes is contingent upon some individual characteristics as well as the specific social context (Slater, 2015). Third, the RSM has proposed some social cognitive mechanisms to explain how reinforcing spirals occur. Chief among them is the accessibility of attitude and construct. According to the attitude accessibility theory, attitudes are influential to the extent that they are easy to be accessed in memory at a given point in time (Fazio, Powell, & Williams, 1989). The selective exposure of attitude-consistent information can function as an ongoing activator of that attitude (Slater, 2015). The attitude accessibility mechanism has been supported by some empirical studies (Knobloch-Westerwick, 2012; Knobloch-Westerwick & Meng, 2011). Recently, the RSM has been adopted by social scientists from multiple disciplines to examine the dynamic and mutual relationship between media use and the outcome of interest, like sexuality (Bleakley, Hennessy, Fishbein, & Jordan, 2008), political ideology (Beam, Hutchens, & Hmielowski, 2018), and attention problems (Baumgartner & Lemmens, 2017).

In the field of environmental communication, however, only a few scholars have attempted to use the RSM to investigate how media use is related to an individual's attitudes toward climate change over time. Feldman and colleagues (2014) have adopted a longitudinal design to investigate the mutual reinforcement of media selectivity and effects in the context of global warming. Their results show that conservative media use is negatively related to global warming belief certainty and support for mitigation policies, while the use of nonconservative media functions in the reverse direction. This research

provides evidence that partisan media use influences climate change beliefs and policy support, which in turn promotes subsequent media use. However, the two-wave design makes them unable to fully test the RSM, as Slater (2007) has proposed that “the assertion of the reciprocal relationship between media use and effects of such media in its simplest case implies a three-step, cross-lagged process” (p. 284). After reviewing the empirical studies related to the RSM, Slater (2015) argues that “work on reinforcing spirals processes in environmental and science communication is still in its beginning stages” (p. 14). Thus, beyond the unidirectional effects as listed above, this study proposes the following bidirectional effect hypotheses:

H3a: The preference for the Internet over TV and perceived pollution are mutually reinforced over time.

H3b: The preference for the Internet over newspapers and perceived pollution are mutually reinforced over time.

Data and Methods

Data

The data sets analyzed during this study are obtained from the official website of China Family Panel Studies (CFPS; <http://www.issf.pku.edu.cn/cfps/en/index.htm>). It is a nationally representative, longitudinal survey of Chinese communities, families, and individuals. Funded by the Chinese government through Peking University, this nationwide survey was launched in 2010 and has published five waves of data reflecting the social and economic situations in mainland China between 2010 and 2018. This study selects the latest three waves (2014, 2016, and 2018) of the CFPS data as the sample because the first and second waves of data do not include the variable related to an individual’s evaluation of the importance of each type of social media. Specifically, CFPS2014 includes five subdatabases, namely the adult database, the adolescent database, the family relation database, the family economy database, and the village database. This study uses only the adult database, with 37,147 people older than 16. The CFPS2016 and CFPS2018 combine the adult database and the adolescent database by redesigning the questionnaires, but they can be matched with CFPS2014 by using the common person ID. After clearing and matching these three waves of data, the final sample consisted of 16,813 participants (45%). Figure 1 illustrates the process of retention. Although more than half of the data have been lost, this sample is fairly nationally representative, covering 27 of 31 provinces in mainland China. Table 1 shows the descriptive statistics of the sample data. Among them, 8,228 participants (49%) are female, 3,681 participants (22%) have at least a high school education, 9,126 participants (54%) live in rural areas, the average age is 47, and the average score of perceived socioeconomic status at the first wave is 2.8 at the scale ranging from 1 to 5.

