The More You Talk, The More You can Prevent Risks: Mediating Role of Interpersonal Communication on Behavioral Intention to Prevent Particulate Matter Risks in South Korea

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Abstract

This study tests a communication mediation model of the relationships between two types of media use (mass media and new media), interpersonal communication, risk perceptions, and preventive behavioral intentions for particulate matter (PM) pollution. A sample from a national online survey (N =1,000) found that only new media use significantly increased risk perceptions. Regarding mediation effects, both mass media and new media uses positively and indirectly influenced behavioral intentions when mediated by interpersonal communication. However, the link between mass media use and risk perceptions was insignificant. Thus, the effects of new media and interpersonal communication were important in the model. Several unique theoretical and practical contributions to health communication research and practice are discussed.

Key Words: particulate matter (PM), preventive behavioral intention, interpersonal communication, communication mediation model
1. Introduction

In South Korea, there has been growing public health concern about particulate matter (PM), which is commonly known as fine dust. As one of air pollutants, PM is released from both anthropogenic and natural sources (Bae and Hong, 2018). It can cause harm to human beings and other living creatures, and finally the natural environment (Kim, Kabir and Kabir, 2015). Recently, risks of PM are considered as manifest and serious in public health problems. According to a recent survey (Research Institute for Healthcare Policy, 2016), for example, Korean adults have indicated PM as the number one among 13 risk factors with regard to public health issues including smoking, drinking, Norovirus, breast cancer, medical accidents, and so on. Also, the survey showed that Koreans perceived PM as the most serious health problem to next generation. Basically, the exposure of PM is not voluntary and its adverse health effects can be made in the entire community or population (Bae and Hong, 2018). Thus, this is why PM pollution is regarded as an important public health issue.

With the increasing public concern about PM pollution, it is important to explore how South Koreans perceive risks of PM and how they are willing to do health-prevention behavior. Can the media play a key role in shaping risk perceptions? Or may interpersonal communication affect individual preventive behaviors? The media play an important role in updating the public health information, and then we may be aware of and understand major public health issues or problems in our community or country (Brossard and Nisbet, 2007; Morton and Duck, 2001). The main role of the media is to produce, deliver, and distributing health information (Chang, 2012). In particular, mass media have made a contribution to shaping the public’s risk perceptions (Ho, Brossard and Scheufele, 2007; Morton and Duck, 2001; Nelkin, 1998). Additionally, many scholars have indicated that interpersonal communication can play a major role in perceiving risks (Coleman, 1993; Fleming, Thorson and Zhang, 2006; Ho, Scheufele and Corley, 2013).

However, few studies have examined the association between media use, interpersonal communication, risk perceptions, and preventive behavioral intentions in the context of PM pollution. The main goal of this study is to address this research gap. In particular, with the communication mediation model (Cho et al, 2009; Ho, Peh and Soh, 2013), we examine how media use can influence risk perceptions and preventive behavioral intentions, and how interpersonal communication may mediate these relationships. That is, this study focuses on the mediating role of interpersonal communication between media use, risk perceptions, and behavioral intentions. After being informed by the media, we are likely to perceive risks of PM and tend to do preventive actions. However, the effects of media exposure may be different depending on individual information processing. Also, emerging media technologies (new media, social media, or smart media) have influenced the patterns of media use. The effects of
such media technologies have rarely been found. Thus, it is too simple to conclude that media exposure directly and completely affect the public’s perceptions and behavioral intentions.

This study examines the relationships of media use, risk perceptions, and behavioral intentions, and at the same time the mediation effects of interpersonal communication with respect to PM pollution as one of the most important public health issues in South Korea. Data for this study came from a nation-wide online survey conducted in 2017. The public’s risk perceptions were measured with four specific issues related to PM pollution: the yellow dust, PM from foreign anthropogenic sources, domestic automobile exhaust fumes, and domestic power plant flue gas. Preventive behavioral intentions were also estimated with four actions: checking our PM information, wearing the PM mask, using an air purifier, and washing hands.

