

Exploring Cues to Action in Health Belief Model*

Abstract

The Health Belief Model (HBM) has played a key role in describing, explaining, and predicting health-related outcomes. As one of the major health behavior theories, HBM has been well applied in numerous health-related studies. However, these studies often ignore the original conception of HBM as a theoretical model because they focus mainly on the predictive roles of risk perception variables - i.e., perceived susceptibility, severity, benefit, and barrier. Within that process, cues to action has not been comprehensively studied. The current study addresses these limitations in HBM research in two ways: (1) following the original conception of HBM and the recommendation by previous researchers, we did not use risk perception constructs as separate predictors but rather used perceived threat (perceived severity \times perceived susceptibility) and perceived evaluation of action (perceived benefit-barrier); (2) we explored both internal and external cues in predicting health-related outcome and separated out interpersonal and media cues from external cues. Path analysis of 992 representative Korean adult samples in the context of tuberculosis (TB) revealed three major findings: (1) Interpersonal and (2) media cues are related to TB screening intention directly and indirectly through perceived threat; (3) perceived threat, but not perceived evaluation of action, is significantly related to TB screening intention. Theoretical and practical implications for our findings are discussed.

Keywords: perceived threat, internal cue, external cue, perceived evaluation of action, health belief model, tuberculosis, preventive health behavior, health campaign



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Introduction

Evidence has documented that people's perception of risks about a health problem is a significant determinant of health-related attitudes and behaviors (Brewer, Chapman, Gibbons, & McCaul, 2007; Champion & Skinner, 2008; Rogenstock, Strecher, & Becker, 1994). Several theories in health research have highlighted the important roles of such risk perceptions. One such theory is the Health Belief Model (HBM), which plays a key role in describing, explaining, and predicting health-related outcomes.

HBM was developed in the 1950s to understand why people did not participate in a free tuberculosis (TB) health screening program (Hochbaum, 1958). Since then, it has been applied to various health domains such as nutrition, exercise, smoking, immunization, and HIV/AIDS and condom use (Chew, Palmer, & Kim, 1998; Conner & Norman, 1996; Jo et. al., 2012; Li et al., 2003; Mattson, 1999; Rodriguez-Reimann, Nicassio, Riemann, Gallegos, & Olmedo, 2004; Sohler, Jerant, & Franks, 2015; Tuma, Smith, Kirk, Hagmann, & Zemel, 2002; Winfield & Whaley, 2002). But evidence supporting HBM has often been mixed, which raises questions about the utility of HBM as a health behavior theory. Several critiques cite insufficient explanation and research of cues to action as a key construct in HBM and of the relations among risk perceptions and evaluation of perceived benefits and barriers in predicting health-related behavior (Carpenter 2010; Harrison, Mullen, &

Green, 1992; Mattson, 1999). We concur with these criticisms and aim to achieve two goals: (1) to better understand and test the original conception of HBM regarding risk perceptions; and (2) to explain the role of cues to action, an important yet often neglected concept in HBM research (for a few exceptions, see Witte, Stokols, Ituarte, & Schneider, 1993; Mattson, 1999; Rodriguez-Reimann et al., 2004). Cues to action are defined as "strategies to activate one's 'readiness'" (Janz, Champion, & Strecher, 2002, p. 49) such as actual or observed symptoms of the target disease and information about the diseases or the target behavior from others and media. By exploring the role of cues to action as one construct of HBM in predicting health-related behaviors, health communication researchers and practitioners can get more insights on what channels to select for delivering public health-related information. Thus, this study attempts to explore how internal and external (interpersonal and media) cues, when considered together, are directly and indirectly related to health outcomes.

In addition, we revisit the model's theoretical purpose by closely following the original conception of HBM, which involves perceived threat combining perceived severity and susceptibility and evaluation of perceived barriers and benefits of the recommended behavior. We test this research question in the study context of tuberculosis (TB) in South Korea by analyzing 992 representative adult samples. TB has the highest incidence and mortality rates among 75 legal communicable diseases in South Korea (이병관 외,

2013). Despite improved socio-economic standards, the reason for such high rates of TB is that people lack interest in the disease as well as knowledge of its seriousness. Accordingly, the Korean Centers for Disease Control (KCDC) have implemented TB eradication programs since 2013, including early detection and treatment of TB patients through education for family and health professionals and through a media campaign. The campaign has been developed and implemented based on HBM as theoretical framework (이병관 외, 2013, 2014a). Thus, TB in South Korea seems to be a good test case for this study's purpose of testing the original conception of HBM.

Tuberculosis as a Recurring Health Issue in South Korea

Tuberculosis (hereafter, TB) is an infectious airborne disease caused by mycobacterium tuberculosis. TB is considered to be a socioeconomic disease because it is manageable through continuous treatment. In most cases, TB affects the lungs, but it can also affect other parts of the body (Korean Centers for Disease Control & Prevention, 2012). According to the World Health Organization (WHO, 2015), 9.6 million cases of TB were recorded worldwide in 2014, during which year 1.5 million people died as a result of the disease. Most TB patients live in underdeveloped countries with poor nutrition, sanitization, and medical care. However, South Korea (hereafter, Korea) continues to re-

cord the highest incidence rate of TB among OECD countries. For example, Korea recorded the highest TB incidence rate (i.e., 86 cases per 100,000 people) in 2014. This is almost 5 times the TB incidence rate recorded in Japan (i.e., 18 cases per 100,000 people) and 10 times that in France (i.e., 8.7 cases per 100,000 people) (WHO, 2015). New occurrences of TB are recorded for 39,000 people annually in Korea. Over 2,300 cases result in death. In particular, according to the 2015 new TB incidence statistics reported by the Korean Centers for Disease Control & Prevention (KCDC), a total of 32,181 (i.e., 63.2 cases per 100,000 people) new incidences of TB were recorded in 2015. The highest peak (11,938) was recorded for individuals over the age of 65. In Korea, 35% of TB patients are between the ages of 20 and 40.

In 2011, the KCDC announced the "TB Early Elimination New 2020 Plan," whose goal is the "implementation of a healthy society free from TB by way of change of people's perception and behavior." To achieve this goal, the KCDC has planned detailed projects that include early detection of TB patients (TB contact screening, screening of individuals at high risk) and strict treatment and management (performance of in-person medication compliance checks, management of socially vulnerable TB patients). The government also provides financial support for screening and hospitalization fees for TB patients, as well as for the living expenses of dependents if a patient is hospitalized upon order. Finally, the government has developed an extensive PR plan to increase

the importance of TB prevention. Nevertheless, it appears that people still perceive TB to be a disease that occurs in underdeveloped countries, and they do not seem to believe that they are susceptible to contracting TB. Accordingly, a campaign called TB Zero was implemented to increase people's perceived risks of TB infection and to change their preventive behavior for TB. TB Zero is a program that the government began implementing in 2013, encompassing TB prevention, TB patient treatment and management, education for patients and their family, health professional training, and media campaigns. In particular, TB Zero media campaigns have been developed and implemented based on increasing the public's risk perceptions (susceptibility, severity, benefit, and barrier)(이병관 외, 2013, 2014a). Thus, it is well suited to use TB in South Korea as a test case for testing HBM.

