

The Extension of the RISP Model with Behavioral Intention regarding Breast Cancer Screening¹

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Abstract

This study aims to analyze multiple predictors of information seeking behavior, including information seeking intention about breast cancer, using the risk information seeking and processing (RISP) model. Data from 680 female respondents shows that when individuals perceived the risk of breast cancer, they felt more negative emotions, such as anxiety and nervousness, which increased the need for more information about the risk and tendency to seek information. In addition, information subjective norms were positively related with information seeking intention. When individuals felt they lacked relevant information, their seeking intention increased. Lastly, seeking intention led to breast cancer screening intention.

Keywords: extended RISP model, information seeking, breast cancer screening, South Korea

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With the emergence of various smart media in health areas, individuals have gained easy access to health information through medical media, expert blogs, and health induction apps. Not only individuals at high risk of disease but also those who are generally healthy show an interest in searching for information about diseases. Korean health-related ministries, such as the Ministry of Health and Welfare and the Korea Centers for Disease Control and Prevention, regularly provide disease prevention guidelines and self-diagnosis methods to ensure people can access more accurate health information.

At this point, two key considerations arise. First, it is essential to broaden the scope of health information recipients to include those who do not currently have a disease. Most studies on risk information seeking and processing have concentrated on individuals already exposed to diseases or engaged in high-risk behaviors, such as smoking, alcohol use disorders, or obesity (Braun & Niederdeppe, 2012; Eagly & Chaiken, 1993; Griffin et al, 1999). A similar trend is observed in health communication research in Korea, which tends to focus more on health crisis behaviors such as smoking, cancer, AIDS, mental health/addiction, and obesity (Han, 2005; S.-J. Lee & Lee, 2016; Park et al., 2008). However, expanding the target audience for health behavior information should be considered within the existing discourse on disease-related information seeking.

Second, while seeking information and developing an interest in health risks represent essential initial steps in learning about health risks, it is crucial to connect this seeking behavior with preventive actions against these risks. However, much of the research on risk information-seeking (e.g., Huh & Kim, 2015; Kahlor, 2007; Noh et al., 2016; Rose et al., 2017; Yang, Aloe, & Feeley, 2014) has primarily focused on exploring predictors of information seeking or intention to seek. Given the ultimate goal of raising public awareness of health risks, emphasis should be placed on encouraging individuals to adopt preventive behaviors against these risks. An example is health/medical examination as a key measure for preventing diseases (Dutta-Bergman, 2004; Sohn et al., 2011).

Breast cancer stands out as the most prevalent cancer in Korea. The incidence of breast cancer has steadily increased over the past two decades, reaching 33.2 cases per

100,000 people in 2010 and escalating to 55.7 in 2021 (Korea Central Cancer Registry, 2023). Fortunately, early detection and treatment offer effective prevention measures for breast cancer (Azaiza & Cohen, 2006). Therefore, our objective is to explore and verify the factors predicting breast cancer screening to assess one’s breast condition.

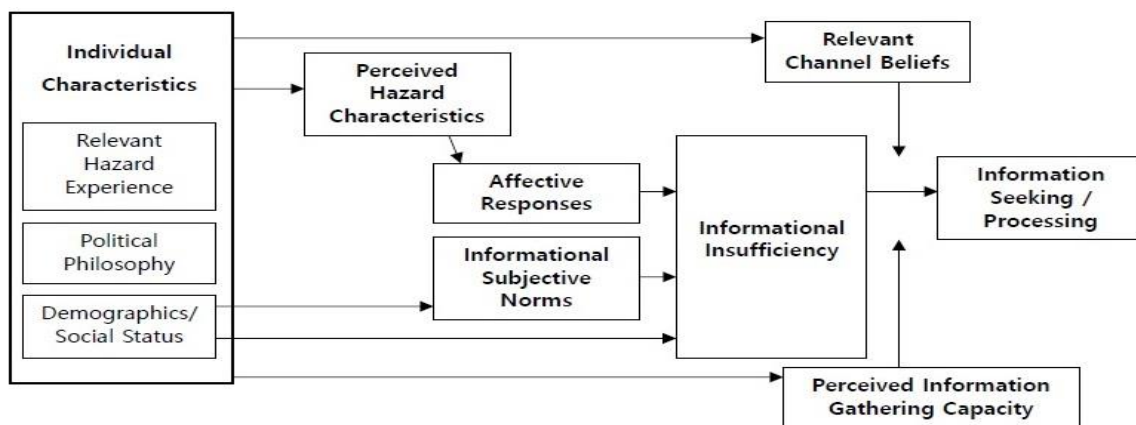
In this study, we applied the risk information seeking and processing (RISP) model, which elucidates various factors related to information seeking, including risk perception, emotional response, and subjective norms (Griffin et al., 1999). By extending the model to include behavioral intention, we aim to analyze the relationship between seeking information and engaging in screening behavior, as well as the interconnections among factors within the existing model. The findings of this study can contribute to understanding when the general public is inclined to undertake breast cancer screening, beyond individuals identified as having a breast cancer risk in prior research (e.g., Hong et al., 2019; Yang et al., 2010). Additionally, this study can provide further evidence in verifying the extended model within the context of breast cancer, complementing existing research on other risk issues such as nuclear energy (H. J. Kim, 2019) and infectious diseases (Seo, 2016).