2. Literature Review

2.1 Media Use, Risk Perception, and Behavioral Intention

The media provide a major source of science and health information (Brossard and Shanahan, 2006; Nelkin, 1987). News stories or information about health have been one of the most popular topics in South Korea (Kim and Kim, 2017). PM has become an increasingly important public health issue in the media (Kim et al., 2015; Kim et al., 2017). In particular, news reports of PM have dramatically increased since 2014 (Kim et al., 2015). Thus, many Koreans have been informed or aware of PM pollution.

Many studies have examined the relationships between media use and risk perceptions of various health issues (Kim et al., 2018; Morton and Duck, 2001; Park, 2003; Snyder and Rouse, 1995). For example, Park (2003) found that using medical news increased perceived risks of several health problems. By using a national online survey, Kim et al. (2018) also found that viewing television and using the Internet were significantly and positively associated with perceived risks of food and medicine safety. However, their findings showed that reading newspapers and using Social Networking Sites (SNS) were not related to risk perceptions. Thus, those who are frequently exposed to health news or information are more likely to perceive risks of PM.

In the field of health and risk communications, many studies have explored behavioral intentions or behaviors as a key dependent variable (Ho et al., 2013; Kim, Jang and Noh, 2018; Yang, 2015). For example, Kim et al. (2018) found that using new media (Internet news and social media) directly and indirectly increased preventive behavior intentions with regard to food safety concerns. In their study, attribution of responsibility and risk perceptions were analyzed as mediators between new media use and behavioral intentions. By using an integrated model, Yang (2015) revealed that behavioral intentions to get the H1NI vaccine were influenced by several variables including mass media use. Thus, if people receive health
information from the media, they will be more likely to wash their hands or faces after coming from outside.

In the present study, we examine the relationship between media use, risk perceptions, and preventive behavioral intentions in the context of PM pollution. In this analysis, we should consider the types of the media because the pattern of media use has been changed in recent years. According to a recent survey (Kim and Kim, 2017), approximately 84% Koreans answered that they use digital platforms for news in the past week. However, only 26% respondents indicated that they use print newspapers. Thus, we categorized two types of media use. Mass media include print newspapers, television news, and radio news, while new media comprise Internet news, Web-bulletin, and SNS.

2.2 Interpersonal Communication and Communication Mediation Model

To update information about health and risk, the public can use two key communication channels such as the media and interpersonal communication (Binder et al, 2011). Talking about health topics with family members and friends can increase the influence of the media (Johnson, 1993). For example, people who frequently discuss PM pollution around them are more likely to look for health-related information. Thus, the media and interpersonal communication may be complementary to each other for the public’s shaping perceptions or judgments (Chaffee, 1986). If the media frequently present specific health problems or issues (e.g., PM pollution), the public will perceive them as important. Then, people may start to talk about such health issues with others. As Dunwoody and Neuwirth (1991) pointed out, the influence of interpersonal communication is a two-step process, where the media first report a certain issue salient or prominent and then people being to discuss their opinions, resulting in increased perceived risks of health issues.

Many researchers have found that interpersonal communication significantly influenced risk perceptions (Binder et al, 2011; Coleman, 1993; Kim et al., 2018; Morton & Duck, 2001; Snyder & Rouse, 1995). For example, Morton and Duck (2001) found that those who frequently talked about skin cancer with others were more likely to perceive risks. Kim et al. (2018) also indicated that interpersonal communication significantly increased risks of food and medicine safety. Therefore, we predict that those who are more likely to discuss PM pollution will perceive risks of PM than those who are less likely to talk about it. Additionally, it is expected that interpersonal communication can influence preventive behavior intentions.

As mentioned above, the relationships between media use, interpersonal communication, risk perceptions, and preventive behavioral intentions are not simply explained. For example, though people are frequently exposed to news information about PM hazards, not everyone
perceives risks of PM pollution. However, communication scholars point out that risk perceptions and behavioral intentions can be influenced by interpersonal discussion.