Health Belief Model: Key Constructs and Limitations

The Health Belief Model (HBM) was developed to discover the reasons for the lack of popularity of an x-ray screening program provided by the US Public Health Service in the 1950s (Hochbaum, 1958). The model was developed based on the value-expectancy framework, which highlights people's behavior as a function of the subjective value of an outcome and their expectation that taking a specific action will achieve that outcome (Janz et al., 2002). If this premise is applied more specifically to the health domain, it is reasonable

to assume that people desire to avoid an illness and that they will expect that taking a certain healthy action would prevent them from becoming ill.

Originally, the HBM comprised five key constructs, four risk perception concepts and the concept of cues to action. The four risk perceptions include perceived susceptibility, perceived severity, perceived benefit, and perceived barrier.

Perceived susceptibility refers to individuals' subjective beliefs about their likelihood of contracting the disease, while perceived severity refers to individuals' levels of perceived seriousness about the disease. These two risk perceptions are combined to form perceived threat, which in turn motivates action. But the perceived threat won't be sufficient enough to trigger the recommended action unless perceived benefits, or individuals' subjective beliefs that the risk can be managed by recommended actions for health, outweigh its perceived barriers (Rosenstock, 1974). Perceived barriers refer to people's beliefs that physical and psychological factors may prevent them from following recommended actions (Rosenstock, 1974). Lastly, according to HBM, health behaviors are influenced by internal and external cues to action that facilitate a series of decision-making processes related to health (Janz et al., 2002; Mattson, 1999). Cues to action refer to specific stimuli that are both internal and external and that lead people to perform appropriate health actions. Internal cues to action aid the development of individuals' perceptions of their physical health status or symptoms. These symptoms can

be personally experienced or observed from close friends and families. External cues include interpersonal communications with friends, families, doctors and health professionals about the target disease and/or preventive behaviors, and media cues represented by media campaign (Janz & Becker, 1984; Mattson, 1999).

Early studies using HBM have produced some supporting results (e.g., Janz & Becker, 1984). For example, the first systematic review of HBM research revealed that perceived barriers, benefits, and susceptibility were significant predictors of behavior, whereas severity was not (Janz & Becker, 1984). This same study also concluded that HBM may be better suited for preventive health behaviors such as TB screening and vaccinations, but not much for lifestyle-related health such as diet and jogging. Another meta-analytic study (Harrison et al., 1992) pointed out that each of the HBM constructs was significantly related to behavior or behavioral intention, although their explanatory power is small. The most recent meta-analysis of HBM studies with a more rigorous statistical method found that the four risk perceptions were generally significant predictors of health-related outcomes but the results were inconsistent (Carpenter, 2010). Among the four risk perceptions, perceived severity had a relatively weak relationship with behavior (likelihood of adopting the target behavior) and susceptibility was almost always unrelated to behavior or a weak predictor of behavior in the studies that examined prevention. Based on the results that perceived susceptibility and severity as predictors

show inconsistent and weak effects, Carpenter (2010) recommended that the simple four-variable additive model should be abandoned and instead mediation and moderation among the variables should be examined.

One of the original, yet underdeveloped, constructs in HBM is cues to action. The fact that it has not been studied much is particularly unfortunate for health communication researchers and practitioners because examining the role of cues to action, particularly external cues, in predicting the target behavior could provide specific implications in terms of education and campaign efforts. For example, exposure to media cues might directly lead to the target behavior or behavioral intention, while it may indirectly affect the target behavior by increasing perceived threat or emphasizing perceived benefit of taking the recommended action over perceived barrier of doing so. Including cues to action in HBM research could provide evidence of whether or not specific cues are effective and, if so, how they are – that is, by either directly or indirectly affecting the target behavior.

To date, only a handful of studies have explored the role of cues to action and found its effects on health-related outcomes. Some found direct effects (e.g., Li et al., 2003; Rosenstock, 1974; Sheeran & Abraham, 2001), while others found indirect effects of cues to action on health behaviors through risk perceptions (e.g., Janz & Becker, 1984; Mattson, 1999; Rodriguez-Reimann et al., 2004). For example, Rodriguez-Reimann et al. (2004) studied the impact of Hispanic

Americans' health beliefs on tuberculosis preventive behavior and found that cues to action derived from media exposure had a positive effect on behavioral intention directly and indirectly through perceived susceptibility and perceived benefit. Mattson (1999) also studied how HIV/AIDS counselor-patient interpersonal communication as a cue to action affected HIV/AIDS- and safe sex-related behavioral intention. He found that, while there was no significant relationship between health beliefs and behavioral intention before counseling, the relationship became significant after counseling. In addition, he found that the counseling strategy, such as educating health center visitors for HIV testing, had a significantly positive relationship with health beliefs. In addition, a recent study by Jones et al. (2015) found that exposure to media cues regarding flu vaccination through media campaigns not only had direct and indirect effects on perceived barrier but also played a moderating role in the relationship between self-efficacy and media exposure, risk perceptions, and preventive actions. Considering the HBM constructs to function as a causal chain, the authors argued found that perceived benefit mediated the relationship between media exposure and preventive actions. They also tested and confirmed that cues to action serve as a predictor for health beliefs and preventive actions. This finding provides empirical evidence for our study's focus on cues to action as precursors to health beliefs and subsequent preventive actions.

However, these earlier studies focused on only one type of cues to action. As a result, they ne-

glect the potentially simultaneous roles of internal and external cues — particularly interpersonal and media cues — in predicting the target behavior. To our knowledge, few studies have examined interpersonal and media cues simultaneously to test their relative effects on risk perceptions and the target behavior. For example, one study examined how use of health information from media and from interpersonal communication affected risk perceptions about colorectal cancer (CRC), expectations about CRC screening, and CRC screening intention (Yoo, Kwon, & Pfeiffer, 2013). While this study dealt with roles of internal/external cues in predicting a health behavior (i.e., CRC screening), it did not use exposure to a specific health media campaign as an external cue. Instead, it used exposure to the health section in a newspaper or magazine, which is a global and general measure.

Proposed Hypotheses and Research Questions

To be sure, HBM has played a key role as a theoretical model for predicting health behaviors. However, some the model's unclear measurement issues should be further refined, and some of its understudied constructs should be further explored (Brewer et al., 2007; Janz et al., 2002). Our study proposes a health belief model for predicting behavioral intention for TB screening, but it advances existing HBM research in two ways. First, to refine measurement issues, our

study conforms to the strong recommendation by Carpenter (2010) to avoid using the four major HBM constructs as additive and independent predictors. Instead, our study sticks to the original conception of HBM by focusing on perceived threat, which is operationalized as multiplying perceived susceptibility and severity, and evaluation of action, which subtracts perceived barrier (of doing the encouraged behavior) from perceived benefit (of doing the target behavior) (Janz et al., 2002; Mattson, 1999; Rosenstock, 1974). The product term of perceived benefit-perceived barrier is consistent with the premise that people will take an action when their cognitive evaluation concerns whether the benefits of taking the action outweigh the barriers against taking it (Rosenstock, 1974).