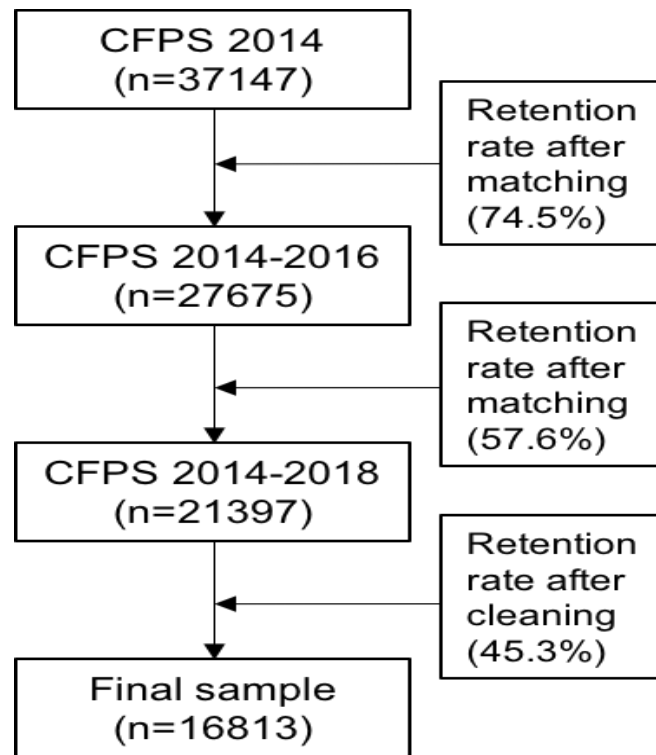


Figure 1. The retention rates of data.

Measurements

To obtain the information on residents' media use, the CFPS investigator would ask them to evaluate the importance of various types of media, such as TV, newspapers, radios, mobile phone text messages, and the Internet, as their channels to get information. In this study, we focus on three types of media: TV, newspapers, and the Internet. A 5-point scale is used, ranging from 1 (very unimportant) to 5 (very important). Internet preference is measured by comparing the self-rated importance scores of the Internet with those of traditional media. More specifically, as this study includes two types of traditional media, there are two indicators of Internet preference. The first reflects what degree individuals prefer the Internet over TV (the importance scores of the Internet minus the importance scores of TV), and the second shows individuals' preference of the Internet over newspapers (the importance scores of the Internet minus the importance scores of newspapers). The higher the scores of Internet preference, the more likely the Internet replaces traditional media as the major source of information searches. Table 1 shows that Chinese citizens prefer TV over the Internet in general, though the gap between them is narrowing ($M_{\text{wave1}} = -1.5$, $SD_{\text{wave1}} = 2.0$, $M_{\text{wave2}} = -1.2$, $SD_{\text{wave2}} = 2.2$, $M_{\text{wave3}} = -1.1$, $SD_{\text{wave3}} = 2.1$). In contrast, they prefer the Internet over newspaper and the gap tends to be widening ($M_{\text{wave1}} = 0.13$, $SD_{\text{wave1}} = 1.5$, $M_{\text{wave2}} = 0.52$, $SD_{\text{wave2}} = 1.6$, $M_{\text{wave3}} = 0.89$, $SD_{\text{wave3}} = 1.7$).

Table 1. Descriptive Analysis of All Variables.

	Final sample (<i>N</i> = 16,813)			
	Wave 1	Wave 2	Wave 3	Overall
Gender				
Male	8,585 (51%)			
Female	8,228 (49%)			
Education				
High school or above	3,681 (22%)			
Middle school or lower	13,132 (78%)			
Residential place				
Urban	7,687 (46%)			
Rural	9,126 (54%)			
Age				
Mean (SD)	47 (± 14)			
Perceived SES				
Mean (SD)	2.8 (± 0.84)			
Perceived pollution				
Mean (SD)	6.8 (± 2.7)	6.3 (± 2.6)	6.7 (± 2.7)	6.6 (± 2.7)
IP: Internet vs. TV				
Mean (SD)	-1.5 (± 2.0)	-1.2 (± 2.1)	-0.67 (± 2.2)	-1.1 (± 2.1)
IP: Internet vs. Newspaper				
Mean (SD)	0.13 (± 1.5)	0.52 (± 1.6)	0.89 (± 1.7)	0.51 (± 1.6)

Note. Perceived SES means perceived socioeconomic status. IP means Internet preference.