Many communication researchers have explored that the effects of media use are largely mediated through interpersonal communication (Cho et al, 2009; Ho et al, 2013; Shah et al, 2005). Their findings have revealed that not only exposure to media contents but also cognitive engagement such as interpersonal communication could influence how people processed and received information that the media presented. Examining the relationship between political campaign communication and participation, for example, Cho et al (2009) found that political discussion mediated the association between news use and political participation. Ho and her associates (2013) found that attention to news media indirectly increased behavior intentions in the context of H1N1 pandemic. Their findings revealed that interpersonal communication, elaborative processing, and knowledge positively mediated the relationships between media use and behavioral intentions.

Thus, we focus on the mediating role of interpersonal communication. This study examines how interpersonal communication influence risk perceptions and how it mediates the effects of media use on risk perceptions and behavioral intentions.

3. Methodology

3.1 Research Question and Hypotheses

Although research on communication has begun to clarify the link between media use, risk perceptions, and behavioral intentions, few studies have examined the mediating role of interpersonal communication and simultaneously considered the effects of mass media and new media in the field of health communication such as PM pollution. This study aims to address this literature gap in research. Additionally, by using data from South Korea, our study may understand cross-culturally the role of health and risk communications.

To test the communication mediation model, the following hypotheses are posed and the research question is asked. Figure 1 illustrates the conceptual model of this study, and shows potential paths between variables.

H1a: Mass media use positively relates to interpersonal communication of PM.
H1b: New media use positively relates to interpersonal communication of PM.
H2a: Mass media use positively relates to risk perceptions of PM.
H2b: New media use positively relates to risk perceptions of PM.
H3: Interpersonal communication positively relates risk perceptions of PM.
H4: Interpersonal communication positively relates preventive behavioral intentions.
H5: Risk perceptions of PM positively relates to preventive behavioral intentions.
RQ1: Are the associations between mass media and new media uses and preventive behavioral intentions mediated by interpersonal communication and risk perceptions of PM?

Figure 1: Mediation Model of Media Use, Interpersonal Communication, Risk Perception, and Behavioral Intention

3.2 Data and Sample

Data for our study were collected in South Korea in October of 2017. The nationwide online survey was conducted by a professional research firm that administers approximately 1.2 million members. The population of this survey was Korean residents aged 19 years or more. Considering gender, age, and region of respondents, we used quota sampling methods. First, 11,140 individuals were randomly selected according to the quotas and then they received emails. Overall 2,114 respondents started to answer the questionnaire (about 19%). However, excluding unreliable or incomplete responses, we analyzed 1,000 cases in this study (47%). The final sample size was 1,000 (response rate = about 9%).

3.3 Measures

*Media use.* Two categories of media use were measured: mass media and new media. Mass media include print newspapers, television, and radio, while new media comprise Internet news, web-bulletin, and SNS (Social Networking Sites). The amount of media use was calculated by (1) media exposure and (2) media attention (Chang et al., 2016). Respondents were asked to show how much exposure and attention to health news/information on atmospheric environment and PM through the six media channels. Their answers were coded on a 5-point scale, where 1 = no exposure or attention through 5 = very frequent exposure or very close attention. The responses were averaged for a composite index with higher scores indicating more media use (Mass media: M = 3.16, SD = .65, α = .77; New media: M = 3.47, SD = .67, α = .84). *Interpersonal communication.* Interpersonal communication about health issues associated with atmospheric environment and PM was assessed by asking a single item...
on 5-point scale, where 1 = no discussion through 5 = very frequent discussion. Respondents were asked to indicate how often they talk with their family members or friends (M = 3.37, SD = .84).