Model of RISP

The RISP model focuses on the mechanism of seeking and processing health information depending on personal traits (Griffin et al., 1999).

Figure 1

Risk Information Seeking and Processing Model (Griffin Dunwoody, & Neuwirth, 1999)



The RISP model insists that seven direct/indirect factors (individual characteristics, risk perception, affective response to risk, pressures on risk information acquisition from others, information insufficiency, information gathering capacity, and belief in the usefulness of various channels) can affect an individual's risk information-seeking behavior (see Figure 1). Among those factors, individual characteristics, including risk experience, demographics, and political philosophy (i.e., identifying oneself as liberal or conservative) (Yang et al., 2014), are controlled for (Seo, 2016).

Perceived hazard characteristics include personal and environmental factors, such as risk perception, institutional trust, and self-efficacy. Griffin et al.'s (1999) original and conceptual RISP models were developed with specific variables. For example, perceived hazard characteristics were measured by perceived risk perception, which combines perceived severity of risk and perceived susceptibility of risk (i.e., the perceived likelihood of facing the risk) (Seo, 2016).

Griffin et al. (1999) described the linkage between risk perception and affective response; when individuals perceive severe risks around themselves, negative effects, such as anxiety, worry, or anger, occur. Risk perception leads to information seeking and processing through motivations such as negative affective responses or information insufficiency. This model highlights negative affects because cognitive and affective factors influence risk perception (Slovic, 1987). For example, Ku et al. (2020) found that negative affect mediates the relationship between risk perception, information insufficiency, information seeking, information processing, and behavioral intention. Other studies have also pointed out the importance of negative affect (H. J. Kim, 2019; Ku et al., 2020; Seo, 2016).

Next, the RISP model suggests two information processing motivations: informational subjective norms (a social factor) and information insufficiency (a self-defense factor). Subjective norms in the theory of planned behavior are defined as social pressures that encourage individuals to behave in particular ways (Ajzen, 1991); subjective norms are applied in RISP as informational subjective norms, which refer to an individual's perception that people who are close to them anticipate that

they are knowledgeable about a specific issue. When individuals perceive others' anticipated information level to be high, the level of sufficient information increases.

The main variable of RISP is information (in)sufficiency, which is directly influenced by negative affects and informational subjective norms. This construct is a motivation for information seeking and is calculated by the difference between the current level of an individual's subjective knowledge of a risk and the ideal level of knowledge needed to manage it (Griffin et al., 1999); that is, when an individual perceives that they currently do not have enough risk information, they believe they need more information (i.e., the perception of information insufficiency increases). The following hypotheses examine the relationships between risk perception, negative affective response, informational subjective norms, and information insufficiency.

H1: The perception of breast cancer risk is positively associated with negative affective response.

H2: Information insufficiency is positively associated with a) negative affective response and b) informational subjective norms.

Information Seeking and Extended Model

Information seeking and processing come from risk perception, negative affective responses, informational subjective norms, and information insufficiency. Information seeking refers to the active behavior of looking for risk-relevant information via various channels. Since this study considers behavioral intention as an outcome of information seeking, we focus on information seeking rather than information processing. Fisher and Fisher (1992) analyzed 50 empirical studies and suggested influential factors that promote behavioral change: information, motivation, and behavioral skills. Information here means knowledge related to health behaviors. The following hypotheses examine the relationships between the former part of the RISP and information seeking.