For CFPS, the public perception of environmental pollution in China is measured by asking the following question: "How would you rate the severity of the environmental problem in China?" An 11-point scale is used to reflect the respondent's attitude, ranging from 0 (not severe) to 10 (extremely severe). Table 1 shows that the public's overall perception of environmental pollution is moderately high and presents a small fluctuation during the years from 2014 to 2018 ($M_{wave1} = 6.8$, $SD_{wave1} = 2.7$, $M_{wave2} = 6.3$, $SD_{wave2} = 2.6$, $M_{wave3} = 6.7$, $SD_{wave3} = 2.7$).

Methods

To effectively capture the mutual influence between media use and perceived pollution, this study employs the RI-CLPM (Hamaker et al., 2015), which is an extension of the traditional CLPM (Finkel, 1995). The CLPM has been criticized for its inability to distinguish the time-varying or "statelike" differences within individuals from the time-stable or "trait-like" differences among individuals. The RI-CLPM solves this problem by adding a random intercept to represent the stable between-person variance. Figure 2 illustrates the RI-CLPM with key parameters. First, each observed measure of media use and perceived pollution is regressed on its latent factor, and each loading is constrained at 1. Second, we add the random intercept factors, each with loading constrained at 1, to control for the stable differences

among individuals. These random intercepts separate the between-person variance from the within-person processes. Finally, we add a correlation (Path e) among the random intercepts that reflects how stable differences in media use among individuals are associated with stable differences in perceived pollution among individuals.

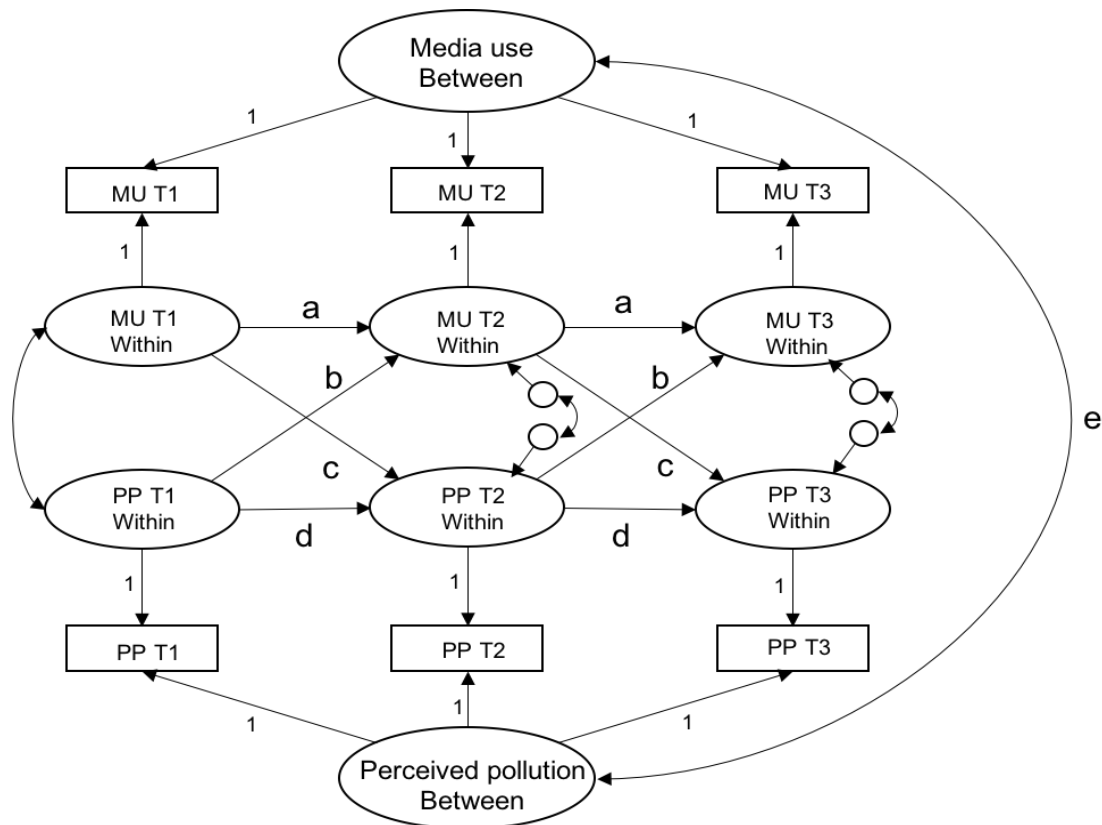


Figure 2. The illustration of a random intercept cross-lagged panel model (RI-CLPM). MU stands for media use. PP stands for perceived pollution.