**Risk perceptions.** Perceived risks of PM were measured by asking the respondents to consider four PM problems that were recently reported in South Korea. Using an index of four items, respondents indicated the amount of risk they were taking regarding the four factors (the yellow dust from foreign countries, PM from foreign anthropogenic sources, domestic automobile exhaust fumes, and domestic power plant flue gas). The responses were on a 5-point scale, where 1 = no risk through 5 = very high risk (M = 3.92, SD = .61, α = .81).

**Behavioral intentions.** Behavioral intentions were measured with responses to four items. On a 5-point scale, where 1 = not at all likely through 5 = very likely, respondents answered how likely they were to do the following “when PM crises occur: (a) I will check out PM information before going out, (b) I will wear the mask before going out, (c) I will use an air purifier indoors, and (d) I will wash my hands, foods, and face after coming from outside (M = 3.92, SD = .66, α = .81).

**Control variables.** We controlled the effects of gender, age, education, household income, political stance, and controllability in the analytical model (Fleming et al., 2006; Ho et al., 2013). Gender was coded as a dichotomous variable (51.4% male) and age was measured in years (M = 39.7, SD = 11.6). Education was an ordinal variable with five categories, where 1 = high school degree or below through 5 = graduate degree (M = 2.76, SD = 1.05). Monthly household income was categorized with nine categories, where 1 = KRW one million or less through 9 = KRW10 million or more (M = 4.82, SD = 2.03). Political stance was assessed as self-reported record (1 = very conservative, 5 = very liberal, M = 3.15, SD = .76). Controllability was measured by asking to indicate how possible it is to avoid risks of PM through individual efforts such as wearing masks or checking out information on a 5-point scale, where 1 = not at all possible through 5 = highly possible (M = 3.16, SD = .87).

### 3.4 Analytical Procedure

To examine the indirect effects as well as mediating relationships in the model, we used the bootstrap approach explained by Hayes and Preacher (2013). This study examined how news media use (X) was associated with preventive behavioral intentions (Y) via interpersonal communication (M1) and risk perception (M2). As the two mediators (M1 and M2) involved causal orderings and also were connected in sequence, the analysis followed PROCESS Model 6 in Hayes and Preacher (2013). In the analysis, we additionally included the control variables such as gender, age, education, income, political stance, and controllability. Bootstrapping
randomly selected cases from the sample produced 10,000 data sets. Estimates of the indirect influences of M1 and M2 were computed for each data set.

These indirect effects were considered statistically significant when the bias-corrected (bootstrapped) confidence intervals (95%) did not have zero.

4. Results and Discussion

4.1 Path Model

Figures 2 and 3 show the unstandardized paths with their coefficients and standard errors with regard to the effects of mass media and new media uses on the preventive behavioral intentions through two mediators: interpersonal communication and risk perceptions. First, mass media and new media uses were significantly and positively related to interpersonal communication, respectively (B = .43, SE = .04, p < .001; B = .47, SE = .04, p < .001), supporting H1a and H1b. Second, new media use was significantly and positively associated with risk perceptions (B = .15, SE = .04, p < .001), supporting H2b. However, mass media use was not significantly related to risk perceptions. Thus, H2a was not supported. As the Figures 2 and 3 illustrate, the paths from interpersonal communication to risk perceptions were significantly and positively related (B = .17, SE = .03, p < .001; B = .13, SE = .03, p < .001), supporting H3. Also, the paths from interpersonal communication to preventive behavioral intentions significantly and positively associated (B = .15, SE = .02, p < .001; B = .11, SE = .02, p < .001), supporting H4. Last, the Figures 2 and 3 show that the paths from risk perceptions to preventive behavioral intentions were positive and significant (B = .46, SE = .03, p < .001; B = .43, SE = .03, p < .001), supporting H5.

Figure 2: Mediation Model of Mass Media and Path Coefficients

Note: Unstandardized regression coefficients and corresponding standard errors are reported. Insignificant paths are omitted in this figure. *p < .05, **p < .01, ***p < .001
Figure 3: Mediation Model of New Media and Path Coefficients.

