

THE PSYCHOLOGICAL MECHANISM UNDERLYING  
THE EFFECTS OF CANCER INFORMATION ON SCREENING INTENTION:  
FOCUSING ON CANCER-RELATED AFFECT AND COGNITION

BY

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DISSERTATION

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## ABSTRACT

It has been found that cancer information exposure is positively associated with the adoption of healthy behaviors, such as cancer screening. However, the process through which cancer information positively influences cancer screening has not been fully investigated. The present study expected that cancer information exposure would be related to various feelings and thoughts that people have toward cancer, which might predict behavioral intention to get screened for cancer. That is, the present study, in the framework of an integrative model of behavioral prediction, investigated the psychological mechanism underlying the effects of cancer information on screening intention, focusing on cancer-related affect and cognition. Two studies were conducted using two samples. Sample 1 participants ( $N = 308$ ; U.S. undergraduates) were asked about cancer in general. Sample 2 participants were Korean people aged 40 or older, and they participated in a two-wave survey about stomach cancer ( $N = 1,130$  at Wave 1 and  $N = 813$  at Wave 2). Given that conceptualization and operationalization of cancer-related affect and cognition has not been consistent in previous cancer literature, Study 1 developed a three-factor cancer-related mental condition model that includes cancer fear (affective), cancer worry (affective-cognitive), and cancer risk perception (cognitive) in Sample 1, and validated the model in the stomach cancer context using Sample 2, Wave 1 data. The results showed that cancer fear, cancer worry, and cancer risk perception are all distinct from each other, although they are all positively correlated. Study 2 tested whether cancer information/avoidance and the cancer-related mental condition model at Wave 1 predict attitude/norm/self-efficacy and screening intention at Wave 2, using Sample 2 Wave 1 and 2 data. The results indicated that cancer information exposure was positively associated with cancer fear and cancer worry at Wave 1,

which directly predicted screening intention at Wave 2. However, cancer fear at Wave 1 reduced screening intention at Wave 2, unlike cancer worry that increased screening intention at Wave 2. Cancer information exposure was also positively related to cancer risk perception at Wave 1, which increased screening intention at Wave 2 through norm. A medium-specific analysis revealed that cancer information from television was positively associated with cancer worry at Wave 1, which in turn predicted higher levels of screening intention at Wave 2. Print media exposure was positively related to cancer risk perception at Wave 1, which increased screening intention at Wave 2 through norm. In conclusion, the present study theorized the path from cancer information, cancer-related affective and cognitive variables, to preventive intention in the integrative model framework, extended the integrative model by demonstrating the direct influence of cancer-related affect (i.e., cancer fear) on behavioral intention, and showed the different roles of cancer fear, cancer worry, and cancer risk perception in cancer communication and prevention.

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## Chapter 1: Introduction

Approximately 25% of all deaths in the U.S. are due to cancer (Siegel, Naishadham, & Jemal, 2012). As people with cancer now live longer due to medical advancements, the prevalence of cancer is increasing (Nasca & Pastides, 2007). This context has exposed people to cancer information far more than in the past, both through the media and personal experiences. For example, cancer information searches on the Internet in the U.S. and U.K. have exploded recently, showing a 183% increase in 2010 compared to 2008 (McHugh et al., 2011).

Increased availability of cancer information has benefited health consumers. The cancer information exposure is related to cancer knowledge and cancer screening behaviors (Kelly et al., 2010; McMenamin et al., 2005; Shim, Kelly, & Hornik, 2006; Yanovitzky & Blitz, 2000). However, the mechanism through which cancer information influences knowledge and behavior has not been fully investigated. People are surrounded by a wealth of information, and, as a result, it is likely that some people become more conscious of cancer risk, while others feel more concerned or anxious about cancer. In other words, cancer information might be associated with various affects<sup>1</sup> and cognitions.

Specifically, in terms of affect, cancer information might be related to fear of cancer. For example, mass media frequently associate cancer with inevitability and fear (Clarke & Everest, 2006). Exposed to such information, individuals might develop fear about cancer. Cancer information can also influence cognition, such as risk perception. Risk perception is a cognition based on an intellectual judgment (Sjöberg, 1998). Morton and Duck (2001) demonstrated that both mass media and interpersonal communication were correlated with personal risk perception

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<sup>1</sup>Affect has been variously defined. In line with Clore and Ortony (1988), this paper uses affect as a general term that includes emotions, but contrary to cognition.

of skin cancer. In addition, cancer worry, an affective-cognitive condition<sup>2</sup>, might be influenced by cancer information. White and Horvitz (2009) reported that health information seeking on the Internet escalates concerns about health, a phenomenon they termed “cyberchondria”. Although this is similar to health anxiety, fear, worry, anxiety, and risk perception are all associated with one another (e.g., Borkovec, Robinson, Pruzinsky, & Dupree, 1983; Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998; Katapodi, Lee, Facione, & Dodd, 2004; Meyer, Miller, Metzger, & Borkovec, 1990).

However, these cancer-related affect and cognition have not been clearly conceptualized or operationalized in previous studies. For example, according to the meta-analysis by Hay, Buckley, and Ostroff (2005), clinical literature has defined worry as a cognition (e.g., Borkovec, 1994), but cancer literature has considered it as an emotional response to cancer (e.g., Bowen et al., 2003). Also, cancer literature has used fear, anxiety, and worry interchangeably (Consedine, Magai, Krivoshekova, Ryzewicz, & Neugut, 2004). In this confusion, no research has attempted to differentiate such constructs, demonstrate the relationship between them, or clarify their association with cancer information.

Another problem is that the contribution of cancer-related affect and cognition to cancer prevention has not received full attention. To explain how cancer-related affect and cognition can influence cancer screening behaviors, this study adopts an *integrative model of behavior prediction* (IM; Fishbein, 2000). The model posits that personal background—including past behavior, demographics, culture, attitudes toward the target behavior, personality, emotions, risk perception, and media exposure—influences people’s beliefs, and beliefs lead to attitude, norm,

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<sup>2</sup>Why cancer worry is an affective-cognitive condition is based on Clore and Ortony (1988), and this will be explained in Chapter 2.

and self-efficacy that result in intention, which is the strongest antecedent of a behavior (Fishbein & Cappella, 2006). Therefore in the IM, cancer-related affect and cognition can be included in the personal background, which indirectly influences intention and behavior through proximal variables. However, all the distal variables are situated at the same level in the model, so it is not clear how these variables are related to one another. Also, the direct effects of these distal variables have not been fully investigated.

The present study focuses specifically on the role of affective states. Theories frequently used in health communication studies such as IM, the *theory of reasoned action* (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and the *theory of planned behavior* (TPB; Ajzen, 1985) do not pay attention to the role of emotional variables. Yet many studies have shown that affect can have direct effects on decision making, which can be represented by the *risk-as-feelings perspective* (Loewenstein, Weber, Hsee, & Welch, 2001). *The risk-as-feelings perspective* posits that feelings such as fear, worry, and anxiety directly influence individuals' response to risk. In short, while adopting IM as a framework, this study adds the *risk-as-feelings perspective* to test the direct contribution of affect.

In summary, the present study theorizes the path from cancer information exposure, through cancer-related affective and cognitive variables, to preventive intention in the IM framework. In other words, the study will show how information acquisition is associated with various cancer-related affective and cognitive factors which play a role—either directly or indirectly—in predicting cancer screening intention/behavior in the IM context. In doing so, this study combines media effects studies (the relationship between cancer information exposure and

cancer-related affect and cognition), *the risk-as-feeling perspective* (the effects of feelings on decision making), and the IM (the role of distal variables in predicting intention/behavior).

## **Chapter 2: Cancer Information Acquisition**

Information is “stimuli from a person’s environment that contribute to his or her knowledge or beliefs” (Brashers, Goldsmith, & Hsieh, 2002). People obtain health information from a variety of sources: physicians as traditional providers (Goldsmith, 2000), interpersonal communication with family and friends (Dutta-Bergman, 2004), mass media (Brodie, Kjellson, Hoff, & Parker, 1999; Johnson, 1997), and the Internet (Cotten, 2001; Cline & Haynes, 2001; Hesse et al., 2005) that provides a vast amount of information with high accessibility (Cotten, 2001; Cline & Haynes, 2001; Hesse et al., 2005).

It is noteworthy that most health information concerns disease. According to a Pew Internet survey, 81% of U.S. adults use the Internet, and 72% of them seek online health information. Also, among Internet users, 55% look for information about a specific disease or medical problem (Fox & Duggan, 2013). Pribble et al. (2006) examined 1,799 items of health news on local television and found that 76% were about medical conditions such as infectious diseases and cancer.

Thus, the use of cancer information follows the general pattern of health information use. Most previous studies on cancer information investigated cancer patients’ use of information (e.g., Gilliam, Speake, Scholefield, & Beckingham, 2003; Huang & Penson, 2008; Rutten, Arora, Bakos, Aziz, & Rowland, 2005), but the present study examines the effects of cancer information in the general population. Research conducted in the 1990s focused on mass media as sources of cancer information (Arkin, Romano, Van Nevel, & McKenna, 1993; Johnson & Meischke, 1994; Rees & Bath, 2000a, 2000b), but more recent research has noted the role of the Internet as an important provider of cancer information (Biermann, Golladay, Greenfield, & Baker, 1999;

Fogel, Albert, Schnabel, Ditkoff, & Neugut, 2002; McHugh et al., 2011; Ziebland, 2004).

Therefore, many studies about cancer information have measured participants' exposure to information from print media, television, the Internet, interpersonal communication, and healthcare professionals (e.g., Kelly et al., 2010; Nguyen et al., 2010; Pecchioni & Sparks, 2007).

To more precisely capture cancer information exposure, this study further categorizes each medium. Information from television is divided into two types based on sources: news programming and health-related shows. Similarly, as for print media, both newspaper and magazines are considered. Online cancer information is classified into three types: online news, health-related websites where information comes from professionals, (i.e., medical organizations or physicians), and information from peers (i.e., online health-related communities or social networking sites). In addition, interpersonal communication for health information is also divided into two types: Communication with lay people and healthcare professionals.