As is shown in Figure 2, the autoregressive paths (paths a and d) present the stability of media use and perceived pollution, while the cross-lagged paths (paths b and c), which are the focus of this study, reflect how they are mutually influenced over time. The direction and significance of these cross-lagged paths are used to determine whether there is a reinforcing spiral between media use and perceived pollution in the sample of Chinese residents. To increase the parsimony of the models, as suggested by Hamaker and colleagues (2015), the autoregressive and cross-lagged paths are constrained to be equal across waves.

The goodness of model fit for the RI-CPLM is evaluated by using a range of indicators including the chi-square measure of exact fit, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the standardized root mean residual (SRMR). Following Hu and Bentler

(1998), this study adopts their recommended cutoff points: CFI and TLI > 0.9; RMSEA and SRMR < 0.08. The calculation of RI-CPLM in this study is achieved by using the R package lavaan (Rosseel, 2012).

Results

The longitudinal relationship between Internet preference and perceived pollution is presented in Figure 3. In both models, a series of demographic variables, including gender, age, education, residential place (urban or rural), and perceived socioeconomic status at the first wave, is included as the controls. As is shown in Figure 3, excellent fit is achieved for both models: RMSEA = 0.033, CFI = 0.981/0.974, TLI = 0.969/0.958, and SRMR = 0.023. According to both models, Internet preference is significantly and positively associated with perceived pollution ($b = 0.290/0.265$, $p < .001$) at the between-person level, which means that those who prefer the Internet over traditional media tend to have higher levels of perceived pollution. At the within-person level, the autoregressive paths across waves are not significant for perceived pollution ($b = 0.015/0.016$, $p > .05$) while highly significant for Internet preference ($b = 0.152, 0.160/0.147, 0.156$, $p < .001$), implying that the former is relatively independent rather than self-reinforcing like the latter.

The most important part in both models is the cross-lagged paths, which respond to the hypotheses being proposed ahead. Figure 3a shows how an individual's preference of the Internet over TV is related to perception of environmental pollution over time. According to this model, although an individual's Internet preference (Internet vs. TV) does not increase perceived pollution over time, perceived pollution shows a highly significant and positive impact on preference for media use in the subsequent wave ($b = 0.030/0.030$, $p < .001$). A similar result can be found in the longitudinal relationships between an individual's preference of the Internet over newspapers and perception of environmental pollution (see Figure 3b). To be more specific, it can be seen that, while the paths from Internet preference (Internet vs. newspapers) to perceived pollution are not significant, the reverse paths are highly significant ($b = 0.027/0.027$, $p < .001$), which highlights that an increase in perceived pollution can significantly lead to the strengthening of preference for the Internet over newspapers.

Hence, the empirical results support only the selective exposure hypotheses, including H2a and H2b. It can be summarized as follows: Neither media effects nor bidirectional relationships can be identified between Internet preference and perceived pollution, but the phenomenon of selective channel exposure is highly significant. In other words, an individual's preference for the Internet over traditional media tends to be strengthened with perception of higher levels of environmental pollution.

Discussion

By using the three-wave longitudinal data, this study provides a more rigorous depiction of how media use and perceived pollution are related to each other over time in China. To make a better response to the existing literature, this study further discusses the implications of these findings.