H3: Seeking intention regarding breast cancer information is positively associated with a) negative affective responses, b) informational subjective norms, and c) information insufficiency.

The RISP model has been extended in two ways: first, to focus on information processing and, second, to focus on risk prevention behaviors. Griffin et al. (1999) proposed this model and suggested a combination of information seeking and processing and preventive behavioral factors in TPB to connect communicative behaviors with actual preventive behaviors. In other words, they highlighted the application of the TPB's risk-preventive behaviors to the RISP. Seo (2016) also pointed out the need to verify the relationship because individuals who perceive risk process risk information to prevent risk behaviors. Therefore, the final outcome of this model needs to include risk-preventive behaviors.

More recent literature (e.g., Jang & Kim, 2016; H. J. Kim, 2019; Seo, 2016; Yang et al., 2015) is interested in the extension of dependent variables. For example, Jang and Kim (2016) used the RISP model to examine how the perception of risks related to Japanese seafood affects intentions to consume seafood. Fischer and Clenk (2011) reported that systematic processing leads to preventive behaviors regarding eco-friendly policy support. Seo (2016) found that the active seeking and systematic processing of information positively affects MERS prevention behaviors. This study conducted two serial surveys with the same respondents in the 2015 South Korean MERS epidemic to measure the actual risk behaviors and examine the RISP motivations of the behaviors. H. J. Kim (2019) found that an individual level of risk information processing can lead to information sharing.

The relationships between variables in the RISP have also been modified. Griffin et al. (2008) proposed that affective response and informational subjective norms do not necessarily pass through information insufficiency but can directly be related to information seeking and processing. Other studies (e.g., Ku et al., 2020; Seo, 2016) verified this relationship. In addition, it was also suggested that risk perception and affective responses—which are more than antecedents of information insufficiency—may be principal motivations for information seeking and processing (Griffin et al., 2008). Therefore, this study applied the newly adapted relationships in the original RISP model.

Specifically, this study proposed that information seeking mediates between risk perception/affective responses and actual behavioral intention, though it has mainly been considered as a dependent variable in previous studies. Risk perception

and affective response to a disease represent the attitudes or feelings in a situation. We suggest that risk perception and affective response do not directly affect health behaviors; rather, we suggest that they are linked to health behavior via information seeking. Similarly, Zhu (2017) reported the indirect effects of attitudes towards smoking, perceived norms about smoking, and smoking self-efficacy on smoking intention through pro-smoking information scanning. Jun (2012) also found a positive relationship between information-seeking behaviors and the actual consumption of performing arts. Lee and Yi (2014) explained that seeking information about specific issues or risks prompts behavioral intention. Overall, we examined whether information seeking was related to health behavioral intentions.

Health Screening Intention and Risk Perception

In South Korea, the breast cancer literature is broadly divided into two streams: research on communication (e.g., Jung & Park, 2010; S. Y. Lee, 2011) and research on cognitive processing (e.g., Jeon, 2013; M. Kim & Kim, 1990; Y. W. Lee et al., 2004). The former deals with changes in screening intention caused by communication; the latter identifies how risk perception influences intention. Since screening behavior is positively affected by screening intention (Dutta-Bergman, 2004; Sohn et al., 2011), it is necessary to examine how cognitive processing impacts screening intention. However, breast cancer studies in Korea are limited and focus primarily on whether to accept treatment (Jeon, 2013; Y. W. Lee et al., 2004). However, Y. W. Lee et al. (2004) analyzed the causes of differences in actual screening behaviors between Koreans living in Korea and the United States. The results show that Koreans in Korea perceived more risk and higher barriers to breast cancer screening, while Koreans in the United States perceived higher benefits to screening; therefore, differences in perception were related to differences in behavior.