Second, our study expands several existing studies (Mattson, 1999; Rodriguez-Reimann et al., 2004) on cues to action by considering both internal and external, and both interpersonal and media, cues to action. Even though several studies applying HBM have dealt with cues to action (e.g., Chou & Wister, 2005; Jones et al., 2015; wray, Jupka, & Ludwig-Bell, 2015), they do not empirically demonstrate how cues to action played a role in predicting health beliefs and preventive actions. Nor do they demonstrate which types of cues to action play a stronger predictive role. To overcome this limitation, we include both internal and external (interpersonal and media) cues to action variables in our HBM model. Also, following Jones et al. (2015), we consider cues to action as direct and indirect predictors of

and antecedents to health beliefs and preventive actions.

As noted by Mattson (1999), health problems such as HIV/AIDS and individuals' health beliefs are socially constructed. Because exposure to health information through various communication channels (i.e., external cues) can determine individuals' health beliefs, he argued that cues to action affect health beliefs that could subsequently lead to preventive actions. This argument was empirically demonstrated by Kim (2010), who performed structural equation modeling to test the relationships among cues to action, health beliefs (perceived severity and susceptibility), and crimes/deviant behavior in cyber space. Kim's study found that internal cues (experiences of being harmed by cyber crimes) indirectly affected cyber-crime preventive actions (reporting crime cites, requesting to stop unethical comments, etc) through perceived severity and susceptibility. Chou and Wister (2005) operationally defined external cues to action as information seeking behaviors (e.g., reading about chronic illness, knowledge of community services, use of health care professionals, consultation with friends and mutual aid). They examined relationships between information seeking behaviors and self-care actions (using exercise to cope with a chronic illness), and they found positive relationships between the two types of behaviors. Wray et al. (2005) used HBM as theoretical framework to evaluate the effectiveness of a heart disease prevention campaign called 'The walk Missouri campaign.' They found that exposure to

the media campaign (i.e., media cue) positively affected perceived benefit and participation in the campaign. Hanson and Benedict (2002) tested HBM in the context of food-borne illness among noninstitutionalized older adults and found positive relationships among cues to action (media cues, educational cues), health beliefs (perceived severity and susceptibility), and safe food-handling behaviors. Lastly, Richard, Kosatsky, and Renouf (2011) examined how an internal cue (being sensitive about heat) and an external cue (exposure to heat warning information, advice from MD/nurse) affected preventive actions (air conditioner use) among old people in the context of a long-term heat wave. They found positive relationships between cues to action and perceived benefit.

Taken together, various types of cues to action have been studied in HBM research and found to have direct and indirect effects on preventive actions. Based on this previous research, we propose the following hypotheses.

- *H1: Internal cues will be positively related to TB screening intention directly (H1a) and indirectly through (H1b) perceived threat and (H1c) perceived evaluation of action.*
- *H2: Interpersonal cues will be positively related to TB screening intention directly (H2a) and indirectly through (H2b) perceived threat and (H2c) perceived evaluation of action.*
- *H3: Media cues will be positively related to TB screening intention directly (H3a) and indirectly through (H3b) perceived threat and (H3c)*

perceived evaluation of action.

So far, HBM studies have focused on the predictive role of each of the health belief variables (perceived severity, susceptibility, benefit, and barrier) (e.g., Hanson, & Benedict, 2002; Kloblen & Batish, 1999; Richard, Kosatsky, & Renouf, 2011). However, these studies often neglected two principles of HBM's original conception: (1) that perceived susceptibility and severity construct perceived threat, which directly leads to preventive actions; and (2) that people evaluate perceived benefit and barriers through a cost-benefit analysis and carry out recommended behaviors when their benefits outweigh barriers. Our study attempts to highlight and test these two principles our HBM model. The proposed model is presented in Figure 1.

While few HBM studies have tested perceived threat (perceived severity + susceptibility) and perceived evaluation (perceived benefit-cost), many have demonstrated positive relationships between each of perceived susceptibility, severity, and benefit. A meta-analytic study that examined 34 studies on influenza vaccination (Brewer et al., 2007) found that evaluation of a specific disease infection and perceived susceptibility and severity related to the disease had a positive relationship with a vaccination behavior. Another meta-analytic study that examined studies in Korea (이병관 외, 2014b) also found positive relationships between each of perceived severity and susceptibility and a recommended behavior or behavioral intention. On the other hand, a meta-

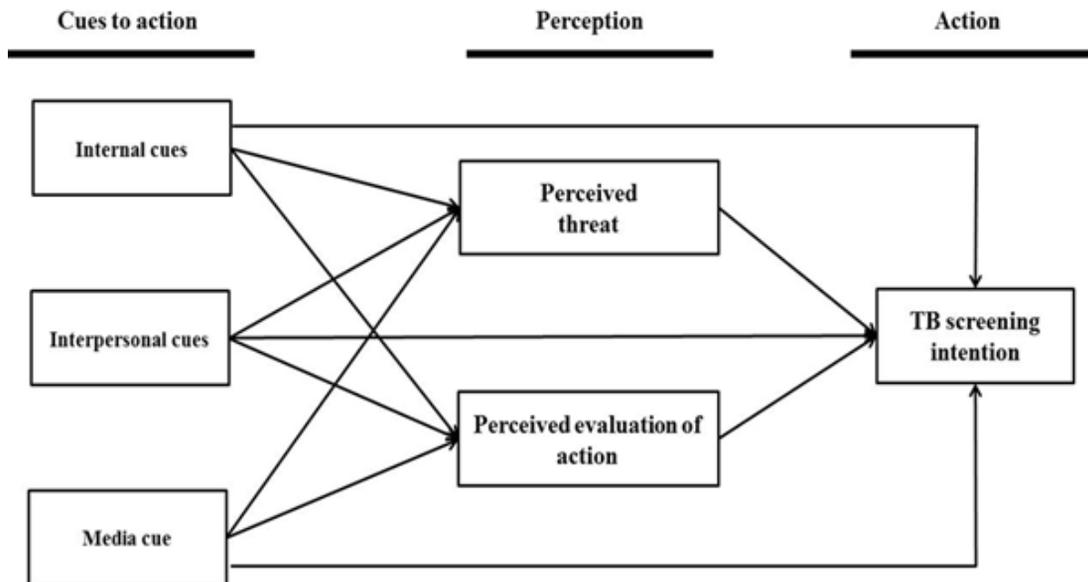


Figure 1 Proposed model

analysis that examined studies on Korean's health-related behaviors (Jo et. al., 2004) found that perceived barriers to healthy behaviors had a negative relationship with the recommended healthy behavior, while perceived benefits had a positive relationship with the recommended behavior. This finding leads us to predict that the more people perceive the benefit of the recommended behavior and the less they perceive the barrier/cost of the behavior (i.e., positive evaluation = perceived benefit > barrier), the more likely they will engage in the recommended behavior. Thus, we propose the following two hypotheses related to health beliefs and intention to do the recommended behavior.