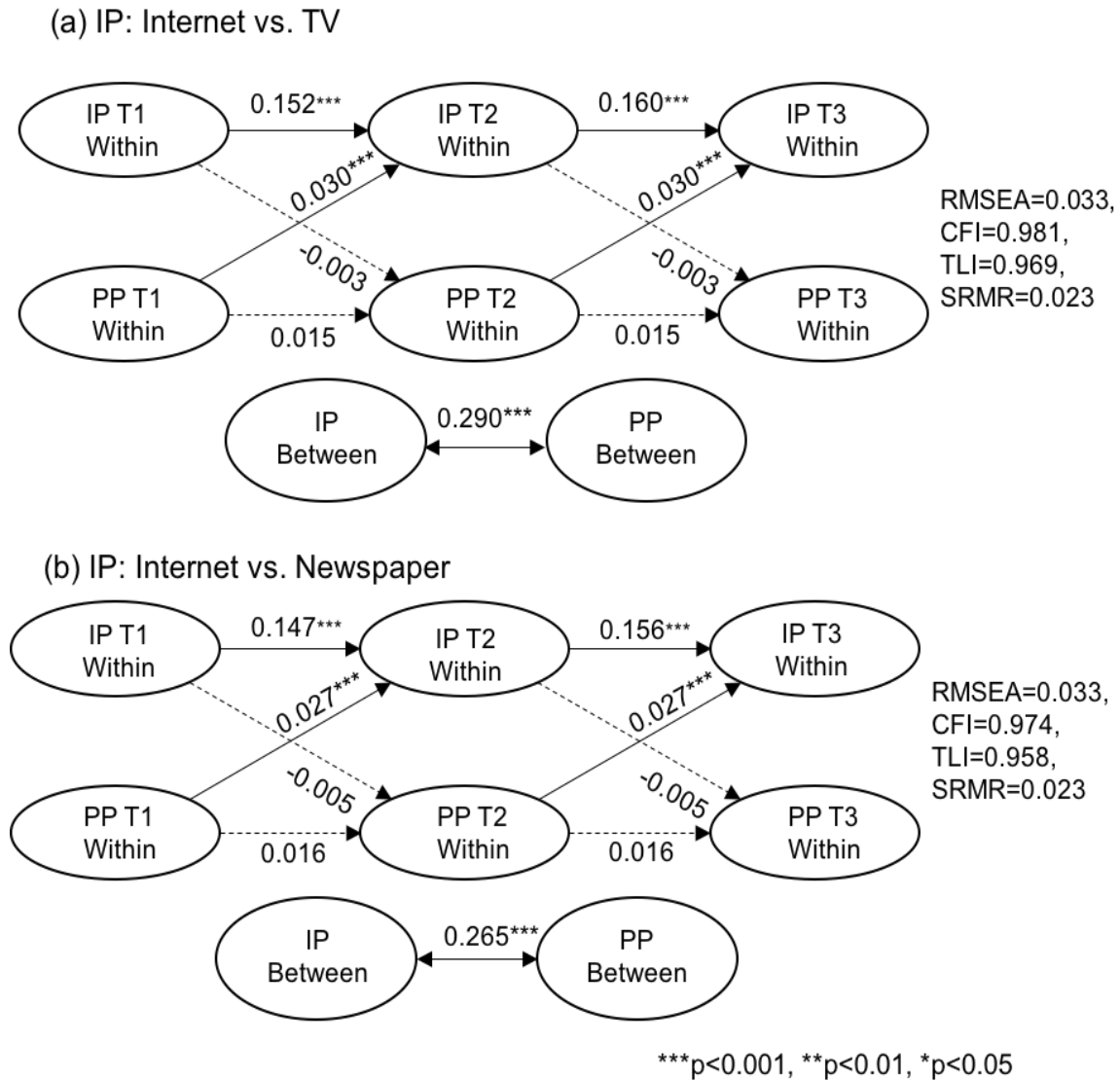


Figure 3. The longitudinal relationships between Internet preference and perceived pollution. The standardized estimates are shown for each model. Nonsignificant paths are shown with dashed lines.

First, this study clearly shows that the public’s preference of the Internet over traditional media is becoming stronger over time. This media displacement trend is noteworthy because traditional media, often regarded as the mainstream news channels in China, bear the responsibility for not only diffusing official attitudes and values but also building the images of governments, especially in the tough situation that the state is struggling with environmental degradation. Although the Internet provides a more convenient and broad way to seek information, the quality of news on the web pages may not be

ensured, even deceitful and misleading. Some studies highlight that the Internet, compared with traditional media, is more likely to cause the polarization of attitudes because of its increasing tendency to provide individual users with personalized information, which may promote filter bubbles that isolate users from other news (Pariser, 2011). Thus, the alienation of the public from traditional media may further cause a lot of unexpected problems, such as the erosion of political legitimacy.