### **Cancer Information Management**

**Information seeking/scanning.** People manage information through communicative and cognitive activities, for example, seeking, avoiding, or providing; among these activities, researchers who study information management in the health context have primarily paid attention to information seeking (Brashers et al., 2002). Information seeking refers to “the purposive acquisition of information from selected information carriers” (Johnson, 1997, p. 4). Although various definitions exist, most emphasize the active efforts of the information seeker in obtaining specific information (Czaja, Manfredi, & Price, 2003; Echlin & Rees, 2002; Freimuth, Stein, & Kean, 1989). Information seeking models posit that individuals are uncertain about health issues, and they try to reduce the uncertainty by actively seeking related information

(Hornik & Niederdeppe, 2008). In sum, information seeking involves non-routine information acquisition, which is outside of normal exposure to information sources (Atkin, 1973; Griffin, Dunwoody, & Neuwirth, 1999; Niederdeppe et al., 2007).

On the other hand, there is another form of information acquisition that is less purposive (Case, 2002). Hornik and Niederdeppe (2008) introduced various terms referring to this type of information acquisition. For instance, Saphiro (1999) and Tewksbury, Weaver, and Maddex (2001) called it *incidental exposure*. Johnson (1997) termed it casual seeking. Dutta-Bergman (2004) and Tewksbury, Hals, and Bibart (2008) used the term *browsing* while Berger (2002) preferred the term *passive information acquisition*. Griffin et al. (1999) referred to such form of information acquisition as *routine information acquisition*. More recently, Niederdeppe et al. (2007) proposed the term *information scanning*, which is consistent with Kosicki and McLeod (1990) and Slater (1997); information scanning is currently widely used in cancer-related research (e.g., Kelly et al., 2010; Kelly, Niederdeppe, & Hornik, 2009; Nguyen et al., 2010).

Information scanning is “information acquisition that occurs within routine patterns of exposure to mediated and interpersonal sources that can be recalled with minimal prompt” (Niederdeppe et al., 2007, p. 154). Niederdeppe et al. (2007) used information scanning as a broad term to refer to a range of behaviors that occur during normal use of information sources. Those behaviors can be purely incidental, but incidental exposure that cannot be recalled later is excluded because researchers cannot measure such exposure (Niederdeppe et al., 2007). For example, the use of search engines to find information about breast cancer treatment is information seeking because it is outside the normal media exposure. In contrast, getting

information about breast cancer treatment while browsing online newspapers is information scanning.

Therefore, it is important to take both information seeking and scanning into account to compare the differences and similarities between them. More specifically, first, the effects of seeking and scanning might be different. According to the information processing theories such as the *elaboration likelihood model* (ELM), information processing with high effort is likely to have stronger persuasive effects than processing with low effort (Petty & Cacioppo, 1986). Thus, the effects of information seeking might be stronger than that of information scanning.

However, second, ELM postulates that processing with low effort also leads to learning and persuasion (Hornik & Niederdeppe, 2008). Health communication researchers have argued that although information actively sought is more likely to influence individuals, scanned information, more frequently acquired than sought information, also has an impact on health consumers (Hornik & Niederdeppe, 2008; Niederdeppe et al., 2007). Moreover, in the cancer context, individuals without cancer are more likely to engage in cancer information scanning, which is less purposive, than information seeking (Johnson, 1997; Johnson, Andrews, & Allard, 2001; Kelly et al., 2010). Previous studies have demonstrated that both sought and scanned information is associated with audiences' health beliefs and behaviors (Kelly et al., 2010; Kelly et al., 2009). For example, using a nationally representative dataset ( $N = 2,489$ ), Kelly et al. (2010) examined if information seeking and information scanning are associated with three prevention behaviors (dieting, fruit and vegetable consumption, and exercise) and three cancer screening behaviors (prostate specific antigen, colonoscopy, mammogram). They found that information seeking has a positive association with all six behaviors while information scanning

has a positive relationship with three behaviors. In short, to exhaustively capture the use of health information, it is important to include both seeking and scanning.

**Information Avoidance.** On the other hand, studies have argued that information avoidance is also an important part of information management (Brashers et al., 2002; Barbour, Rintamaki, Ramsey, & Brashers, 2012; Hogan & Brashers, 2009). Uncertainty management theory (UMT; Brashers, 2001, 2007; Hogan & Brashers, 2009) posits that exposure to information can lead to reduction, maintenance, or increase of uncertainty; thus, the relationship between information and uncertainty is not simple. For example, exposure to information about cancer prevention might reduce some people's uncertainty by informing them of ways to maintain their health. However, for others, the information might raise new concerns or cause information overload. Moreover, some individuals avoid the information because they do not want to reduce uncertainty (Barbour et al., 2012; Hogan & Brashers, 2009). In other words, information avoidance occurs when people want to maintain or increase uncertainty (Barbour et al., 2012). In addition, people avoid health information if attention paid to such information makes them unpleasant (Case, Andrews, Johnson, & Allard, 2005). As Maslow (1963) said, people want to know to reduce anxiety but sometimes they don't want to know to reduce anxiety. Past experience of serious illness is also associated with information avoidance (Barbour et al., 2012) because such people maintain hope through uncertainty (Brashers et al., 1999).

According to Barbour et al.'s (2012) study using two samples, a student sample ( $N = 507$ ) and a community sample ( $N = 418$ ), a considerable number of respondents (37.2% in the student sample and 31.1% in the community sample) reported that they had tried to avoid health information. Reasons for this avoidance varied. Some did so to maintain hope or to deny the

possibility of developing disease. Some did not want to be overexposed to health information. Information avoidance also occurred when people thought the information did not apply or could not prevent illness. In addition, people avoided health information that was questionable or interfered with their private lives or the activities they enjoy. The authors reported that respondents avoided information by removing or ignoring health information. In interpersonal communication, they did so by controlling the conversation.

In the cancer context, information avoidance is especially important. Given the prevalence and severity of the disease, cancer poses a large threat, and information avoidance is associated with fear and anxiety (Case et al., 2005). Genetic testing for cancer is a good example of information avoidance; some people decline to be tested (Struewing, Lerman, Kase, Giambarresi, & Tucker, 1995), and their anxiety level is even higher than those who receive a positive or negative result (Kash et al., 2000). In this sense, in exploring cancer information management, information avoidance should be examined along with information seeking/scanning because they are “collaborative activities” (Brashers et al., 2002, p. 266). Next chapter discusses how this cancer information management influences our affect and cognition related to cancer.

### Chapter 3: Cancer-related Mental Condition Model<sup>3</sup>

Content analyses of media coverage on cancer have suggested the possible associations between cancer information and cancer-related affect and cognition. First, cancer information from the media might be associated with fear about cancer. In U.S. mainstream media, cancer prevention and detection received less attention than treatment (Slater, Long, Bettinghaus, & Reineke, 2008), and the tendency has been consistent from the 1970s to 2000s (Stryker, Solky, & Emmons, 2005; Jensen, Moriarty, Hurley, & Stryker, 2010). Studies that examined the mainstream media coverage (newspapers, television, and magazines) of breast cancer revealed that prevention and detection received less attention compared to treatment, and prevention related items usually focused on pharmaceutical products rather than individual preventive behaviors (Atkin, Smith, McFeters, & Ferguson, 2008). Lifestyle factors were portrayed as the most common risk to cancer without exact data on incidence or mortality rates (Jensen et al., 2010).

When cancer is portrayed as unpreventable, it is highly likely to arouse fear. According to Clarke and Everest's (2006) content analysis of magazines, cancer is frequently represented with fear. For example, cancer is portrayed as related to normal activities, and growing while one is not aware of its development. Mass media emphasize scary statistics about cancer, and the

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<sup>3</sup>Study 1 (including some part of chapter 3, chapter 5, chapter 6, and chapter 7) has been accepted for publication in *Journal of Health Communication* prior to the final examination. According to the Graduate College thesis requirement, "Inclusion of work that has been previously published by the degree candidate is a common practice in research institutions across the country, and it is permitted at the University of Illinois" (<http://www.grad.illinois.edu/graduate-college-thesis-requirements>).

Chae, J. (forthcoming). Development of a three-factor cancer-related mental condition model and its relationship with cancer information use, cancer information avoidance, and screening intention. *Journal of Health Communication*.

metaphors of war and battle are frequently adopted in cancer narratives (Clarke & Everest, 2006). Moreover, an analysis of U.S. newspaper found that efficacy messages were rarely presented (Moriarty & Stryker, 2008). Therefore, frequent exposure to such information might be associated with the level of cancer fear that an individual has.

Second, other than fear, such coverage might cause worry about cancer. If cancer is hard to prevent by lifestyle behaviors, individuals will not only have fear, but also worry about developing cancer. Also, cancer reports in mass media often miss detailed information, which can result in incomplete understanding of the issue (Calloway, Jorgensen, Saraiya, & Tsui, 2006). Sometimes articles contradict one another, and thus cause confusion (Clarke & Everest, 2006). Confusion about information cause individuals to miss or not to trust important health information (Gurmankin & Viswanath 2005), and this might be related to cancer worry, because worry is closely associated with uncertainty (Borkovec et al., 1983; Mathews, 1990).

Third, cancer information from the media can influence personal risk perception<sup>4</sup> because mass media coverage is not proportional to actual prevalence and importance of disease (Frost, Frank & Maibach, 1997; Kline, 2006). In other words, some diseases receive more attention than others; for example, content analyses of newspaper coverage in the U.S. and Canada revealed that breast cancer is overrepresented and lung cancer is underrepresented (Cohen et al., 2006; Hoffman-Goetz & Friedman, 2005; Hoffman-Goetz, Gerlach, Marino, & Mills, 1997; Hoffman-Goetz & MacDonald, 1999; Gerlach, Marino, & Hoffman-Goetz, 1997; Slater et al., 2008; Stryker, Emmons, & Viswanath, 2007). Moreover, Adelman and Verbrugge's (2000) analysis of U.S newspaper coverage of cancer found that cancer coverage did not reflect

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<sup>4</sup>Risk perception is a multidimensional construct, but risk perception use in health communication refers to perceived susceptibility and severity, which are cognitive dimensions of risk perception (Freimuth & Hovick, 2012).

changes in epidemiological data such as decline in the incidence and mortality rates. Stryker, Fishman, Emmons, and Viswanath (2009) reported that both U.S. major newspapers and ethnic newspapers rarely provided numerical data of risk. These findings suggest that people might become indifferent to less-covered diseases (Gottlieb, 2001), and overestimate their risk of getting frequently represented cancer.