Additionally, Jeon (2013) examined the psychological determinants of breast cancer screening intention and found that perceived benefit and self-efficacy directly affect screening intention. Even though there are significant findings on the relationship between risk perception and screening intention regarding breast cancer, the number of related studies is very small, so more follow-up research is needed. Therefore, this study

aimed to use RISP and examine the process of risk perception and screening intention in the context of breast cancer. The research question was as follows:

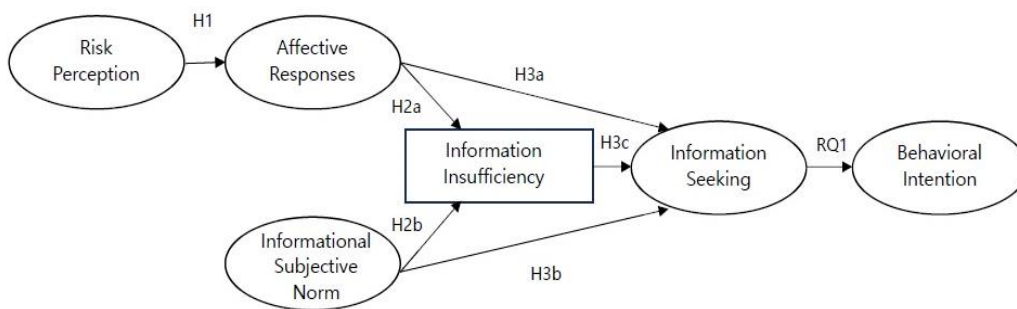
RQ1: Is seeking information about breast cancer related to screening intention?

Proposed Research Model

In this study, we planned to verify the following research model, which is a schematic model of the hypotheses and RQ1 presented above, which starts from risk perception and ultimately leads to behavioral intention (see Figure 2).

Figure 2

Theoretical Model with Hypothesized Relationships



Method

Data and Measures

This study collected data through an online survey panel owned by a Korean research firm, Macromill Embrain, in October 2017. The people listed on the panel were invited by email to participate in this study. A small incentive (cash points worth about \$1.50US) was provided for participation in the study. The population comprised Korean residents aged 18 years or older (the panel size was 1,266,764). Quota sampling methods were used with respect to sex, age, and region of residence. A total of 2,861 individuals opened the email and accessed the questionnaire, and 1,500 individuals completed and submitted the questionnaire (approximately 52%). Due to the nature of the research topic, men (n = 761) were excluded. Of the 739 female respondents, 679 were used for the analysis, excluding unreliable or incomplete responses. Our respondents ranged in age from 18 to 70 years, with a mean age of

43.09 years. The fact that the sample was collected based on overall population characteristics and only male responses were excluded remains a limitation of the sample. Measurements were made in such a way that participants read and answered questions related to risk perception, informational subjective norms, negative affective response, information insufficiency, information seeking on breast cancer, and risk preventive behavioral intention. The items were composed by revising and supplementing previous studies (as described below), and a 7-point scale was used.

Risk Perception

First, risk perception of breast cancer was measured using two sub-factors: perceived susceptibility and perceived severity. It consisted of three items based on the items of previous studies (Becker, 1974; B. K. Lee et al., 2008): "I may have breast cancer," "I am afraid of getting breast cancer," and "I am sensitive to the thought of getting breast cancer."

Informational Subjective Norm

The informational subjective norm was defined as "the level at which people close to me, such as friends and family, want me to know about specific information." By referring to the questionnaires introduced by Ajzen and Fishbein (2005), four statements indicated the informational subjective norm associated with breast cancer: "My family expects me to seek information about how breast cancer affects my health," "The people close to me think that I should seek information about how breast cancer affects my health," "People in my life whose opinions I value expect me to seek information about how breast cancer affects my health," and "My close friends expect me to seek information about how breast cancer affects my health."

Negative Affective Response

Negative affective responses were defined as "negative emotional responses when thinking about breast cancer," referring to the literature related to appraisal theory (Shen & Dillard, 2007). Four statements indicated a negative affective response to breast cancer: "When I think about breast cancer, I am worried," "When I think about breast cancer, I am anxious," "When I think about breast cancer, I am afraid," and "When I think about breast cancer, I am nervous."