Second, the Internet preferences of Chinese citizens tend to be strengthened when they believe environmental pollution is becoming more serious. In other words, perceived pollution can play a facilitating role in the displacement of traditional media by the Internet. This finding contributes to the existing literature on media displacement by including perceived environmental quality as a crucial predictor, especially in the context of China. It can thus be expected that traditional media in China will be beset in a crisis of losing their audiences if environmental pollution cannot be effectively governed. More important, as selective exposure mechanism links perceived pollution to media choice, it provides some potential explanations of how perceived pollution impacts attitudes and behavior by taking media use as a mediator. For example, it can be suggested that Internet preference may work as a key mediating mechanism to explain why perceived pollution will lead to political distrust (Chen & You, 2021). Thus, the consequences of selective media exposure are far beyond the scope of environmental risk perception.

Third, the reinforcing spiral hypotheses are not supported as Internet preference is not significantly associated with perceived pollution over time at the within-person level, although they are significantly correlated at the between-person level. This outcome may have multiple reasons. On the one hand, Chinese residents commonly rely on multiple types of media rather than a single medium to get information, so they are exposed to heterogeneous environmental information. The Internet provides infinite information containing both congenial and uncongenial perspectives. Garrett (2009) has found that, although the Internet can facilitate searching for like-minded information, it does not comparably promote avoidance of information that may challenge viewpoints. Moreover, the research of Brundidge (2010) has also shown that online political discussion and online news can significantly contribute to the overall heterogeneity of political discussion networks. Recently, with the digitalization of traditional media, most environmental news on TV or in newspapers can be accessed online, which also increases the diversity, even conflict, of media content. Thus, the mixed media exposure may prohibit the persistent effect of Internet preference on perceived pollution. On the other hand, it may be simply because of the limitation of research design and data. Chief among them is the length of time intervals adopted in the RI-CLPM. Restricted by the second-hand data, this study has to use the same length of time intervals, that is, about two years. This can be problematic as the media effects and selectivity may not be synchronous. For example, the impact of Internet use on perceived pollution may be immediate while the preference for the Internet may be relatively stable. Thus, the two-year interval may be appropriate for testing selective exposure but too long to capture the media effects. Even so, the adoption of the RSM opens a promising field that focuses on the within-person complex dynamics of media use and perceived pollution over time.

Conclusion

Despite the increasing attention on how media use relates to the public's perceived pollution, few studies have explored their mutual relationship over time comprehensively. The current study fills this gap by constructing a three-wave nationwide sample from the CFPS data. The RSM is employed as the theoretical framework, and the RI-CLPM is adopted to separate the within-person effects from the between-person correlation. The empirical results show that, although no reinforcing spirals can be found between Internet preference and perceived pollution, the perception of environmental pollution makes people attach more importance to the Internet rather than traditional media. In other words, perceived pollution plays a facilitating role in media displacement in the context of China. This tendency should be taken seriously by Chinese governments as the alienation of the public from mainstream media may cause the weakening of official voices and the consequent potential erosion of political legitimacy.

This study has several limitations. First, the CFPS data used in this study include only subjective self-reports, which may cause some deficiency in the reliability and validity of the measures. Future studies are advised to advance their measures by combining subjective and objective indicators. Second, constrained by the raw data, this study adopts the same length of the time intervals in the RI-CLPM, which may be insufficient to reveal both media effects and selective exposure. Future studies should try varying time intervals if possible to uncover if the cross-lagged effects show at different speeds. Third, despite taking the basic media types into consideration, this study still lacks a detailed analysis of media content and online tools because of the limitation of data. In recent years, with the digital transformation of traditional media agencies in China, environmental news on the TV and newspapers is increasingly being shared on the Internet. This trend can blur the line between traditional media and the Internet. Furthermore, Internet use has become an umbrella term as it may mean different things to different people, such as web pages, microblogs (Weibo), and WeChat. These outlets present distinguished design features and usually attract demographically differentiated audiences. For example, WeChat tends to be much more personal as it is usually used to communicate and share information within networks of family members, friends, and acquaintances, while Weibo is often more casually used as its users can be anonymous. Thus, future studies can go further by examining how a specific Internet-based outlet will relate to perceived pollution over time.

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