In short, previous content analyses on cancer information from mass media have implied the possibilities that exposure to such coverage might be associated with fear, worry, and risk perception about cancer. Nevertheless, how active avoidance of such coverage, i.e., cancer information avoidance, is associated with aforementioned affect and cognition has rarely been studied. Moreover, most previous content analyses have focused on U.S. newspapers. The Internet and interpersonal communication have been rarely examined although the effects of each source can be different. For example, regarding breast cancer screening behaviors, the impact of interpersonal communication was greater than mass media effects for young college women, while mass media effects were larger in middle-aged women (Ogata Jones, Denham, & Springston, 2006). Similarly, it may be that effects of cancer information on cancer-related affect and cognition might vary based on characteristics of each medium. Thus, a study that considers all possible cancer information sources is necessary.

### **Framework: Affective, Cognitive, and Affective-Cognitive**

Although previous studies have suggested the association between cancer information exposure and cancer-related affect and cognition, the relationship has not been fully tested. The present study argues that there are two reasons. First, previous studies have primarily focused on the effects of information on cognition. Generally, health information from mass media and the

Internet increases awareness, knowledge, and self-efficacy (Brodie et al., 1999; Kalichman, Benotsch, Weinhardt, Austin, & Luke, 2002), brings about behavioral change (Ayers & Kronenfeld, 2007; Yanovitzky & Stryker, 2001), and encourages the use of health services (Grilli, Ramsay, & Minozzi, 2002). These findings also hold true specifically for cancer. Cancer information use is positively related to preventive behaviors and screening behaviors (Kelly et al., 2010; Lewis et al., 2012; Yanovitzky & Blitz, 2000) as well as knowledge about cancer (e.g., McMenamin et al., 2005; Stryker, Moriarty, & Jensen, 2008). In addition, online health information use reduces fatalistic beliefs regarding cancer (Lee, Niederdeppe, & Freres, 2012). Thus, individuals who use cancer information are likely to know more about cancer and to hold positive attitudes toward cancer prevention. Notably, dependent variables in these studies are all cognitions (e.g., knowledge, awareness, self-efficacy).

Second, previous cancer literature has not adequately conceptualized cancer-related affect and cognition. As previously mentioned, cancer literature has conceptualized cancer worry as an affect, which is different from psychologists' view that considers worry as cognitive activity. This discrepancy is because cancer-related research has explored cancer worry in comparison to cancer risk perception, which is regarded as cognition (Hay et al., 2005). Nevertheless, it seems unreasonable to say that worry becomes affect only in the cancer context. Moreover, previous studies have used fear and worry interchangeably in the cancer context (Consedine et al., 2004). Psychologically, fear and worry are distinct. Fear is aroused as a response to a threat (Marks, 1987), and is classified as a discrete emotion (Nabi, 1999). Worry is a thought process related to a negative emotion such as fear (Borkovec, Ray, & Stober, 1998). Thus, it seems that cancer fear is more appropriate constructs to represent cancer-related affect

than cancer worry. Therefore, it is vital to clearly conceptualize and operationalize fear, worry, and risk perception in the cancer context in order to understand the role of each construct in cancer communication and prevention.

Therefore, to demonstrate the associations between cancer-related affect and cognition and other cancer-related variables, this study attempts to re-conceptualize cancer fear, cancer worry, and cancer risk perception. In doing so, this study relies on the taxonomy of psychological conditions proposed by Ortony, Clore, and Foss (1987). Although it is difficult to perfectly capture mental conditions in words, social scientists, in most cases, depend on language to assess individuals' mental condition (Clore & Ortony, 1988).

The authors classified mental conditions into three categories: *cognition*, *conation*, and *affect*. Conation is *will*, which the authors referred to as *behavior*. These three categories result in five subcategories. *Affective states* are purely emotional states, such as “fear” and “depressed.” *Cognitive condition* includes terms such as “aware” and “bored.” The three remaining subcategories represent combinations of two of the three categories: *Affective-behavioral conditions* involve behaviors based on affection (e.g., cheerful, apologetic); *Behavioral-cognitive conditions* are terms that express individuals' behavior based on thinking (e.g., careful, cooperative); the last subcategory is *affective-cognitive conditions*, a thinking process closely related to emotion, which includes “worried.” Although Ortony et al. (1987) proposed five subcategories of mental condition, this study examines only thoughts and feelings regarding cancer, not their behavioral manifestation. Thus, excluding the behavioral part, the present study hypothesizes a *cancer-related mental condition model* consisting of affective states (fear), affective-cognitive condition (worry), and cognitive condition (risk perception).

**Cancer fear (affective).** Fear refers to a negative emotion coming with a high level of arousal that individuals experience when facing a significant and personally relevant threat (Easterling & Leventhal, 1989; Ortony & Turner, 1990; Witte, 1992). The definition is consistent with the taxonomy above, which sees fear as an affective state. Thus, this study conceptualizes cancer fear as a negative emotion about cancer as a disease that threatens an individual both physically and psychologically. As fear and worry are psychologically different, they should also differ in the context of cancer. For example, an individual with a family history of cancer might worry about the chance of getting cancer (i.e., cancer worry), but that worry does not necessarily mean he/she is anxious or depressed when thinking about cancer as a disease, although the two are closely related.

Jensen, Bernat, Davis, and Yale (2010) demonstrated empirically that cancer fear is distinct from cancer worry while they were investigating the dimensionality of cancer worry. They factor-analyzed various cancer worry scales, including the breast cancer fear scale (cancer fear scale; Champion et al., 2004), and the results showed that cancer fear items loaded on a different factor from that of cancer worry. The authors suggested that the cancer fear scale measures something different from cancer worry. Therefore, this study operationalizes cancer fear by using the scale proposed by Champion et al. (2004), which measures “physiological arousal and subjective experience” toward cancer threat (p. 752).

**Cancer worry (affective-cognitive).** Worry is a cognitive thinking process, but is highly correlated with negative emotions such as fear and anxiety (Borkovec, 1994; Muris, Merckelbach, Gadet, & Moulaert, 2000). Thus, worry is a “cognitive component of anxiety” (Mathews, 1990, p. 456). In this sense, it seems reasonable to conceptualize cancer worry as an

affective-cognitive condition, as Ortony et al. (1987) suggested. This study conceptualizes cancer worry as a thinking process related to feelings aroused by the threat of cancer—a combination of affect and cognition. Supporting this, the only descriptive study of cancer worry, which explored cancer worry during a one-month period and at one year follow-up, found that both cognitive and affective aspects are involved with cancer worry (McCaul, Branstetter, O'Donnel, Jacobson, & Quinlan, 1998).

Although Jensen et al. (2010) demonstrated that cancer worry consists of two factors: severity and frequency, this study used only cancer worry-severity. Cancer worry-severity explained the greatest variance in cancer worry (Jensen et al., 2010). Cancer worry-frequency within the general population is very low, and thus Jensen et al. (2014) concluded that cancer worry-severity might be a better predictor of health outcomes than frequency. Following their recommendation, this study used the brief worry scale (Dijkstra & Brosschot, 2003) that measures cancer worry-severity.

**Cancer risk perception (cognitive).** In contrast to the confusion around cancer worry, it is relatively evident that cancer risk perception is a cognitive process based on an intellectual judgment (Sjöberg, 1998). Risk perception - in the health context - refers to the beliefs about one's vulnerability to a negative health event (Dillard, Ferrer, Ubel, & Fagerlin, 2012). This study conceptualizes cancer risk perception as a cancer-related cognition regarding one's own vulnerability. Although risk perception is regarded as multidimensional, health-related studies have focused on cognitive aspects of risk perception, that is, perceived susceptibility or severity (Freimuth & Hovick, 2012; Leppin & Aro, 2009). Consistently, cancer risk perception has

mainly been operationalized as perceived susceptibility to cancer (e.g., McQueen, Vernon, Meissner, & Rakowski, 2008; Zajac, Klein, & McCaul, 2006).

For the operationalization of cancer risk perception, this study adopts Dillard et al.'s scale (2012), which followed the recommendation of Brewer, Weinstein, Cuite, and Herrington (2004). According to Brewer et al. (2004a, 2004b), questions on perceived susceptibility should ask about a person's chance of contracting a certain disease if he/she does not adopt preventive behavior; an individual who adopts or plans preventive behavior might report that his or her susceptibility is low, but might also know that their risk would be high without the behavior. The scale by Dillard et al. (2012) includes a behavior, and consists of four items: relative risk, absolute risk (two items, numerical scale and verbal scale), and feeling of risk. Of these, relative risk and feelings of risk measure the affective aspect of risk perception. Given that risk perception is cognition, those two items might be more correlated with affect than the other two items rather than being purely affective<sup>5</sup>.

In short, the present study assumes a cancer-related mental model where cancer fear, cancer worry, and cancer risk perception represent affective, affective-cognitive, and cognitive aspects, respectively. The development and the validation of the model will constitute Study 1.

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<sup>5</sup>Consistent with this expectation, all four items loaded on the same factor in the subsequent factor analysis (see Results section of Study 1).

## **Theorizing the Association between Cancer Information and Cancer-Related Mental Condition Model**

**The mutual influence.** With regard to the relationship between information use/avoidance and affect/cognition, most previous studies have already found that affect/cognition influences information management. Many health information seeking models posit that uncertainty about a health issue leads to anxiety and high risk perception that cause information seeking (e.g., Griffin et al., 1999; Kahlor, 2010). The affective/cognitive/affective-cognitive factors previously mentioned have all been found to predict information seeking or avoidance. For example, when an individual experiences fear, he/she tries to seek information to reduce the feeling (Brasher et al., 2000). Jepson and Chaiken (1990) suggested that fear results in greater heuristic processing of information or avoidance. Psychology literature has confirmed that worry is associated with coping strategies and information seeking (Davey, Hampton, Farrel, & Davison, 1992; Tallis, Davey, & Capuzzo, 1994). High risk perception is also a predictor of information seeking in the health context (Rimal & Real, 2003; Turner, Rimal, Morrison, & Kim, 2006).

Yet the present study argues that information exposure and cancer-related affect and cognition will be mutually influencing each other. Slater (2007) posited that media selectivity and effects influence each other. That is, some types of media use influence related beliefs, attitudes, and behaviors, and these in turn influence that type of media use. Over time, media use and related beliefs, attitudes, and behaviors mutually influence (Slater, 2007). Applying this to the cancer context, it is possible that cancer-related affect and cognition influence information use, but information use also can affect them.