Information Insufficiency

Information insufficiency was defined as “the amount of information that is considered necessary to cope with risk” with reference to Griffin et al. (1999). Information insufficiency can be measured in several ways. The traditional method calculates the difference between the amount of information that respondents think they have and the amount of information they need (Griffin et al., 2004). Another method is to ask the respondents what amount of information they think is necessary to cope with risk with a single question (Seo, 2016). The latter method was used in the present study with the following statement: “Please use a number on a scale of 0-100 to indicate how much knowledge you think is necessary to cope with breast cancer.”

Information Seeking Intention

Information-seeking behavior was assessed by asking participants to indicate their level of agreement with each of the following three statements on a 7-point scale (1 = not at all, 5 = very much): “I have looked for information about breast cancer to improve my health,” “I have looked for information on breast cancer screening,” and “I have looked for information about self-examinations for breast cancer.”

Screening Intention

Screening intention was defined as “the degree of an individual’s intention to screen for breast cancer.” By referring to the questionnaires introduced by Sohn et al., (2011) and Williams et al. (1996), four statements indicated behavioral intentions associated with breast cancer: “I am willing to be screened for breast cancer within the next year,” “I will be screened for breast cancer regularly,” “I have a plan to practice breast cancer screening,” and “I am thinking of learning how to examine myself for breast cancer.”

Control Variables

The control variables of age and education level were included as potential confounding factors. Such demographic variables are likely to affect the main factors related to RISP (Griffin et al., 2008).

Measurement Model Analysis

The mean, standard deviation, and reliability values (α) of the major variables are listed in Table 1. All Cronbach's alpha values (α), which show the internal consistency between the measurement items, exceeded .8, ensuring a satisfactory level of measurement validity.

Table 1

Descriptive Statistics (N = 679)

Variable	<i>M (SE)</i>	<i>SD</i>	Skewness	Kurtosis	α
Risk Perception	3.85 (.05)	1.31	-0.10	-0.34	.87
Info. Subjective Norm	3.22 (.03)	0.84	-0.45	0.20	.94
Affective Responses	3.25 (.04)	0.91	-0.38	-0.26	.94
Information Insufficiency	68.83 (.70)	18.35	-0.85	1.04	-
Information Seeking	3.09 (.04)	0.94	-0.42	-0.39	.92
Behavioral Intention	5.35 (.04)	1.02	-0.61	0.53	.87

To examine the proposed hypotheses and research questions, we used structural equation modeling techniques. Specifically, a two-step approach (Anderson & Gerbing, 1988) was carried out to examine the suitability of concept construction by verifying the measurement model, and then to determine the relationship between all variables through structural model analysis. AMOS 20 was used to examine the validity of the measurement instrument construct. Preliminary tests of the data found that skewness and kurtosis were not problematic, with all variables having a skew of less than two and kurtosis less than three, as recommended by Kline (2011).

Construct validity was assessed using factor loading scores and average variance extracted (AVE) values (Hair et al., 2006). The results indicated that factor loadings for all variables were greater than .5, and AVE values were greater than 0.5, in the same order. Thus, we confirmed convergent validity for the measurement items of each construct.

Table 2

Results of Discriminant Validity (N = 679)

	RP	ISN	AR	IS	BI	CR
Risk Perception	0.54					.78
Info. Subjective Norm	0.04	0.84				.95
Affective Response	0.38	0.1	0.82			.95
Information Seeking	0.06	0.24	0.07	0.81		.93
Behavioral Intention	0.02	0.16	0.03	0.21	0.55	.82

The shaded cells are the AVE values.

We assessed discriminant validity by comparing the AVE for each construct with its squared correlation with any other construct. In Table 2, the shaded cell is the average variance extraction (AVE) value of each variable and the remaining column is the square value of the correlation coefficient between the variables. Since the AVE value of each variable was higher than the square value of the correlation coefficient with other variables (see Table 2), it was judged that discriminant validity was secured. The construct reliability (CR) values were all .7 or higher.

Finally, for accurate analysis, confirmatory factor analysis (CFA) was performed to check for factor loading, model validity, and reliability. As a result of CFA, ($\chi^2[138] = 594.74, p < .001, CFI = .95, NFI = .94, IFI = .95, RMSEA = .07$), it was determined that the measurement model was at an acceptable level and the hypothesis was tested.

Results

Correlations Among Variables

As a result of performing correlation analyses between each variable before model validation, all values were significant at the $p < .05$ level or better. (Table 3).