- *H4: Perceived threat will be positively related to TB screening intention.*
- *H5: Perceived evaluation of action will be positively related to TB screening intention.*

Methods

Data

This study analyzed data from the 2013 TB Prevention Media Campaign Evaluation Survey in Korea, which was conducted among nationally representative adults between ages 19 and 69 by face-to-face interviews using the PPS (proportional

Table 1 Demographic Characteristics (*N* = 992)

		n(M)	%
Sex	Male	501	50,5
	Female	491	49,5
	Age	(42,89)	
Marriage	Unmarried	224	24,6
	Married	748	75,4
Income level*	under 100	12	1,2
	100 ~ under200	68	6,9
	200 ~ under300	166	16,7
	300 ~ under400	310	31,3
	400 ~ under500	256	25,8
	500 ~ under600	105	10,6
	600 ~ under700	45	4,5
	700 ~ under800	16	1,6
	800 ~ under900	3	0,3
	900 or higher	11	1,1
Education level	elementary school degree	29	2,9
	middle school degree	57	5,7
	high school degree	492	49,6
	college degree	405	40,8
	graduate school degree	250	25,2

Note: Monthly household income, Income Unit = 10,000Won.

to size) method. The PPS sampling method was based on the 2012 census data to allocate samples proportional to gender and age per 16 cities. Professionally trained interviewers conducted a face-to-face interview survey for 22 days at the work sites where they were assigned. A total of 1,000 people participated in the survey between July 15 (when the media campaign ended) and

August 16 in 2013. The survey instrument included a series of questions on campaign exposure, channels on which people saw the information about TB, risk perceptions toward TB, and TB screening intention. After excluding missing cases, the final sample size for analysis was 992 with 50.5% males ($n = 501$) and average age of 42.89. Detailed demographic information

is presented in Table 1.

Measures

The outcome variable in this study is TB screening intention, and the major predictors are three types of cues to action – i.e., internal cues, interpersonal cues, media cues – and two risk perceptions – i.e., perceived threat and perceived evaluation of action. In addition, the following data served as control variables: sex, age, marriage, income level, and education level. The variables measured with multiple items were examined with Cronbach's alpha reliability for internal consistency.

Cues to action in our study were operationalized based on and in consultation with previous research (Chou & Wister, 2005; Mattson, 1999), measures of which were modified to fit the context of tuberculosis. For example, Chou and Wister (2005) defined internal cues as perceptions and internalization of illness symptoms learned from individuals' own or others' experiences and external cues as information learned from social interactions such as use of health care professionals and consultation with friends (interpersonal communication), and/or mass media. We adopted the definitions from this study and further distinguished interpersonal and mass media communication.

Internal cue was measured by counting "yes" responses from the following four questions: (1) have you ever received TB screening? (2) Have

you ever contracted TB? (3) Have you ever met TB patients? (4) Have you been diagnosed with TB? The "yes" answers for each question were counted to construct the variable, which ranges from 0 to 4 numeric values.

Interpersonal cue was measured by counting how many people answered "yes" for the items in the following question about having TB prevention-related education: "Through what channels have you heard about TB? (1) people surrounding you, (2) hospitals, and (3) public health center." Thus, the numeric value of the variable ranges from 0 to 3.

Media cue was measured with aided recall of TB prevention campaign – whether or not people remembered the campaign. Specifically, to measure aided recall of the TB prevention campaign, this study asked the participants, "Have you ever watched or listened to a TB prevention campaign in recent three months?" The response options were "yes" or "no." Although other exposure measures such as recognition, unaided recall, and confirmed recall are available, empirical studies have demonstrated that aided recall is an equally valid measure of message exposure (e.g., Niederdeppe, 2005). This aided recall was similarly used to measure the "truth" antismoking campaign's effectiveness in the US (Paek, 2008).

Perceived threat was measured by multiplying perceived susceptibility and perceived severity according to the suggestion by Janz & Becker

(1984), and with a 5-point scale ranging from 1 (really disagree) to 5 (really agree). Specifically, *perceived susceptibility* was measured with one item: “There is a high possibility that I may contract TB.” *Perceived severity* was measured with the following four items: (1) “TB is more severe than other diseases”, (2) “TB is a very serious illness”, (3) “TB is a very painful disease”, and (4) “If I get TB, my life will be ruined” (Cronbach’s $\alpha = .87$).

Perceived evaluation of action was measured by calculating the value of the perceived benefit minus perceived barrier of TB screening with a 5-point scale ranging from 1 (really disagree) to 5 (really agree), following the proposition of Janz & Becker (1984). *Perceived benefit* was measured with the following three items: (1) “TB screening will protect my family”, (2) “I believe TB screen-

ing will protect me”, (3) “TB screening may reduce the anxiety of contracting the disease” (Cronbach’s $\alpha = .62$). *Perceived barrier* was measured with the following two items: (1) “I don’t have enough time for TB screening”, (2) “The TB screening fee is a burden for me” (inter-item correlation = .63).

TB screening intention was measured with the following three items rated on a 5-point scale ranging from 1 (really disagree) to 5 (really agree): (1) “I will be screened for TB if coughing persists for more than 2-3 weeks”, (2) “I will get screened for TB if night sweats and fever persist for more than 2-3 weeks”, (3) “I will be screened for TB if lack of appetite and weight loss persist for more than 2-3 weeks” (Cronbach’s $\alpha = .79$).

Control variables. Previous research demonstrated that demographic characteristics such as education level indirectly affect the relationship between risk perceptions (perceived susceptibility, perceived severity, perceived benefit, perceived barrier) and recommended actions (Janz et al., 2002). It was also found that age and income variables affect perceived benefit and barriers, and preventive behaviors such as TB screening (Jo et al., 2012). Therefore, we controlled the five demographic variables – i.e., sex, age, marital status, income level, and education level – as exogenous variables, consistent with the study by Yoo, Kwon, and Pfeiffer (2013). By controlling these variables, we can see clearer relationships among the key HBM constructs and their roles in TB

Table 2 Descriptive Statistics for Major Variables
($N = 992$)

	Range	Mean	SD
Internal cues	4.00	0.40	0.79
Interpersonal cues	3.00	1.36	0.99
Media cues	1.00	0.31	0.46
Perceived threat	21.50	7.65	4.06
perceived susceptibility	4.00	2.30	0.93
perceived severity	4.00	3.26	0.83
Perceived evaluation of action	6.33	1.18	1.14
perceived benefit	2.67	3.92	0.51
perceived barrier	4.00	2.86	0.89
TB screening intention	4.00	3.44	0.79