## **The effects of cancer information exposure and avoidance on cancer-related mental condition model.**

*Cancer fear.* As stated, fear is a response to a threat (Easterling & Leventhal, 1989; Ortony & Turner, 1990), and thus expecting the effect of cancer information on cancer fear is conceptually consistent with the definition of fear. Moreover, fear appeal studies have shown that persuasive messages can elicit fear in people and thus to compel them to follow the recommendation (Witte, 1992; Witte & Allen, 2000); this demonstrates that the exposure to messages can arouse fear. As stated, content analyses of mainstream media have shown that media reports on cancer might increase fear (e.g., Clarke & Everest, 2006).

As for information avoidance and cancer fear, one study found that cancer fear is positively associated with cancer information avoidance. Miles, Voorwinden, Chapman, and Wardle (2008) conducted a survey using a community sample of people aged 50 to 70 years ( $N = 1,442$ ) and reported a positive association between cancer fear and cancer information avoidance, which was partly mediated by perceived cancer severity. As this was a cross-sectional survey, it is also possible that cancer information avoidance predicts cancer fear. However, some people avoid information to maintain uncertainty (Barbour et al., 2012). By preventing the exposure to new information that can arouse fear, they are likely to maintain their current level of fear. Thus, this study poses a research question about the relationship between information avoidance and cancer fear.

Finally, because no research has investigated differential effects of information sources on cancer fear, it is difficult to hypothesize which medium has stronger effects. However, vivid images can cause strong emotional reaction (Loewenstein et al., 2001). Thus, television and the

Internet might be related to cancer fear.

*H1: Cancer information exposure will be positively associated with cancer fear.*

*RQ1: How is cancer information avoidance associated with cancer fear?*

*H2: Exposure to cancer information from television or the Internet will be positively associated with cancer fear.*

**Cancer worry.** Worry is initiated when threat-related information is presented (Tallis & Eysenck, 1994). Thus, when information including a threat to one's health is presented, one might worry about his/her health. For example, based on both a longitudinal log-based study and a survey, White and Horvitz (2009) found that search for common symptoms can escalate into search of serious disease related to those common symptoms. Moreover, they reported that the amount and distribution of medical information that the Internet users viewed was associated with the escalation of medial concern. What they meant by medical concern is health anxiety on the Internet, cyberchondria, but existing health anxiety scales include the worry about developing a serious disease (Lucock & Morley, 1996; Salkovskis, Rimes, Warwick, & Clark, 2002).

The present study expects the same effect in the cancer context. Jensen et al. (2010) viewed cancer worry as dispositional. However, McCaul et al.'s (1998) descriptive study showed that the breast cancer worry level changed over a one-month period. The participants' thoughts about breast cancer were influenced by media or interpersonal communication, which suggests that cancer worry can be influenced by situational factors. Therefore, this study anticipates a positive association between information exposure and cancer worry. In addition, similar to cancer fear, information avoidance might lead to maintenance of the current level of cancer worry. Otherwise, it is also possible that avoidance of cancer information is related to lower level

of cancer worry, because, without the new threat information, an individual might forget about cancer threat. Thus, a research question was posed.

There has been no study looking at the differential effects of cancer information sources and cancer worry. McCaul et al.'s (1998) study found that both media and interpersonal communication served as cues to think about cancer. However, given that now the Internet is the most frequently used medium for self-diagnosis (Fox & Duggan, 2013; White & Horvitz, 2009), it may be that those who frequently practice self-diagnosis through the Internet are more likely to have cancer worry. Therefore, the Internet would be associated with cancer worry.

*H3: Cancer information exposure will be positively associated with cancer worry.*

*RQ2: How is cancer information avoidance associated with cancer worry?*

*H4: Exposure to cancer information from the Internet will be positively associated with cancer worry.*

**Cancer risk perception.** Previous studies found an association between media exposure and risk perception. For example, Morton and Duck (2001) found that media exposure is correlated with personal risk perception about skin cancer. People who were exposed to AIDS campaign messages were more likely to report a higher perceived risk of contracting AIDS (Agha, 2003). Coleman (1993) explored mass media effects on risk perception in relation to various health related issues, and reported that the perception of personal risk is influenced by mass media exposure.

Studies have rarely investigated the relationship between information avoidance and risk perception, but in a similar way to cancer fear and worry, it is possible that information avoidance either maintains the current perception of risk or reduces it by preventing exposure to

a threat. Thus, the present study expects to find a positive association between cancer information use and cancer risk perception, and poses a question about the relationship between information avoidance and cancer risk perception.

As for differential effects of each information source, interpersonal communication with lay people is more likely to influence risk perception than other sources. Morton and Duck (2001) demonstrated that both mass media and interpersonal communication were correlated with personal risk perception of skin cancer, but interpersonal communication was more strongly correlated with personal risk perception than mass media. Therefore, communication with lay people would be associated with risk perception than other sources.

*H5: Cancer information exposure will be positively associated with cancer risk perception.*

*RQ3: How is cancer information avoidance associated with cancer risk perception?*

*H6: Exposure to cancer information from interpersonal communication will be positively associated with cancer risk perception.*

**The moderating role of trait anxiety.** Although use of cancer information seems to influence an individual's affect and cognition, the effects are not the same for everyone. Pifalo, Hollander, Henderson, DeSalvo, and Gill (1997) surveyed 270 adults who received health information from a library in 1995. The authors found that 52% said that the information reduced their anxiety about health. However, 10% reported that the information increased their anxiety level, and 1% said that the information had no effect at all. The authors did not use an established measure for anxiety level. However, the study does suggest that the effects of health information are not identical.

For this reason, this study considers individual difference in the effects of cancer information. Media effects vary according to individual differences such as needs, readiness to respond, and trait. Due to these differences, individuals prefer certain media contents. Also, individuals select and perceive information based on their characteristics (Oliver & Karakowiak, 2009). Individuals want to have consistency in their cognitions, and when inconsistency exists, they experience cognitive dissonance (Festinger, 1957). Thus, they tend to select information consistent with their beliefs. In addition, individuals tend to perceive and interpret information in ways that reinforce their existing beliefs (Klapper, 1960).

Therefore, this study considers the individual characteristic that makes people select and focus on certain information, and expects that cancer information's association with cancer fear, cancer worry, and cancer risk perception will be stronger for highly anxious individuals. Anxiety is positively related to all three constructs (e.g., Borkovec et al., 1983; Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998; Katapodi, Lee, Facione, & Dodd, 2004; Meyer, Miller, Metzger, & Borkovec, 1990). Numerous studies have shown that anxious individuals have a cognitive bias that selectively processes threat-related information (MacLeod & Mathews, 1991; MacLeod, Mathews, & Tata, 1986; MacLeod & Rutherford, 1992; Mathews & MacLeod, 1985, 1986). That is, individuals with a high level of anxiety tend to focus on and process threat-related information compared to those with a low level of anxiety (MacLeod & Rutherford, 1992). Psychologists have found that trait anxiety is associated with all self-referent negative events, and it is related to the extent or range of information that an individual is exposed to (Butler & Mathews, 1987). Therefore, people with high trait anxiety would not only use more cancer information, but also interpret it in a more negative way than low anxiety people do, which will cause higher levels of

fear, worry and risk perception about cancer; thus the following hypotheses were advanced. Next chapter will discuss how the cancer-related mental condition model fits into the IM framework.

*H7: The effect of cancer information exposure on cancer fear will be larger for those who with higher trait anxiety.*

*H8: The effect of cancer information exposure on cancer worry will be larger for those who with higher trait anxiety.*

*H9: The effect of cancer information exposure on cancer risk perception will be larger for those who with higher trait anxiety.*

## **Chapter 4: Predicting Screening Intention in the Framework of an Integrative Model**

To develop successful intervention programs to change a given behavior, many scholars have provided behavioral prediction and behavior change theories that identify predictors of a targeted behavior (Fishbein & Cappella, 2006). Among these theories, several have focused on the role of attitude and norms in predicting intention and behavior.

### **Behavioral Prediction Theories**

**The theory of reasoned action.** TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) posits that a specific behavior is determined by behavioral intention. The intention—the strongest predictor of the behavior—is influenced by attitude toward the behavior and subjective norm. Attitude is affected by behavioral beliefs (i.e., the beliefs that a behavior will lead to certain outcomes) and outcome evaluation. Subjective norm is influenced by normative beliefs, which refers to one’s perception about how important others think about the behavior, as well as motivation to comply. The theory effectively explains volitional behavior; people behave according to their intention and, in doing so, want to get favorable outcomes and meet important others’ expectations (Eagly & Chaiken, 1993).

However, TRA has many limitations. First, it does not include some important variables that can affect behavior. Variables such as demographics, attitudes toward target, and personality traits are distal and external to the model. Although all of these are seen as important factors in predicting behavior, TRA does not show how these variables influence behavioral and normative beliefs (Eagly & Chaiken, 1993). For this reason, Eagly and Chaiken argued that TRA is not a “general theory of behavior” but a “theory of the immediately proximal cause of volitional behavior” (p. 173). Therefore, many scholars have added other variables to the model, such as

perceived moral obligation (Schwartz & Tessler, 1972), which refers to personal normative beliefs, self-identity (Granberg & Holmberg, 1990), and past behavior (Bentler & Speckart, 1979). In addition, Liska (1984) argued that TRA is not appropriate for explaining behavior that requires “skills, abilities, opportunities, and the cooperation of others” (p. 63).

More importantly, the theory is purely about rational decision making and does not consider the role of affect in social influence (Hale, Householder, & Greene, 2002). Armitage, Conner, and Norman (1999) investigated the effect of induced mood in the TRA model. They reported that mood type influences the association between attitude/norm and intention to use condoms. In the negative mood, only attitude—not subjective norm—predicted intention to use a condom. In the positive mood, only subjective norm predicted such an intention. Their results suggest that affect plays a role in shaping one’s behavioral intention.