4.2 Mediation Model: Indirect Effects

Bootstrapping estimated the indirect effects of mass media and new media uses on preventive behavioral intentions through interpersonal communication and risk perceptions. Each data set assessed the indirect effects of the hypothesized mediators. Table 1 shows the indirect effects of the three mediating routes as well as the total effects of mass media and new media uses on preventive behavioral intentions. This analysis considered that the indirect effects were statistically significant when the confidence intervals did not include zero.

Table 1: Direct and Indirect Effects of Mass Media and New Media Uses on Preventive Behavioral Intentions through Interpersonal Communication and Risk Perceptions (N = 1,000)

<table>
<thead>
<tr>
<th>Mediators:</th>
<th>Mass media (X1)</th>
<th>New media (X2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Point estimate</td>
<td>CI</td>
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<tr>
<td></td>
<td>(SE)</td>
<td></td>
</tr>
<tr>
<td>Indirect effects</td>
<td>.10 (.02) *</td>
<td>.06 to .15</td>
</tr>
<tr>
<td>Interpersonal communication</td>
<td>.06 (.01) *</td>
<td>.04 to .09</td>
</tr>
<tr>
<td>Via M1</td>
<td>.01 (.02) *</td>
<td>-.02 to .04</td>
</tr>
<tr>
<td>Via M2</td>
<td>.03 (.01) *</td>
<td>.02 to .05</td>
</tr>
<tr>
<td>Via M1 &amp; M2</td>
<td>.12 (.03) *</td>
<td>.21 (.03) *</td>
</tr>
</tbody>
</table>

* indicates significant effects.

Note: M1 = Interpersonal communication; M2 = Risk perceptions; CIs are bias-corrected 95% confidence intervals for the indirect effects (Bootstrap N = 10,000).

Research question 1 asked the relationships between mass media and new media uses and preventive behavioral intentions mediated by interpersonal communication and risk perceptions. The findings revealed that mass media use significantly and indirectly influenced preventive behavioral intentions in two mediating routes through interpersonal communication (B = .06, SE = .01, CI [.04, .09]) and through interpersonal communication and risk perceptions (B = .03, SE = .04, CI [.02, .05]).
SE = .01, CI [.02, 05]). New media use had statistically significant indirect effects on preventive behavioral intentions through three mediating pathways via interpersonal communication (B = .05, SE = .02, CI [.03, 08]), via risk perceptions (B = .06, SE = .02, CI [.03, 10]), and via interpersonal communication and risk perceptions B = .03, SE = .01, CI [.01, 04]). In particular, interpersonal communication played a mediating role in the relationships of mass media and new media uses to preventive behavioral intentions. As shown in Table 1, all of these statistically significant relationships were positive.

4.3 Effects of Mass Media and New Media Uses on Risk Perceptions

Using data from a nationwide online survey, this study analyze the relationships of media use, interpersonal communication, risk perceptions, and preventive behavioral intentions about PM pollution in South Korea. The findings showed that mass media use failed to affect risk perceptions, whereas new media use significantly increased risk perceptions. As hypothesized, interpersonal communication positively related to risk perceptions regarding PM, which, in turn significantly and positively increased behavioral intentions to prevent PM risks. The mediating role of interpersonal communication was examined and this mediating role was a strong predictor for explaining the influences of mass media and new media use on preventive behavioral intentions in PM pollution.

Two types of media used to obtain PM news were tested by examining the effects of mass media and new media on perceived risks of PM and behavioral intentions to prevent PM risks. Both types of media use positively and significantly related to interpersonal communication. Our findings, however, revealed that only new media use significantly increased risk perceptions, while mass media use failed to influence risk perceptions. So, why are the effects of the two types of media use (mass media and new media) on risk perceptions different?