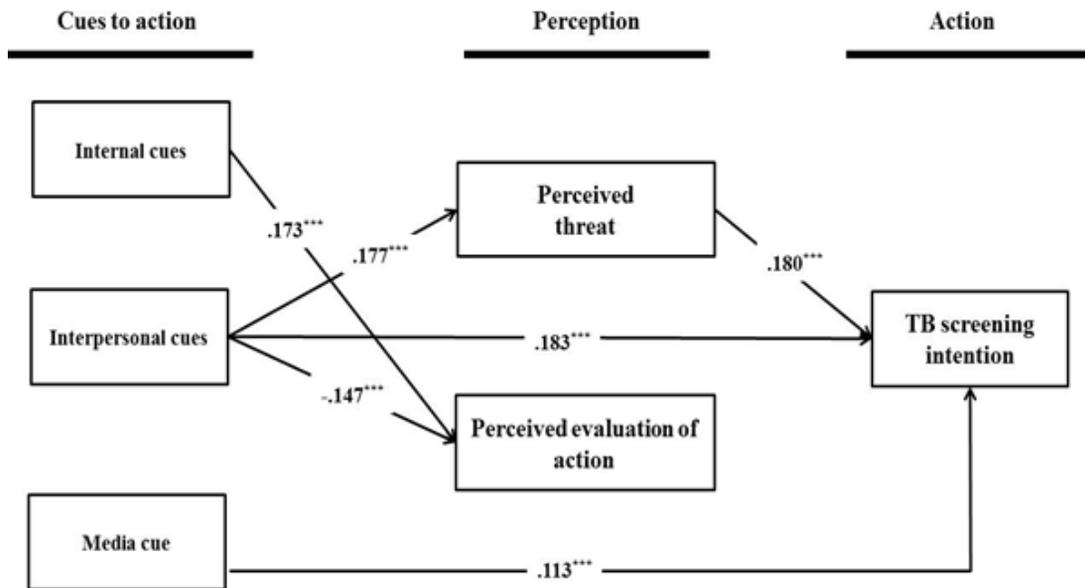
screening intention.

Statistical analysis

Because our main interest is to test the direct and indirect effects of the three cues-to-action variables on TB screening intention, structural equation modeling (SEM) is an appropriate statistical method. SEM allows for examining multiple causal relations among the variables based on well-established theoretical arguments (Anderson, 1987). Since a cross-sectional survey study such as ours does not allow rigorous causal relationships, SEM using a cross-sectional survey but with theoretical arguments is not uncommon.

The cues to action variables were constructed by counting “yes” responses. Because two mediators – perceived threat and perceived evaluation of action – were product terms, we did not perform full SEM involving latent variables and observed indicators to test the hypothesized model. Instead, we performed a path analysis with the covariance matrix. The AMOS 18.0 program was employed with maximum-likelihood estimates (Arbuckle, 2009). The five control variables – sex, age, marriage, income level, and education level – served as exogenous variables that link all the paths to the variables. The proposed model indicates a reasonably good fit using multiple goodness of fit indices: $\chi^2(49) = 218.36$, root mean square error of approximation (RMSEA) = .07; comparative fit index (CFI) = .93; goodness-of-fit index (GFI) = .97; and standardized

root mean square residual (SRMR) = .05. These indices were chosen based on Hu and Bentler (1999), who note that, when sample size is bigger than 250, SRMR should be used along with one of CFI, TLI, and RMSEA. Given that the cut-off criteria of SRMR and RMSEA = .08 or smaller and incremental index such as CFI and TLI is .90 or greater, our model seems to have a reasonably good fit. Figure 2 presents our final model with completely standardized coefficients and their statistical significance. Next, the statistical significance of the path coefficients in the path analysis were examined, while mediation tests were additionally performed following the distribution of products equations. The equations compare the relationship between an independent and outcome variable before and after accounting for the role of a potential mediator (Holbert & Stephenson, 2002, p. 561). This comparison is done by calculating the product of the paths coming from the independent variable to the intervening variable and the intervening variable to the dependent variable, dividing this product by its standard error, and then comparing to the normal distribution (Holbert & Stephenson, 2002, p. 561). This approach performs best in terms of retaining statistical power and providing an accurate Type I error rate (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The reason why is that this method creates greater normality in the products of the path estimates in a given mediating relationship. According to the distribution of products equation formula, the z-score product for the mediation path was computed using the following for-



Note: Only significant coefficients are presented. All the coefficients are completely standardized. Control variables (sex, age, marriage, income level, education level) are included as exogenous variables but are not shown here.

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

Figure 2 Final model

mula: (unstandardized parameter estimate / standard error for independent variable \rightarrow mediator) * (unstandardized parameter estimate by standard error for mediator \rightarrow dependent variable). The z-score is evaluated for its statistical significance with the Sobel estimates that are known to perform well for moderate to large effect sizes with samples of 200 or larger (Holbert & Stephenson, 2002, pp. 565 ~ 566; MacKinnon, et al., 2002).

Results

H1 Internal Cues and TB Screening Intention

H1 predicted the (H1a) direct and (H1b-c) indirect effects of internal cues on TB screening intention. As shown in Figure 2, internal cue to action was not significantly and directly related to TB screening intention. H1a was therefore not supported. However, mediation tests indicate that internal cue was indirectly related to TB screening intention through perceived evaluation

of action ($z = 9.51, p < .001$), which supports H1c but not H1b (perceived threat).

H2 Interpersonal Cues and TB Screening Intention

Hypothesis 2 predicted the positive effects of interpersonal cues on TB screening intention directly (H2a) and indirectly through (H2b) perceived threat and (H2c) perceived evaluation of action. The results support H2a in that the more people talk about TB with people surrounding you, hospitals, and public health center, the more likely they are to get TB screening (standardized coefficient = .183, $p < .001$). For more detailed analysis regarding difference of information gaining from each interpersonal channel and the relative strength of the predictive roles, we performed post-hoc analyses. Our independent samples t-tests indicated that those who gained information from each of people surrounding you ($t(990) = 5.816, p < .001$), hospitals ($t(990) = 4.218, p < .001$), and public health center ($t(990) = 2.860, p < .01$) had significantly greater level of behavioral intention than those who did not. In addition, we performed a regression analysis that includes the three interpersonal cues as independent variables and TB screening intention as a dependent variable. The results indicated that information gained from people surrounding you ($\beta = .162, p < .001$) and hospitals ($\beta = .091, p < .01$) had significant effects on TB screening intention, while that from public health centers did not have a significant effect.

Lastly, the interpersonal cues were also indirectly related to TB screening intention by heightening perceived threat, which supports H2b ($z = 31.44, p < .001$). The indirect effect of interpersonal cues on TB screening intention by way of perceived evaluation of action was negatively significant, which is opposite to our prediction ($z = -8.10, p < .001$).

H3 Media Cue and TB Screening Intention

Hypothesis 3 predicted the positive effects of media cue on TB screening intention directly (H3a) and indirectly through (H3b) perceived threat and (H3c) perceived evaluation of action. The results indicated that people's self-reported exposure to the TB prevention campaign was directly related to their intention to get TB screening, supporting H3a (standardized coefficient = .113, $p < .001$). In addition, the indirect effect of exposure to TB prevention campaign also affected TB screening intention indirectly through perceived threat ($z = 5.38, p < .001$), but not through perceived evaluation of action.