A second limitation is that the relationship among variables is not always consistent with the prediction of the model. Liska (1984) showed concerns about the causal direction in the model, which flows from beliefs to behavior through attitude and subjective norm. It is also possible that attitude directly influences behavior without the mediating role of intention as people sometimes behave spontaneously without a clear intention (Eagly & Chaiken, 1993). In the TRA model, attitude and subjective norm separately influence behavioral intention, but in some cases a positive correlation exists between them (Hale et al., 2002).

**The theory of planned behavior.** In response to the criticism on TRA, Ajzen (1985, 1987, 1988, 1991, 2002) proposed TPB to explain non-volitional behavior. Ajzen (1985) argued that whether intention leads to behavior depends on how much control an individual has over the behavior. Thus, he added perceived behavioral control (PBC). PBC is “the perceived ease or

difficulty of performing the behavior” (Ajzen, 2002, p. 665); this consists of perceived self-efficacy, which is the “confidence in one’s ability to perform” the behavior, and perceived controllability, which is “the extent to which its performance is up to the actor” (p. 671). PBC influences intention or it directly influences behavior (Ajzen, 2002). One meta-analysis found that TPB variables explained 27% of the variance in behavior and 39% of the variance in intention (Armitage & Conner, 2001). The theory has been employed in many health-related research studies, such as condom use (Albarracín, Fishbein, & Middlestadt, 1998; Jamner, Wolitski, Corby, & Fishbein, 1998), smoking (Godin, Valois, Lepage, & Desharnais, 1992), alcohol (Johnston & White, 2003), and exercise (Courneya, Friedenreich, Arthur, & Bobick, 1999; Trafimow & Trafimow, 1998).

Although TPB is more appropriate for explaining non-volitional behavior than TRA, it also has weaknesses. Eagly and Chaiken (1993) argued that (a) a causal link between PBC and intention needs to be questioned because it does not apply to negative behaviors<sup>6</sup>; (b) like TRA, the theory is not a sufficient model in that it includes just one more variable, PBC, without considering other variables such as past behavior and self-identity; and (c) unlike its own name, the theory does not explain the process through which people *plan* behavior (see Eagly & Chaiken, 1993, p. 189-190).

**The integrative model.** Based on previous cognitive theories predicting a given behavior such as TRA, social cognitive theory (Bandura, 1977, 1986, 1997), and the health belief model (Janz & Becker, 1984), Fishbein (2000) proposed an integrated model of behavioral

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<sup>6</sup> The authors stated that people do not engage in negative behaviors although they know that they can do the behaviors if they want to.

prediction (IM). According to IM, if an individual has a strong behavioral intention with skills and abilities, and does not have environmental constraints, he/she is likely to perform the behavior. Intention is determined by three factors: attitude toward the behavior, perceived norm, and self-efficacy (PBC). The importance of each determinant varies according to the kind of behavior and the population. As with TRA or TPB, each determinant of intention is determined by underlying beliefs; attitude is influenced by behavioral beliefs and outcome evaluation, norm by normative beliefs and motivation to comply, and self-efficacy by control beliefs and perceived power. Finally, demographics and culture, attitude toward targets, personality, mood/emotions, media and intervention exposure, and other individual differences play an indirect role in influencing behavior through underlying beliefs (Fishbein, 2000; Fishbein & Cappella, 2006; Fishbein et al., 2001; Fishbein & Yzer, 2003; Montano & Kasprzyk, 2008).

In applying IM, it is necessary to identify a specific behavior which needs to be changed; when defining a behavior, the action, the target, and the context and time should be included (Fishbein & Cappella, 2006; Fishbein & Yzer, 2003). After that, the model can be used to predict a given behavior in a target population. Researchers can test various kinds of hypotheses, such as the influence of attitude on intention. Generally the goal of theory-based communication is to identify specific beliefs that make a difference between those who do the behavior and those who do not (Fishbein & Cappella, 2006; Fishbein & Yzer, 2003). To date, IM has been used for topics such as condom use (Kasprzyk, Montaño, & Fishbein, 1998; Kenski, Appleyard, Von Haefen, Kasprzyk, & Fishbein, 2001; von Haefen, Fishbein, Kasprzyk, & Montaño, 2001) and HIV prevention (Kasprzyk & Montaño, 2007).

Although IM has been updated compared to its predecessors, scholars have suggested ways to improve the model. Among several limitations, the present study focuses on the role of distal variables. Distal variables in the model need to be more carefully examined. Distal variables, as stated, include demographics, culture, emotion, and cognition. IM posits that these distal variables indirectly affect intention or behavior through proximal variables (Fishbein & Cappella, 2006; Fishbein & Yzer, 2003). Supporting this, for example, Yzer et al. (2004) reported that adolescents' being at risk for marijuana use ( $N = 1,175$ ) indirectly influences their intention to use it. However, the role of distal variables might be more direct. A longitudinal study about the impact of communication with friends on adolescents' sexual initiation in the IM framework ( $N = 316$ ) indicated that peer communication both directly and indirectly predict sexual initiation (Busse, Fishbein, Bleakley, & Hennessy, 2010). The study suggests that distal variables in the IM not only influence attitude norms and self-efficacy, but also affect a given behavior without the mediating role of such proximal variables.

In short, in extending the IM, this study explores the role of distal variables. Rather than putting them all together outside the main model, this study hypothesizes that information use influences cancer-related mental condition (cancer fear, cancer worry, and cancer risk perception), and also considers the direct effects of mental condition on intention. Particular attention is given to the role of affect in the model, which has been somewhat disregarded in previous studies. This issue will be discussed in the next section.

## **The Influence of Affect on Behavior Change**

Research on attitude became cognitively oriented from the late 1960s (Eagly & Chaiken, 1993). The emphasis on cognition in social psychology was spurred by a cognitive revolution (Zajonc, 1980) in experimental psychology. This cognitive revolution was a backlash against behaviorism and focused on human information processing based on cognitive evaluations, characterized by the “computer metaphor” (Phelps, 2006, p. 28). As a result, affect was largely ignored, although it is also an important part of social psychology (Eagly & Chaiken, 1993).

In the 1980s, there was a big controversy about the relationship between affect and cognition. Zajonc (1984) argued that affect (emotion) preceded cognitive processing. He stated that “affect and cognition are separate and partially independent processes and although they ordinarily function conjointly, affect could be generated without a prior cognitive process” (p. 117). On the other hand, Lazarus (1984) argued that cognitive evaluations precede emotion. He stated that “Cognitive activity is a necessary precondition of emotion because to experience an emotion, people must comprehend—whether in the form of a primitive evaluative perception or a highly differentiated symbolic process—that their well-being is implicated in a transaction, for better or worse” (p. 124).

Increasingly however, an integrative approach that considers both affect and cognition, or an interaction between the two, has become a main trend (e.g., Lee, Scheufele, & Lewenstein, 2005). This reflects evidence from neuroscience suggesting that affect and cognition interact (Phelps, 2006). There have been numerous studies showing that the amygdala—a brain region involved in processing memory and emotion—automatically processes emotion without cognitive evaluation. At the same time, there is equally ample evidence that cognition influences

the amygdala and emotional experience (for details, see Phelps, 2006). Phelps (2006) concluded that the answer is not straightforward and that affect and cognition are intertwined.

These findings from neuroscience suggest that it is almost impossible to identify precisely the relation between affect and cognition. In other words, it is impossible to explain all cases where affect causes cognition and all cases where cognition causes affect, and include the relation in the behavioral prediction theory. Given that all theories and models involve some degree of simplification, this study has hypothesized a model in which affect, affective-cognitive, and cognitive factors run parallel with one another. Although this model ignores the interaction between affect and cognition, it has following strengths as a health communication model.

First, the complex relation between affect and cognition has little practical value in health communication studies. The purpose of health communication is to study and develop communication strategies to enhance public health (U.S. Department of Health and Human Services, 2005), so health communication research should concentrate on factors that lead to desirable health behaviors. In this sense, focusing on the relation between psychological factors makes it hard to identify the relationship between those psychological factors and health outcomes.

Second, although the model does not consider the interaction between affect and cognition, by situating affect and cognition in parallel, researchers can demonstrate an independent effect of each construct related to affect and cognition on health-related variables, because, in the model, each construct controls for one another. Previous health research did not consider various affect and cognition at the same time. However, in reality, people fear, worry, and perceive risk almost simultaneously. By having each construct control for one another,

researchers can check the relatively independent role of each construct. This is necessary because affect, whether or not it is influenced by cognition, can play a direct role in risky decision making (Loewenstein et al., 2001). Many theories and models support this relationship, which will be discussed below.

**Functional emotional theories.** Emotion<sup>7</sup> refers to “internal mental states representing evaluative reactions to events, agents, or object that vary in intensity” (Nabi, 2002b, pp. 289-290; Ortony, Clore, & Collins, 1988). Functional emotional theories have shown that emotions can influence behavior. Based on the previous works (e.g., Arnold, 1960; Izard, 1977; Lazarus, 1991; Ortony et al., 1988), Nabi (2002b) summarized the principles of functional emotional theories as follows:

First, emotions have inherent adaptive functions. Second, emotions are based on events that are personally relevant. Third, each emotion has a distinctive goal or motivation represented in its state of action readiness or tendency to action designed to arouse, sustain, and direct cognitive and/or physical activity. Fourth, emotions are organizers and motivators of behavior. (p. 290)

In this view, several emotions, such as fear, anger, and happiness/joy, have been thought to be discrete. In other words, they have their own pattern of appraisal and motivational functions and are associated with behavior (Nabi, 1999, 2002a, 2002b).

Among the discrete emotions, fear is the most studied in the persuasion context (Breckler, 1993). Individuals feel fear when exposed to a threat that they cannot control; when fear arises, they want to be protected from the threat (Frijda, 1986; Lazarus, 1991). Although fear appeal

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<sup>7</sup>In line with Clore and Ortony (1988), this study views affect as a broad concept that includes emotion and mood. Mood refers to “a diffuse affective state that occupies the background of consciousness” (Dillard & Meijnders, 2002).

literature has shown inconsistent findings, meta-analyses have indicated that fear is positively associated with attitude and behavior change (Boster & Mongeau, 1984; Mongeau, 1998; Nabi, 2002b). For example, in the cancer context, cancer fear will arise when an individual perceives cancer to be threatening. Because fear is related to the desire for protection, those who have cancer fear will take action to prevent the danger.