First, mass media use went into decline with the arrival of emerging media technologies in South Korea. Though television news is the major sources for health information, South Koreans infrequently use other types of mass media including print newspapers and radio (Kim and Kim, 2017). In recent years, more and more people consume news contents by using their mobile devices such as a smart phone or a tablet PC. Thus, they are more likely to read or view news feed on social media and news stories from the Internet to update health information. With the advent of emerging media technologies, the patterns of media use have been replacing, and then news consumption has been changing as well. As well, media companies as a news provider may change their focus on from mass media audiences into new media customers. Thus, the influences of mass media use can be relatively diminished compared to previous years.

Second, new media are different from mass media in specific manners. Above all, the major feature of new media (Internet news, web-bulletin, and social media) is interactivity, which makes possible a two-way communication and information exchange (Larsson, 2018; Smith, 2009). This interactivity can lead to several discussions between a user and other user, and at
the same time this may convenient and effective communication between users and journalists. Also, new media technologies can provide news stories with various formats including texts, audios, videos, and infographics. New media users can consume news contents more vividly and dramatically, and the effects of new media use can be enhanced. Visual images of news have powerful effects on individual memory and perceptions (Wilkins, 2005). Because print newspapers and radio lack visuality and variety of formats compared to new media, new media can be a more effective predictor of risk perceptions.

4.4 Communication Mediation Model Testing

This study tested the mediating role of interpersonal communication in the relationships of media use, risk perceptions, and behavioral intentions in the context of PM pollution. The analysis further examined the effects of mass media and new media uses in the communication mediation model. Our findings revealed that interpersonal communication was very important in the communication mediation model as a key mediator of the links between media use and preventive behavior intentions. If interpersonal communication was omitted from the model, the pathway from mass media use to behavioral intentions could not be connected. Thus, the effects of mass media on behavioral intentions can be disregarded in the model. However, due to the mediating role of interpersonal communication, both mass media and new media uses should be significantly considered in the model.

Because this study indicated the key role of interpersonal communication in increasing perceived risks of PM and in enhancing behavioral intentions to prevent PM risks, journalists should pay attention to how their news stories can lead to more discussion between news consumers. Basically, news writers and producers have to report public health issue such as PM pollution sufficiently and accurately. This is why the public can talk about them with more sufficient and accurate information. The findings indicated that the effects of new media use were stronger in the model than those of mass media use. Thus, it is a better option for health communication practitioners to focus on the influence of new media in their health campaigns and communication strategies.

5. Conclusions and Recommendations

Our findings should be carefully interpreted because this study has several limitations. First, the survey data were cross-sectional. Though the bootstrapping method by Hayes and Preacher (2013) to analyze the communication mediation model was employed, however, it is not possible to make sure that our findings indicate causal relationships. Thus, future research should test this model with different time points. That is, a longitudinal research design is highly recommended for future studies. Second, our sample could be criticized for its lack of representativeness. Because we used online panels, the data were collected with a non-
probability sampling method. However, we used proportional sampling according to gender, age, and region, and the population of the online panel where the sample was drawn was more than 1,160,000, which is large enough to represent South Koreans. Last, this study only examined the mediating role of interpersonal communication. However, other communication mediation model studies have tested elaborative processing as well as interpersonal discussion (e.g., Cho et al, 2009). Cognitive information processing may include both interpersonal communication and elaboration (or intra-personal reflection). Thus, future research should analyze our model with an additional variable or elaborative processing.

Conclusively, our study makes several unique contributions to the health communication literature. First, this study indicates a potential link between media use, interpersonal communication, risk perceptions, and behavioral intentions of PM pollution. Rather than considering media use as a single type, we analyzed two media types, mass media and new media, and found that new media was more important than mass media for explaining variation in the model. The results revealed that interpersonal communication played a key role in our communication mediation model. Thus, these findings suggest that journalists and health communication practitioners should pay more attention to the influences of new media and interpersonal communication in the context of PM pollution. Using data from South Korea, our study can expand the cross-cultural understanding of health communication.

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