Table 3

Correlations Among Variables (N = 679)

Variable	1	2	3	4	5	6
1. RP	-					
2. ISN	.19**	-				
3. AR	.62**	.32**	-			
4. II	.08*	.08*	.12**	-		
5. IS	.25**	.49**	.26**	.13**	-	
6. BI	.15**	.40**	.17**	.19**	.46**	-

Note. RP=risk perception, ISN=informational subjective norm, AR=affective responses, II=information insufficiency, IS=information seeking, BI=behavioral intention. ** $p < .01$.

Hypothesis Testing

Structural equation modeling was performed using the proposed model to test this hypothesis. The fit of the research model was found to be satisfactory ($\chi^2[171] = 786.93$, $p < .001$, CFI = .94, NFI = .93, IFI = .94, RMSEA = .07). Table 4 and Figure 3 summarize the analysis results of the model.

As a result of the analysis, the overall structure of the RISP model was supported except for the effect of informational subjective norms on information insufficiency. Looking at each hypothesis, breast cancer risk perception had a very strong effect on negative affective responses, which correspond to psychological motives that make people feel like they have inadequate information. Therefore, H1 is supported.

Negative affective responses contributed to information insufficiency; the flow was the same as in most RISP model studies. Negative affective responses also had a positive effect on risk information seeking. Therefore, H2a was supported. However,

the informational subjective norm did not appear to have a statistically significant effect on information insufficiency; therefore, H2b was rejected.

Table 4

Result of Path Analysis (N = 679)

path		B	SE	CR	Decision
H1	Risk Perception → Affective Responses	.68***	.04	15.7	Supported
H2a	Affective Responses → Info. Insufficiency	.10*	.77	2.5	Supported
H2b	Info. Subjective Norm → Info. Insufficiency	.06	.95	1.5	Not supported
H3a	Affective Responses → Information Seeking	.13***	.03	3.7	Supported
H3b	Info. Subjective Norm → Information Seeking	.49***	.04	12.9	Supported
H3c	Info. Insufficiency → Information Seeking	.09**	.01	2.7	Supported
RQ1	Information Seeking → Behavioral Intention	.45***	.05	11.4	Supported

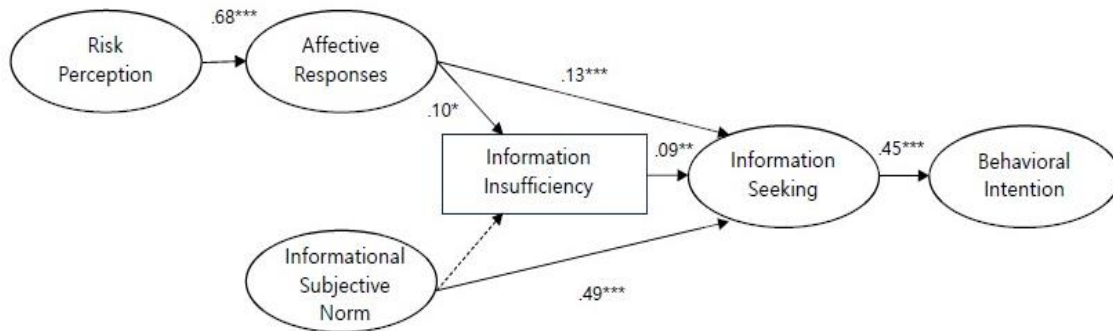
Note. * $p < .05$, ** $p < .01$, *** $p < .001$

H3 was about the variables affecting information seeking for breast cancer. Negative affective responses were found to have a positive effect on information seeking, and H3a was supported. Informational subjective norms were also found to strongly influence information seeking. Therefore, H3b is supported. Insufficient information also had a positive effect on information seeking for breast cancer. In other words, the higher the awareness of the need for breast cancer information, the higher the likelihood of demonstrating information-seeking behavior.

Finally, we turn directly to our research question about the relationship between preventive behavioral intention and the variables of the existing RISP model. Risk information seeking proved to have a strong positive relationship with behavioral intention. The willingness to take action to solve risk increased when cognitive effort was expended to seek risk-related information.