Based on both emotional theories and cognitive persuasion models such as ELM, Nabi (1999) proposed the *cognitive functional model* (CFM). CFM posits that emotions affect the level of elaboration itself, and the direction and stability of a persuasive outcome is influenced by negative emotions related to a persuasive message (Nabi, 1999, 2002a). In other words, the type and intensity of the experienced emotion and the expectation as to whether the message is helpful for achieving the emotion-induced goal will determine the depth and direction of the information processing that leads to attitude change (Nabi, 1999, 2002a, 2002b).

**Judgment/decision-making research.** Many psychologists and economists have explored decision making under risk and uncertainty, mainly based on expected utility theory (EU). According to EU, when an individual makes a decision between risky or uncertain prospects, the person compares the expected utility values. To obtain the values, the utility values of outcome are added after each value is multiplied by its probability (Mongin, 1997). Theories frequently used in communication research (e.g., TRA and HBM) are all EU-type theories. Notably, Loewenstein et al. (2001) pointed out that most EU-type theories take a rational approach to explaining decision making. In other words, the role of affect has been ignored. This section discusses decision-making hypotheses that consider the role of affect.

***Affect as information.*** Clore and Schwarz's *affect-as-information hypothesis* (Clore, 1992; Clore, Schwarz, & Conway, 1994; Schwarz & Clore, 1983) posits that feelings that an individual experiences while engaging in judgment/decision making influence their choice. Schwarz and Clore (1983) conducted two experiments in which either a good mood or bad mood was induced when making judgments of one's well-being. Both results indicated that participants were more satisfied with their lives when they were in a good mood. When the authors induced participants to attribute their feelings to external sources not related to judgment about their lives, participants in a good mood were not influenced. However, the influence of the bad mood on participants' judgment about their lives disappeared. The results suggested that affective states serve informative or directive functions in one's judgment/decision making. In other words, people use the affective state as information with regard to their judgment, and the affective state directs people's attention to certain information when they want to seek causes of their feelings (Schwarz & Clore, 1983).

***Affect heuristic.*** Damasio's (1994) *somatic marker hypothesis* postulates that thought is determined by images (i.e., perceptual and symbolic representations) that are marked by positive or negative feelings. These feelings are directly or indirectly associated with somatic or bodily states. If a certain future outcome is linked to a negative somatic marker, that marker warns the individual. Scholars like Epstein (1994) and Mowrer (1960a, 1960b) also argued that affect motivates human behavior.

Based on these ideas, Slovic and his colleagues (Finucane et al., 2000; Slovic, Finucane, Peters, & MacGregor, 2002; Slovic, Flynn, & Layman, 1991; Slovic et al., 1991) developed the *affect heuristic*. Affect heuristic theorists asserted that affect is an important component in

judgment/decision making. Similar to Damasio (1994), they argued that representations of objects and events are linked to affect, and people use this affective pool in decision making. Because using affect as a cue is easier than cognitive evaluation, the mental shortcut was labeled as affect heuristic (Finucane et al., 2000).

***Risk-as-feelings perspective.*** Although theories introduced above all consider the role of affect on human behavior, this study relies on the *risk-as-feelings perspective* (Loewenstein et al., 2001). According to the authors, there have been two perspectives on role of affect in behavior change. One is the consequentialist perspective; it posits that affect does not directly influence intention or behavior, but influences cognition, which in turn influences intention or behavior. This view assumes that people evaluate desirability and probability of the outcome of their choice and use this information to reach a decision.

The other perspective labeled as *risk-as-feelings* posits that feelings have an impact on decision making in a different and independent way from cognition. Other decision-making hypotheses (e.g., *somatic marker hypothesis*, *the affect as information hypothesis*, and the *affect heuristics*) include emotions. However, unlike these perspectives, which postulate that emotion and cognition complement each other, the *risk-as-feelings* perspective focuses on the independent role of emotions. According to this view, emotions influence decision making not only when they first occur, but also at later points via memory. Cognitive evaluations are based on the anticipated outcome and subjective probabilities whereas emotional reactions are more likely to be affected by vivid images and proximity in time. Although emotions are also influenced by probabilities and outcome, emotions' relationship with these variables is different from that of cognition; thus, it is possible that an individual's emotion about a risk (e.g., fear) and

cognitive evaluation of that risk are quite different.

**Application to the integrative model.** All theories or models introduced reached the same conclusion: Affect/emotion can influence behavior and, as such, should be given more attention in IM. IM is a highly cognitive-oriented model like its predecessors, TRA and TPB, and has downplayed the role of affect. As previously stated, mood and emotion are included in background factors and, thus, thought to influence intention or behavior indirectly. However, the roles of affect/emotion are more diverse.

For example, affect/emotion can directly influence intention or behavior. Cappella (2007) conducted a survey among a nationally representative sample of young adults aged 18 to 25 ( $N = 450$ ). Participants were asked about their intention of quitting smoking, and other IM constructs such as attitude, norms, and self-efficacy. They were also asked about their emotions about quitting smoking and emotions about smoking itself; five types of discrete emotions – proud, disgusted, angry, apprehensive, hopeful - were used. The results indicated that emotions about quitting smoking explain a substantial variance over and above all demographic and cognitive variables (Cappella, 2007). Cappella (2007) argued that independent and substantial effects of emotions in the IM showed that cognitive theories have downplayed the role of emotion. Therefore, he asserted that including emotions is important for the extension of the IM framework.

In addition, affect/emotion can influence proximal variables in the IM. In Cappella's (2007) study, the author measured emotion related to the target behavior. Other studies showed that affect/emotion related to a certain event or object can influence attitudes and, in doing so, might interact with cognition or influence each other. For example, Lee et al. (2005) explored the

effect of affect and cognition on public attitudes toward nanotechnology. A nationally representative telephone survey ( $N = 706$ ) revealed that affective variables, negative emotions, and trust in scientists were associated with both risk perception of and general attitudes toward nanotechnology. In addition, the interaction between cognition and affect—namely, knowledge about nanotechnology and negative emotion—was found for both dependent variables.

In this sense, it is clear that affect influence proximal variables in the IM. As stated, fear has rarely been used as a distinct concept in cancer communication research. Theories such as CFM (Nabi, 1999) posit that fear has an avoidance tendency but Champion et al. (2004) found that fear has a curvilinear relationship with mammography adherence. Thus, RQ2 was proposed.

*RQ4: How is cancer fear associated with attitude, norm or self-efficacy?*

*RQ5: How is cancer fear associated with intention to get screened for cancer?*

### **The Influence of Cancer Worry on Behavior Change**

In addition to cancer fear, the present study anticipates that cancer worry, the affective-cognitive condition, might influence proximal variables in the IM or directly influence screening intention. According to Hay et al. (2005), several theoretical hypotheses have explained the relation between cancer worry and cancer screening. Based on Leventhal's self-regulative systems model (also called dual process or parallel response model; Cameron, Leventhal, & Leventhal, ;1995; Diefenbach & Leventhal, 1996; Leventhal, 1970; Leventhal & Cameron, 1987), cancer worry increases cancer screening. In the framework of HBM (Janz & Becker, 1984), cancer worry can both facilitate and inhibit cancer screening. The cognitive-social health information processing model (Miller, Hurley, & Shoda, 1996) posits that affective processing has a curvilinear relationship with preventive behavior.

However, all these theoretical hypotheses are not specifically about cancer worry. None of the aforementioned theories conceptualize cancer worry as an affective-cognitive condition like the present study does. HBM and The extended parallel process model (EPPM; Witte, 1992) studies measure not worry, but risk perception, which consists of perceived susceptibility and perceived severity. As previous cancer literature has used worry, fear, and anxiety interchangeably (Consedine et al., 2004), there has been no clear explanation about the role of cancer worry, which is distinct from that of fear or risk perception. According to Consedine et al. (2004, p. 506), studies that reported a positive association between fear and cancer screening measured “undifferentiated fear or anxiety regarding getting cancer,” which is actually cancer worry. However, studies that measured fear of screening/screening outcomes yielded negative or mixed findings (for details, see Consedine et al., 2004). Thus, this study expects that pure cancer worry, which is distinct from cancer fear, would influence proximal variables in the IM or directly influence screening intention, as cancer worry is positively associated with cancer screening behaviors (Hay, McCaul, & Magnan, 2006). However, it is not clear whether the effect would be direct or indirect.

*RQ6: How is cancer worry associated with attitude, norm or self-efficacy?*

*RQ7: How is cancer worry associated with intention to get screened for cancer?*

### **The Influence of Risk Perception on Behavior Change**

Individuals with a high level of risk perception believe that he/she is likely to develop a disease, and this belief is associated with preventive intentions or behavior (Brewer et al., 2004a), based on HBM (Janz & Becker, 1984), protective motivation theory Rogers, 1975), EPPM (Witte,

1992, 1994), and the risk perception attitude Model (RPA, Rimal & Real, 2003). Risk perception has also been used in the cancer context, and a meta-analysis conducted by Katapodi et al. (2004) confirmed that breast cancer risk perception is positively related to the use of mammography. Even people in a high-risk group tend to underestimate their risk of getting cancer, and this tendency negatively influences cancer screening behavior (Katapodi, Dodd, Lee, & Facione, 2009).

However, the causal relationship between risk perception and health behavior has not been consistently found; thus Witte proposed EPPM, which postulates the role of self-efficacy as a moderator in the relationship between risk perception and health intention or behavior (Witte, 1992, 1994). In line with EPPM, RPA (Rimal & Real, 2003) also posits that efficacy belief moderates the relationship between risk perception and health behavior. The difference is that risk perception is conceptualized as an individual attribute in RPA, while EPPM sees it as an effect of the message (Rimal & Real, 2003). RPA suggests that some people are more responsive to persuasive health messages, and their personal characteristics have an impact on their responsiveness. In short, both EPPM and RPA posit that risk perception is an important predictor of behavior change, and its relationship with behavior change is moderated by self-efficacy.

However, in the IM, risk perception indirectly influences intention/behavior through proximal variables. Risk perception is situated among background distal variables such as demographics and media exposure. Thus, it could have an effect on attitude, norm, or self-efficacy. In addition, based on the established positive relationship between risk perception and cancer screening, the present study tests if risk perception directly influences screening intention. As empirical findings based on RPA have shown, risk perception is sometimes not associated

with intention or behavior (Rimal, Böse, Brown, Mkandawire, & Folda, 2009; Rimal & Juon, 2010). Therefore, it is not clear whether risk perception has direct or indirect effects in the IM framework, and the following research questions were posed.