H4/5 Risk Perceptions and TB Screening Intention

The HBM predicts a positive relationship between each of perceived threat (H4) and perceived action of evaluation (H5) and the preventive behavior/behavioral intention of inquiry. Our results also support H4 in that the higher people perceive, the more likely they are to get

Table 3 Path coefficient estimates

Path	Unstandardized Coefficient	Coefficient	SE	<i>p</i>
Internal cues → Perceived threat	-0,123	-0,024	0,159	0,442
Interpersonal cues → Perceived threat	0,726	0,177	0,127	< 0,001
Media cue → Perceived threat	0,266	0,030	0,272	0,328
Internal cues → Perceived evaluation of action	0,251	0,173	0,044	< 0,001
Interpersonal cues → Perceived evaluation of action	-0,170	-0,147	0,035	< 0,001
Media cue → Perceived evaluation of action	-0,028	-0,011	0,076	0,709
Internal cues → TB screening intention	-0,028	-0,045	0,021	0,181
Interpersonal cues → TB screening intention	0,090	0,183	0,017	< 0,001
Media cue → TB screening intention	0,119	0,113	0,035	< 0,001
Perceived threat → TB screening intention	0,022	0,180	0,004	< 0,001
Perceived evaluation of action → TB screening intention	0,025	0,058	0,015	0,087

Note: Model variables include internal cues, interpersonal cues, media cue, perceived threat, perceived evaluation of action, TB screening intention.

TB screening (standardized coefficient = .180, $p < .001$). However, H5 was not supported in that there was no significant relationship between perceived evaluation of action and TB screening intention.

Discussion

The key constructs in HBM – perceived susceptibility, perceived severity, perceived benefit, and perceived barrier – have been used widely not only in HBM-related research but in other theories predicting health behaviors. However, the HBM studies often focused on each of the variables' effects on the recommended behavior, while ne-

glecting two principles of the original conception of HBM – (1) that perceived susceptibility and severity construct perceived threat and (2) that perceived evaluation refers to perceived benefit outweighing perceived barrier. In closer accordance with the original conception of HBM, the current study conceived and tested perceived threat and perceived evaluation of action. In addition, it explored both internal and external cues together, separating the two external cues into interpersonal communication and media. We used these internal and external cues as antecedents for risk perceptions and behavioral intention. We used tuberculosis (TB) in South Korea as our health topic, which has been a recurring health problem as its occurrence rate is the number one

among OECD countries, even though many people continue to believe that it is not a serious risk and that they are not vulnerable to the disease.

We had three major findings: (1) Interpersonal cue is directly and indirectly related to TB screening intention; (2) media cue is also directly and indirectly related to TB screening intention; and (3) among the risk perceptions, perceived threat, but not perceived evaluation of action, is significantly related to TB screening intention.

First, the strong and positive effect of interpersonal cue on health-related outcome seems consistent with existing evidence that the patient-counselor communication about HIV served as important external cues to compliance with safer-sex recommendations (Mattson, 1999; also see Chou & Wister, 2005; Jones et al., 2015). But more closely examined, our post-hoc analysis indicated that communication with people surrounding you (e.g., friends and family members) and with hospitals (doctors) had relatively stronger effects on TB screening intention than communication with public health centers (public health staffs). Outside the HBM literature, interpersonal communication – particularly communication with friends/family members – is known to be a critical predictor of attitude and behavior (Chaffee, 1986). This finding may be due to greater availability and personal relevance, while people in Korea have less familiarity with public health centers (보건소). In fact, according to the 2014 patient health care information report by the Department of Health and Welfare and

Korean Institute of Health and Social Affairs (KIHASA), the number of patients per day in public health centers smaller than that in hospitals, and people prefer going to health clinics or hospitals in the vicinity of public health centers. However, information from people surrounding you may be less reliable and accurate compared to that from health professionals.

At the same time, media cue was also directly associated with TB screening intention. Similarly, media cue was directly related to TB screening intention such that people who reported awareness of the TB campaign were more likely to intend TB screening when they have some symptoms (e.g., continuous coughing, fever, and weight loss for more than 2~3 weeks). Our finding is also consistent with existing evidence that media cue was significantly related to intent to engage in TB prevention/control behaviors among Mexican Americans (Rodriguez-Reimann et al., 2004; Wray et al., 2005). This finding implies the effectiveness of the TB prevention campaign and should encourage continued efforts of media campaigns.

Existing meta-analytic studies reported weak and sometimes null effects of perceived susceptibility and /or perceived severity on the target behavior (Carpenter, 2010; Harrison et al., 1992). Following Carpenter's (2010) recommendations, we used the product term of perceived threat by multiplying the two risk perception variables instead of using them as separate predictors. Indeed, our findings indicate the influential role of perceived threat in predicting TB screening intention

and mediating the relationship between each of interpersonal and media cues and the intention. Our finding is also consistent with existing risk perception literature that argues the impact of risk perceptions in health behaviors (Brewer et al., 2007). At the same time, our findings suggest that, in order to take a preventive action for an illness or disease, people should have not only the perception that they are likely to get the disease (perceived susceptibility) and not only the perception that the contracting the disease is serious (perceived severity) but rather *both* perceptions together.

On the other hand, perceived action of evaluation did not play any significant role either as a predictor or a mediator. This null finding is inconsistent with existing literature. Mattson (1999), for example, found that the participants' perception that safer-sex benefits outweigh barriers was significantly related to their compliance with the counselor's recommendations. He explained that people might have performed a cost-benefit analysis after they received information during the counseling session. However, our study does not show the positive and significant effects of perceived evaluation of action. This finding may be explained by the way that the interpersonal cue was measured. Mattson's study took place in actual HIV/AIDS and safe-sex related counseling sessions in which perceived benefit and barriers of the target behavior were fully discussed. By contrast, our measure only addressed whether or not people have heard about TB prevention from friends and families, or from

doctors and health centers. Thus, the nature and specific content of the interpersonal communication are not known. Similarly, the main focus of the TB prevention media campaign was to awaken the public to the serious reality of TB infection and inform them about 'cough etiquette' for TB prevention rather than the benefits and barriers of the TB screening behavior. For example, the campaign messages highlighted 'high rates of TB incidence and mortality' and 'cough etiquette for everyday life.' The messages on the TV campaign included the following: "About 40,000 people become TB patients every year" and "2,300 die of TB every year." As a result, perceived action of evaluation did not significantly mediate the relationship between the media cue and TB screening intention. Although not hypothesized in this study, the finding that interpersonal cues were negatively related to perceived action of evaluation is noteworthy. This finding may be explained by the fact that the more people get information from interpersonal channels (e.g., people surrounding you, hospitals, public health center), the more people perceive barriers to taking TB preventive actions. Indeed, a post-hoc correlation analysis indicated a positive correlation between interpersonal cues and perceived barrier ($r = .206, p < .01$). One implication of this finding is that TB campaign practitioners should think carefully about whether to use health professionals and public health center staff to inform people about TB preventive actions, especially if their goal is to remove these barriers and highlight the benefits of taking preventive actions. At the

same time, the finding may be due to the fact that people had heightened barriers because they did not like health professionals' communication style. While this explanation is speculative and beyond the scope of this study, future research could further explore how communication styles and specific contents of health professionals' communications affect people's risk perceptions about a certain health behavior, including TB screening.