Figure 3

Structural Equation Model (N = 679, age and education were controlled)



Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Indirect Effect Testing

The proposed model is an extended model in which a final variable related to an individual's behavior is added to the existing RISP model. To specifically examine the relationship between the added behavioral intention and the existing variable, the indirect effect was confirmed. Bootstrapping was performed to estimate indirect effects. As can be seen from the analysis results in Table 5, each variable had a significant effect on behavioral intention; that is, all indirect effect pathways (mediating effect pathways) were statistically significant. Therefore, it was possible to reconfirm that the extended model, including behavioral intention, was appropriate.

Table 5

Result of Indirect Effect (N = 679)

Path		Direct	Indirect	Total
Risk Perception	→ Info. Insufficiency	-	.07*	.07*
	→ Info. Seeking	-	.09**	.09**
	→ Behavioral Intention	-	.04**	.04**
Informational Subjective Norm	→ Info. Seeking	.49***	.01	.49***
	→ Behavioral Intention	-	.22***	.22***
Affective Responses	→ Info. Seeking	.13**	.01*	.14**
	→ Behavioral Intention	-	.06**	.06**
Info. Insufficiency	→ Behavioral Intention	-	.04*	.04*

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

With the rising incidence of breast cancer in Korea, this study specifically focuses on the predictors of breast cancer screening, which serves as a recovery measure for the cancer (Azaiza & Cohen, 2006). By incorporating screening intention into the RISP model, we were able to verify the interconnections among the original RISP factors and explore the relationship between information seeking and screening intentions regarding breast cancer. The findings contribute to extending the model and developing practical strategies to encourage the public to undergo breast cancer screening as a preventive measure.

Our results indicate that individuals who perceive the risk of breast cancer experience more negative emotions, leading to a heightened need for information about the risk and increased information seeking regarding the risk. In comparison to informational subjective norms, negative emotions, such as anxiety and nervousness, play significant roles in generating interest in the risk issue and prompting further exploration. While most of our findings align with the model as identified in previous studies, it is noteworthy that, unlike Griffin et al. (1999), who originally included

negative affective responses in the model as a determinant of information insufficiency, our results emphasize the role of negative affective responses in information seeking, supporting prior studies (e.g., Ahn et al., 2021; Ku et al., 2020). This highlights that feelings of anger, anxiety, or depression about breast cancer can stimulate information seeking, even when individuals do not perceive a lack of information. This finding suggests the potential use of emotional appeals in health campaigns to motivate the public to actively engage in learning about breast cancer risk.

Our second focus was to extend the RISP model and examine the relationships between existing RISP factors and screening intention. We observed a strong and positive relationship between information seeking and screening intention, signifying that individuals who actively seek risk information also possess the willingness to engage in behaviors aimed at preventing risk. Within the extended RISP model, which includes screening intention, negative emotions were found to partially mediate the relationship not only between information seeking intention but also screening intention and risk perception. These findings align with the suggestions of Griffin et al. (1999), who proposed incorporating actual risk-related preventive behaviors into the model, along with previous studies employing this concept (e.g., Jang & Kim, 2016; H. J. Kim, 2019; Ku et al., 2020; Seo, 2016). To confirm and refine the extended RISP model, future research can replicate such measures to examine changes in actual behaviors.

Despite the implications and significance of the findings, this study has several limitations. First, we measured intentions rather than actual behavior. While repeated measures with the same respondents would be necessary to observe changes in breast cancer screening from risk perception and information processing, we were constrained to measuring behavioral intentions using a single national survey. Furthermore, this study focuses on one type of risk, breast cancer, in developing the model. It is essential to apply various risks, such as natural disasters or environmental issues, to assess whether preventive behavioral intention is appropriate for inclusion in the RISP model. Similarly, given that the model covers a range of risk contexts, including diseases, general health, and environmental issues, specifying negative

emotions (e.g., high-certainty emotions vs. low-certainty emotions), as H. J. Kim (2019) did, becomes necessary. Additionally, since we excluded other main variables of RISP such as channel belief and perceived information gathering capacity to emphasize individuals' motivations for information processing, information seeking, and behavioral intention, future research could integrate all variables and evaluate the explanatory power of the model. Finally, when interpreting the results, it should be considered that the data was collected before the onset of COVID-19. After experiencing the COVID-19 pandemic, people's risk perception regarding diseases and attitudes about health checkups may have changed.

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