*RQ8: How is cancer risk perception associated with attitude, norm or self-efficacy?*

*RQ9: How is cancer risk perception associated with intention to get screened for cancer?*

In addition, consistent with the IM framework, it is highly likely that attitude, norm, and self-efficacy are positively associated with screening intention. Based on the hypotheses presented so far, cancer fear, cancer worry, and cancer risk perception will serve as mediators between information use/avoidance and screening intention. However, it remains unclear whether those three affective, cognitive, and affective-cognitive variables will mediate the effects of cancer information use/avoidance on screening intention, or if they need other mediators—attitude, norm, and self-efficacy—to predict screening intention. Thus, the following research questions were posed:

*H10: Attitude toward cancer screening will be positively associated with screening intention.*

*H11: Norm about cancer screening will be positively associated with screening intention.*

*H12: Self-efficacy about cancer screening will be positively associated with screening intention.*

*RQ 10: Does cancer fear mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy, which is positively associated with screening intention?*

*RQ 11: Does cancer worry mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy, which is positively associated with screening intention?*

*RQ 12: Does cancer risk perception mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy, which is positively associated with screening intention?*

*RQ 13: Does cancer fear mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy, which is positively associated with screening intention?*

*RQ 14: Does cancer worry mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy, which is positively associated with screening intention?*

*RQ 15: Does cancer risk perception mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy, which is positively associated with screening intention?*

In summary, the present study posits that cancer information exposure—both seeking and scanning—would be positively associated with the cancer-related mental condition model which consists of affective, affective-cognitive, and cognitive factors, and asks if the mental condition model would predict proximal variables in the IM, or directly influence screening intention (see Figure 1). To test these hypotheses and research questions, two studies were conducted. Study 1 aimed to develop and validate the cancer-related mental condition model to clarify the distinction between cancer fear, cancer worry, and cancer risk perception. Study 1 also examined the relationship between each component and cancer information use/avoidance/screening intention, using cross-sectional data before testing the relationship in Study 2 using two-wave data. Based on the results of Study 1, Study 2 tested hypotheses and research questions via a two-wave study that was able to demonstrate causal relationships. Study 2 was done in the stomach cancer context in a Korean sample.

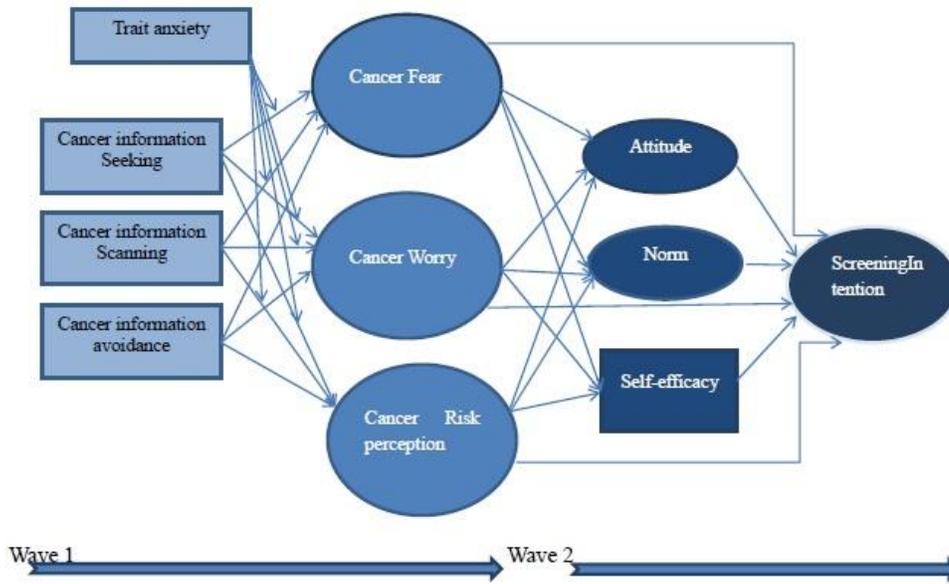


Figure 1. A hypothesized model.

## Chapter 5: Study 1

### Method

**Participants and procedures.** Two samples were used. Sample 1 consisted of U.S. college students ( $N = 309$ ) from a large public university. All participants were recruited from two introductory communication courses, and volunteered for this study in return for extra credit. A total of 433 students were invited, and 309 students completed the survey (participation rate of 71%) in November, 2013.

Sample 2 ( $N = 1,130$ ) participants were recruited by an online survey company in Korea. They participate in academic or commercial research in return for points that are exchanged for cash payments. Sample 2 participants took part in a two-wave survey. The research company sent emails including a link to the survey to 5,900 people, and 1,130 people completed the Wave 1 survey (participation rate of 19%) in February 2014. At Wave 2, which was conducted three months later, 813 people participated (giving a retention rate of 72%). To select participants, quota sampling that considered gender ratio and age group ratio in Korea was adopted. Participants in the two samples visited the online survey website, read a consent form, and completed a questionnaire.

Importantly, Sample 1 respondents were asked about cancer in general, and those in Sample 2 were asked about stomach cancer. Previous research has focused on prostate, breast, colon, and lung cancers, all prevalent in the U.S. Although decreasing in prevalence, stomach cancer is the third leading cause of cancer death in the world, and more than 50% of stomach cancer occurs in Eastern Asia (International Agency for Research on Cancer, 2013). In Korea, it is the most commonly diagnosed cancer in males and has the fourth-highest incidence rate in

females (National Cancer Center, 2012). Koreans in Sample 2 were restricted to those aged 40 or older, because stomach cancer screening (gastroscopy) is recommended for people over 40 (National Cancer Center, 2013).

For Study 1, Sample 1 and Sample 2 Wave 1 data were used. In other words, this study developed a model in the general cancer context using a specific population (i.e., undergraduates), and checked whether the model could be applied to a specific context using a more general population. For Study 2, Wave 1 and 2 data from Sample 2 were used. For descriptive statistics and response options, see Table 1.

**Measures.** For Sample 2, all items were translated into Korean. Only the cancer fear scale had a Korean version (Kim & Kim, 2006). For other scales, items were translated by the researcher and confirmed by another health communication researcher. Back-translation was then performed by two college students who know both languages.

***Cancer information exposure (only in Sample 2).*** Both information seeking and scanning were measured (Niederdeppe et al., 2007). Participants indicated how often, during the previous 12 months, they had actively sought information on stomach cancer (seeking) from nine sources: newspapers, magazines, television news, television health programs, online news, professional health-related websites, social network sites or online communities, family and friends, and healthcare professionals. In addition, they reported how often they had heard or come across information (scanning) from those nine sources. Items were adapted from Kelly et al. (2010).

Table 1

*Descriptive Statistics*

	<b>Sample 1 (N =309)</b>	<b>Sample 2-Wave1 (N = 1,130)</b>	<b>Sample 2-Wave 2 (N = 813)</b>
	<i>M(SD) or %</i>	<i>M(SD) or %</i>	<i>M(SD) or %</i>
Age	20.17(2.04)	51.92(8.21)	51.90(8.21)
Gender	58.6% female	49.8% female	48.2% female
Race/ethnicity	65% white	—	—
Employment	—	63% employed	64.3% employed
Marital status	—	84% married	83% married
Years of education <sup>a</sup>	—	14.70 years (2.31)	14.73 years (2.29)
Income (\$) <sup>b</sup>	\$ 113,035 (\$ 65,074)	\$ 56,400 (\$ 28,272)	\$ 54,863 (\$ 26,950)
Personal cancer history	1.6% “yes”	6.6% “yes”	6.3% “yes”
Family cancer history	80.6% “yes”	62.8% “yes”	63.1% “yes”
Health status <sup>c</sup>	3.50 (.88)	3.32(.65)	3.24(.67)
Current smoking	9.7% “yes”	23.4 “yes”	23.9% “yes”
Trait anxiety <sup>d</sup>	2.14(.46)	2.19(.43)	2.18(.43)
General fear <sup>e</sup>	3.33(.83)	—	—
Cancer fear <sup>f</sup>	3.14(.83)	3.08(.78)	3.09(.78)
Cancer fear –Reduced <sup>g</sup>	2.78(.91)	2.96(.87)	2.88(.85)
Cancer worry -Severity <sup>h</sup>	3.00(.64)	4.26(1.40)	4.01(1.46)

Table 1 (continued)

Cancer risk perception <sup>i</sup>	4.65(2.32)	5.09(2.25)	5.19(2.28)
	3.21(1.50)	3.54(1.36)	3.41(1.38)
	3.31(1.49)	3.45(1.26)	3.33(1.33)
	3.64(1.69)	3.46(1.39)	3.25(1.44)
Cancer info	—	1.93(1.54)	1.34(1.20)
Seeking <sup>j</sup>			
Cancer info	—	2.03(1.54)	1.36(1.21)
Scanning <sup>k</sup>			
Cancer information avoidance <sup>l</sup>	—	2.38(.68)	2.43(.67)
Attitude <sup>m</sup>	—	4.62(1.24)	4.58(1.20)
Norm <sup>n</sup>	—	2.87(.61)	2.87(.62)
Efficacy <sup>o</sup>	—	4.00(.97)	4.00(1.00)
Screening intention <sup>p</sup>	—	3.89(1.03)	3.90(1.04)

*Note.* Sample 1 is U.S college students. Sample 2 is Korean general population aged 40 or older. Sample answered questions about cancer in general. Sample 3 answered questions about stomach cancer. Multiple items were averaged.