As does any scientific research, this study has some limitations. First, despite our efforts to refine the measurement issue in HBM, some of the measures constructing the variables of inquiry were limited. For example, interpersonal cue did not include specific content about which kinds of information were exchanged between the survey participants and doctors, friends, and/or family members. Similarly, media cue may lack reliability because it was measured with a single and binary item of whether or not people are aware of the TB prevention campaign. Because some limitations in HBM include measurement issues, future research should refine the measurement of the key HBM constructs by using the same multiple question items consistently.

Second, due to the cross-sectional nature of the data, the relationships among the internal and external cues, risk perceptions, and TB screening intention should be interpreted to be correlational rather than causal. For example, some of the research considered cues to action as exogenous variables that affect the target behavior (Sheeran & Abraham, 2001) and as mediators between risk perceptions and the target behavior

(Mattson, 1999). Because TB is a relatively less salient health issue in Korea, and because internal and external cues were measured with questions asking about the participants' past behavior (e.g., have you ever experienced/heard about...), our study considered the cues to action as antecedents to risk perceptions. This decision was also consistent with past research (Jones et al., 2015). But it is possible that people's high level of perceived threat may make them more attuned to information about TB. While much HBM research has employed a cross-sectional survey method similar to ours, future research should employ various methods including longitudinal survey, pre- and post-intervention survey, and experiments to replicate and further explore the direct, mediating, and moderating relationships among the key constructs in HBM.

Despite these limitations, this study provides both practical and theoretical implications for HBM and TB research. Practically, since interpersonal and media cues can directly produce positive outcomes, simultaneous efforts to communicate with people about TB interpersonally and through media may produce more synergistic effects on heightening people's TB screening intention. In addition, a campaign message strategy should be developed to increase perceived threat (both perceived susceptibility and severity) and to highlight a specific call-to-action. In addition, among the interpersonal cues, information from friends/family members ("people surrounding you") and from doctors (hospitals) had a relatively significant role in predicting intention to

TB screening. For this reason, an effective communication strategy for TB prevention practitioners may be to provide sufficient and accurate information on TB prevention – not only to doctors who deliver the information to their patients but also to lay people who may serve as a powerful information source for their friends and family members. In particular, since TB requires prompt examination and steady management, it is critical to manage and maintain patient relationship in medical environments. Therefore, more efforts need to be made on increasing patients' satisfaction regarding medical service. One such effort includes establishing mutual relationship through emotional feedback with the patients (김현아 · 안보섭 · 김윤희, 2015). Expanding social support programs and public services provided by local community members may also be effective ways to prevent TB infection and/or to detect early and manage TB.

Theoretically, this study further explored cues to action as antecedents to risk perceptions and TB screening intention and simultaneously examined internal, interpersonal, and media cues to

actions. Internal cues such as experiencing symptoms about TB or understanding the symptoms from direct and indirect observations are obviously important antecedents of risk perceptions and health-related outcomes. However, such internal cues are often neglected or omitted from HBM research. Furthermore, while existing HBM research has used perceived susceptibility and severity as independent predictors of the target behavior/behavioral intention and produced mixed results (Janz et al., 2002), it should be understood that the original conception of HBM highlights perceived threat as combining *both* risk perceptions. As a result, perceived threat seems to have had a stronger and more consistent predictive role in HBM, whereas perceived evaluation of action, the product term of perceived benefit-barrier, seems to have had weaker and less stable evidence. But these findings require further exploration and evidence. Future research could also compare our final model with an HBM model that includes four risk perception constructs independently and evaluate the models' relative predictive power and utility.

References

- 김현아, 안보섭, 김윤희 (2015). 의사-환자 간 커뮤니케이션 유형이 병원만족도와 병원평판에 미치는 영향: 병원 서비스 품질 인식 매개효과를 중심으로. *광고PR실학연구*, 8(3), 54~72.
- 이병관 외 (2013). *2013 일반국민의 결핵 인식·지식·태도·행동 및 미디어 캠페인 효과 평가 조사 보고서*. 질병관리본부.
- 이병관 외 (2014a). *2014 일반국민의 결핵 인식·지식·태도·행동 및 미디어 캠페인 효과 평가 조사 보고서*. 질병관리본부.
- 이병관 외 (2014b). 건강 관련 행동의 예측을 위한 사회인지이론의 유용성: 국내 건강신념모델 연구의 메타분석. *홍보학연구*, 18(2), 163-206.
- Anderson, J. G. (1987). Structural equation models in the social and behavioral sciences: Model building. *Child Development*, 58(1), 49~64.
- Arbuckle, J. L. (2009). *Amos 18 user's guide*. Chicago, IL: Amos Development Corporation.
- Brewer, N. T., Chapman, G. B., Gibbons, F. X., McCaul, K. D. (2007). Meta-analysis of the relationship between risk perception and health behavior: The example of vaccination. *Health Psychology*, 26(2), 136~145.
- Carpenter, C. J. (2010). A Meta-analysis of the effectiveness of health belief model variables in prediction behavior. *Health Communication*, 25(8), 661~669.
- Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (4th ed.) (pp.41~63). San Fransisco, CA: Jossey-Bass.
- Chew, F., Palmer, S., & Kim, S. (1998). Testing the influence of the health belief model and a television program on nutrition behavior. *Health Communication*, 10(3), 227~245.
- Chou, P. H. B., & Wister, A. V. (2007). From cues to action: Information seeking and exercise self-care among older adults managing chronic illness. *Canadian Journal of aging*, 24(4), 395~408.
- Conner, M., & Norman, P. (1996). The role of social cognition in health behaviours. In M. Conner, & P. Norman (Eds.), *Predicting health behavior: Research and practice with social cognition models* (pp. 1~22). Buckingham, UK: Open University Press.
- Harrison, J. A., Mullen, P. D., & Green, L. W. (1992). A meta-analysis of studies of the health belief model with adults. *Health Education Research*, 7(1), 107~116.
- Hanson, J. A., & Benedict, J. A. (2002). Use of health belief model to examine older adults' food-handling behaviors. *Journal of Nutrition Education and Behavior*, 34(Supplement 1), 25~30.
- Hochbaum, G. (1956). Why people seek diagnostic X-rays. *Public Health Reports*, 71, 377~380.

- Hu, L., & Bentler, P. M. (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1~55.
- Janz, N. K., Champion, V. L., & Strecher, V. J. (2002). The health belief model. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory, research, and practice* (3rd ed.) (pp.45~66). San Francisco, CA: Jossey-Bass.
- Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly*, 11, 1~47.
- Jo et. al. (2012). The study of factors affecting tuberculosis preventive behavior intention: An extension of HBM with mediating effects of self-efficacy and fear. *Journal of Public Relations*, 16(1) 148~177.
- Jo, H-S., Kim C-B., Lee, H-W., & Jeong H-J. (2004). A Meta-analysis of health related behavior study based on Health Belief Model in Korea. *The Korean Journal of Health Psychology*, 9(1), 69~84.
- Jones, C. L., et al. (2015). The health belief model as an explanatory framework in communication research: Exploring parallel, serial, and moderated mediation. *Health Communication*, 30(6), 566~576
- Kim, J. H. (2010). The effects of victimization experiences as internal cues to action on preventive behavioral intentions in cyber communication: Modifying Health Belief Model. *Journal of Cybercommunication Academic Society*, 27(3), 5~46.
- Kloeblen, A. S., & Batish, S. S. (1999). Understanding the intention to permanently follow a high folate diet among a sample of low-income pregnant women according to the Health Belief Model. *Health Education Research*, 4(3), 327~338.
- Korean Centers for Disease Control & Prevention (2012). *Evaluation of 2012 tuberculosis campaign effectiveness*.
- Li, C., Unger, J. B., Schuster, D., Rohrbach, L. A., Howard-Pitney, B., & Norman, G. (2003). Youths' exposure to environmental tobacco smoke (ETS): Associations with health beliefs and social pressure. *Addictive Behaviors*, 28, 39~53.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7(1), 83~104.
- Mattson, M. (1999). Toward a reconceptualization of communication cues to action in the health belief model: HIV test counseling. *Communication Monographs*, 66, 240~265.
- Niederdeppe, J. (2005). Assessing the validity of confirmed ad recall measures for public health communication campaign evaluation. *Journal of Health Communication*, 10, 635~650.
- Paek, H.-J. (2008). Mechanisms through which adolescents attend and respond to antismoking media campaigns. *Journal of Communication*, 58, 84~105.
- Richard, L., Kosatsky, R., & Renouf, A. (2011). Correlates of hot day air-conditioning use among

- middle-aged and older adults with chronic heart and lung diseases: The role of health beliefs and cues to action. *Health Education Research*, 26(1), 77~88.
- Rodriguez-Reimann, D. I., Nicassio, P., Riemann, J. O. F., Gallegos, P. I., & Olmedo, E. L., (2004). Acculturation and health beliefs of Mexican Americans regarding tuberculosis prevention. *Journal of Immigrant Health*, 6(2), 51~62.
- Rosenstock, I. M. (1974). Historical origin of the health belief model. In M. H. Becker (Ed.), *The health belief model and personal health behavior* (pp.1~8). Thorofare, NJ: Charles B. Slack, Inc.
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). The health belief model and HIV risk behavior change. In R. J. DiClemente & J. L. Peterson (Eds), *Preventing AIDS: Part of the series AIDS prevention and mental health* (pp.5~24). Springer Science & Business Media.
- Sheeran, P., & Abraham, C. (2001). *The health belief model. Predicting health behavior* (pp. 23~61). Buckingham, UK: Open University Press.
- Sohler, N. L., Jerant, A., & Franks, P. (2015). Socio-psychological factors in the Expanded Health Belief Model and subsequent colorectal cancer screening. *Patient Education and Counseling*, 98, 901~907.
- Tuma, J. N., Smith, S. M., Kirk, R. H., Hagmann, C. E., & Zemel, P. C. (2002). Belief and attitudes of caregivers toward compliance with childhood immunization in Cameroon. *Public Health*, 116(1), 55~61.
- WHO (2015). Global tuberculosis control. WHO Report 2015. Geneva, World Helath Organization. <http://www.who.int/tb>
- Winfield, E. B., & Whaley, A. L. (2002). A Comprehensive test of the health belief model in the prediction of condom use among African American college students. *Journal of Black psychology*, 330~346.
- Witte, K., Stokols, D., Ituarte, P., & Schneider, M. (1993). Testing the health belief model in a field study to promote bicycle safety helmets. *Communication Research*, 20(4), 564-596.
- Wray, R. J., Jupka, K., & Ludwig-Bell, C. (2005). A community-wide media campaign to promote walking in a Missouri town. *Public Health Research, Practice, and Policy*, 2(4), 1~17.
- Yoo, W., Kwon, M-W., & Pfeiffer, L. J. (2013). Influence of communication on coloectal cancer screening: Revisiting the health belief model. *Journal of Communication in Healthcare*, 6(1), 35-43.

Appendix

A. Correlations among the Major HBM Variables and control variables ($N=992$)

	1	2	3	4	5	6	7	8	9	10	11
Gender											
2. Age	.022										
3. Income	-.046	-.233**									
4. Education	-.154**	-.321**	.391**								
5. Marriage	.069*	.740**	-.173**	-.118**							
6. Internal cues	.008	.176**	-.079*	-.046	.142**						
7. Interpersonal cues	.018	.171**	-.015	-.026	.128**	.134**					
8. Media cues	.068*	.055	.001	.081*	.107**	.112**	-.011				
9. perceived threat	-.028	.066*	.048	-.064*	.041	.006	.179**	.017			
10. perceived evaluation of action	.049	-.009	.065*	.057	-.011	.149**	-.123**	.017	-.238**		
11. TB screening intention	.040	.048	.087**	.023	.065*	.016	.200**	.117**	.174**	.012	

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

국문초록

건강신념모형에서의 행위단서에 대한 탐색적 고찰

건강신념모형(HBM: Health Belief Model)은 건강과 관련된 행동 결과를 설명하고, 예측하는 데에 있어 자주 사용되고 있으나, 대부분의 연구는 모형을 검증하기보다는 모형에서 소개된 위협 지각 변수들이 행동 변수에 미치는 영향을 검증하는 데에 그치고 있다. 또한 커뮤니케이션 전략에 중요한 함의를 제공할 수 있는 행위 단서에 대해서는 상대적으로 관심이 적었다. 따라서 본 연구의 목적은 크게 두 가지다. 첫째, 건강신념모형에서 제시하는 개념적 논의와 선행 연구자들이 권고했던 사항을 따라 그동안 다수의 연구에서 지각된 심각성과 지각된 개연성이라는 변수가 별개로 사용되었던 것을 '위험 인식(지각된 심각성 × 지각된 개연성)'이라는 단일 개념으로 구성하고, 지각된 이득과 장애로 각각 사용되었던 것을 '지각된 행동 평가(지각된 이득-장애)'로 정의하여 분석하였다. 둘째, 본 연구에서는 건강 행동에 영향을 미치는 내적 단서와 외적 단서를 모두 탐색함은 물론, 외적 단서를 대인 커뮤니케이션 단서와 미디어 단서로 구분하여 분석하였다. 이를 위해 본 연구는 992명의 성인 응답자를 대상으로 결핵예방행동에 대한 인식을 조사, 경로분석을 실시하였다. 분석 결과, 대인커뮤니케이션과 미디어 단서는 결핵 검진 의도와 직접적으로 관계가 있는 것으로 나타났으며, 지각된 위협을 통한 간접 경로도 유의미한 것으로 나타났다. 한편, 본 연구에서는 지각된 행동 평가는 결핵 검진 의도와 유의한 관계가 없는 것으로 나타났으나, 지각된 위협 변인은 검진의도와 유의미한 관계를 있는 것으로 나타났다.

주제어: 지각된 위협, 내적 단서, 대인 커뮤니케이션 단서, 미디어 단서, 지각된 행동 평가, 건강신념모델, 결핵, 건강 예방 행동, 건강캠페인