- a. In Sample 2, the item was based on a six-point scale (1 = *elementary school* to 6 = *postgraduate*). Before the analysis, it was transformed into an interval variable, that is, the number of years required to obtain degree. For example, a high school graduate (= 3) was recoded as 12 (years).
- b. In Sample 1, based on a nine-point scale (1 = 0 to \$ 9,999 to 9 = \$200,000 or more). In Sample 2, monthly income was asked based on a nine-point scale (1 = 0 to \$999 to 9 = \$15,000 or more). Like education, the variable was transformed into the actual amount of money. For example, income range 1 was recoded as \$5,000 in Sample 1, the mean value in the range. Also, the monthly income in Sample 2 was converted into annual income.
- c. A single item based on a five-point scale (1 = *poor* to 5 = *excellent*).
- d. Twenty items based on a four-point scale (1 = *almost never* to 4 = *almost always*).
- e. Twenty two items based on a five-point scale (1 = *none* to 5 = *terrified*).
- f. Eight items based on a five-point scale (1 = *strongly disagree* to 5 = *strongly agree*)
- g. Four items that were used in the analyses.
- h. Four items based on a seven-point scale (1 = *not at all* to 7 = *very much*).
- i. Four items. The first one was based on ten-point scale (1 = 0% to 10 = 100%). The second was based on seven-point scale (1 = *almost 0* to 7 = *almost certain*). The third was based on a 7-point scale (1 = *much lower* to 7 = *much higher*). The fourth was based on a seven-point scale (1 = *strongly disagree* to 7 = *strongly agree*). As each item was measured on different scales, they were standardized when used in the analyses.

Table 1 (continued)

- j. Nine items based on a five-point scale (1 = *never* to 5 = *more than seven times*).
- k. Nine items based on a five-point scale (1 = *never* to 5 = *more than seven times*).
- l. Seven items based on a five-point scale (1 = *strongly disagree* to 5 = *strongly agree*).
- m. Four items based on a seven-point scale (1 = *extremely bad/unpleasant/difficult/harmful* to 7 = *extremely good/pleasant/easy/beneficial*)
- n. Three items. Injunctive norm was measured with one item based on a four-point scale (1 = *definitely should not* to 4 = *definitely should*). Descriptive norm was assessed with two items based on a four-point scale (1 = *none or very few* to 4 = *all or almost all*).
- o. A single item based on a five-point scale (1 = *very unsure* to 5 = *very sure*).
- p. Two items based on five-point scale (1 = *strongly disagree* to 5 = *strongly agree*).

The present study aimed to demonstrate the differential effects of seeking and scanning. However, the correlation between seeking and scanning was too high ( $r = .86$  at Wave 1 and  $.87$  at Wave 2). Thus, seeking and scanning were averaged.

***Cancer information avoidance (only in Sample 2).*** The tendency to avoid cancer information was assessed by items adapted from Miles et al. (2008). Miles et al. used five items that did not include the Internet and interpersonal communication. Thus, this study added one item related to the Internet, and two about interpersonal communication (family/friends and healthcare professionals). Also, the radio item was deleted because that medium was not included in seeking/scanning items. Finally, seven items were used: “I prefer not to think about cancer,” “I avoid reading things about cancer from newspapers or magazines/reading things about cancer on the Internet/ watching TV news or health programs about cancer/talking about cancer with family or friends/ talking about cancer with healthcare professionals,” and “I do not want any more information about cancer.” ( $\alpha = .91$  at Wave 1). Items were averaged.

***Cancer fear (in Sample 1 and Sample 2) and fear (only in Sample 1).*** In the cancer fear scale, “breast cancer” was replaced by cancer in general in Sample 1 ( $\alpha = .91$ ), and by stomach cancer in Sample 2 ( $\alpha = .93$  at Wave 1 and  $.93$  at Wave 2). General fear level was also measured to establish its difference from cancer fear (only in Sample 1). As the fear survey schedule II (FSS-II; Geer, 1965) is too lengthy (51 items), the 22-item reduced FSS-II (Hakeberg, Gustafsson, Berggren, & Carlsson, 1995) was adopted. Items asked how much fear participants have about things such as death, sharp objects, and the like ( $\alpha = .87$ ). FSS-II items were averaged.

**Cancer worry (in Sample 1 and Sample 2).** Jensen et al. (2010) previously demonstrated that cancer worry is only moderately correlated with dispositional worry. Thus, only cancer worry was measured by four items from the brief worry scale (Dijkstra & Brosschot, 2003) in both samples ( $\alpha = .87$  in Sample 1;  $\alpha = .92$  in Sample 2-wave 1 and  $.92$  in Sample 2-Wave 2).

**Cancer risk perception.** Four items were used from Dillard et al. (2012). As the items were based on different response options, all items were standardized ( $\alpha = .89$  in Sample 1;  $\alpha = .93$  in Sample 2-Wave 1 and  $.92$  in Sample 2-Wave 2). All items and cancer fear, cancer worry and cancer risk perception are presented in Table 2.

**Intention (only in Sample 2).** Screening intention was measured by two items, including “I am willing to/intend to get gastroscopy in the next two years.” The timeline was set to two years because this is the interval for gastroscopy recommended by the National Cancer Screening Program<sup>8</sup> in Korea ( $\alpha = .96$ ,  $r = .93$  at Wave 1 and  $\alpha = .97$ ,  $r = .94$  at Wave 2). Items were adapted from Busse et al. (2010).

**Control variables (In Sample 1 and Sample 2).** First, for demographic characteristics, participants’ age, gender, employment status, and marital status were included. Questions also included education level and monthly income. For comparison with Sample 1, monthly income in Sample 2 was converted into annual income. Second, health status, current smoking, and personal/family cancer history were adopted as health-related variables, because these were previously found to be associated with cancer worry, cancer risk perception, and cancer

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<sup>8</sup> Korea launched its National Cancer Screening Program in 1999. Recipients of the Korean version of Medicaid and those in the lower 50% of the National Health Insurance premium are screened without charge, and those in the upper 50% of the premium can receive cancer screening for a 10% out-of-pocket expense (National Cancer Center, 2013). Thus, Korean health policy makes it relatively easy to get screened for cancer.

information seeking (DiLorenzo et al., 2006; McQueen et al., 2008; Rutten, Squiers, & Hesse, 2006; Rutten, Blake, Hesse, Augustson, & Evans, 2011). Third, the state-trait anxiety inventory (STAI) was used (Spielberger, Gorsuch, & Lushene, 1970). Trait anxiety is correlated with worry (Borkovec, 1994) and risk perception (Butler & Mathews, 1987). Items were averaged ( $\alpha = .88$ ). All items are presented in Appendix.

Table 2

*Measures of Cancer Fear, Cancer Worry, and Cancer Risk Perception*

<b>Measure</b>	<b>Item</b>
Cancer fear	The thought of cancer scares me (CF1)
(CF)	When I think about cancer, I feel nervous (CF2)
	When I think about cancer, I get upset (CF3)
	When I think about cancer, I get depressed (CF4)
	When I think about cancer, I get jittery (CF5)
	When I think about cancer, my heart beats faster (CF6)
	When I think about cancer, I feel uneasy (CF7)
	When I think about cancer, I feel anxious (CF8)
Cancer	I am afraid of the physical consequences of getting cancer. (CW1)
worry (CW)	I worry about my health because of my chances of getting cancer. (CW2)
	I feel anxiety when I think of the possible consequences of getting cancer. (CW3)
	I brood about the physical consequences of getting cancer. (CW4)
Cancer risk	If I don't get screened, I think my chances of getting cancer sometime in my life are. . .
perception	(CRP1; Answered in numerical scale)
(CRP)	If I don't get screened, I think my chances of getting cancer sometime in my life are. . .
	(CRP2; answered in verbal scale)
	Compared to the average person your age, gender, and race, how would you rate your chances of developing cancer sometime in your life? (CRP3)
	If I don't get screened, I would feel very vulnerable to getting cancer sometime in my life (CRP4)

**Analytic Procedure.** For Study 1 that aimed to develop the cancer-related mental condition model, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was performed via *Mplus* 7.11. Scholars have recommended the development of a theory about underlying constructs via exploratory factor analysis (EFA) in a small sample, followed by confirmation of the results via confirmatory factor analysis (CFA) in a different, larger sample (Muthén & Muthén, 2009). Thus, a model was derived via EFA in Sample 1 (U.S. undergraduates), which was then tested in Sample 2-Wave 1 (Koreans) via CFA.

## Results

**Sample 1: Exploratory factor analysis.** EFA was conducted with *Mplus* 7.11. The maximum likelihood estimator with robust standard errors, which also accommodates missing data, was used (Muthén & Muthén, 2012). Along with the EFA, a parallel analysis<sup>9</sup> was performed. Parallel analysis is one of the best ways to determine the number of factors (Hayton, Allen, & Scarpello, 2004).

The results of the parallel analysis recommended retaining three factors. The first, second, and the third eigenvalues of the sample correlation matrix were greater than 95 percentile eigenvalues from the parallel analysis. However, the EFA showed an unacceptable model fit. A good model should have a root mean square error of approximation (RMSEA)  $\leq .06$ , a comparative fit index (CFI)  $\geq .95$ , and a standardized root mean square residual (SRMR)  $<$

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<sup>9</sup>Parallel analysis “involves the construction of a number of correlation matrices of random variables based on the same sample size and number of variables in the real data set. The average eigenvalues from the random correlation matrices are then compared to the eigenvalues from the real data correlation matrix, such that the first observed eigenvalue is compared to the first random eigenvalue, the second observed eigenvalue is compared to the second random eigenvalue, and so on. Factors corresponding to actual eigenvalues that are greater than the parallel average random eigenvalues should be retained” (Hayton et al., 2004, p. 194).

than .08 (Hu & Bentler, 1999). The results were  $\chi^2(75) = 346.51, p < .001, RMSEA = .108, CFI = .90,$  and  $SRMR = .04$ . The cancer fear items did not hang together, suggesting that some items are cognitively oriented (see Table 3).

To reduce the number of items in the cancer fear scale (only the cancer fear scale had eight items) and to make the scale represent more purely affective states, both theoretical and empirical aspects were considered. First, the factor loadings provided empirical evidence. CF2 and CF3 loaded most weakly on the cancer fear factor (.67 and .59, respectively), and CF1 and CF7 double-loaded on the cancer worry factor. CF1 loaded more highly on the cancer worry factor (see Table 3). Interestingly, these four were all reported as double-loaded items by Jensen et al. (2010). The authors also reported that CF1 loaded more highly on the cancer worry factor. This consistency suggests that those items are less purely affective.

Second, theoretically, the cancer fear scale measures both bodily states and feelings caused by fear of cancer. Omitting the above four items left CF4-6 and CF8, which equally represent both aspects of the scale: physiological arousal (CF 5 and CF6) and subjective experience (CF 4 and CF8). Third, the reduced four items had convergent and divergent validity. The reduced scale was almost the same as the original one ( $r = .94$ ). Both reduced and original scales were only moderately correlated with general fear (.39 and .35, respectively), and somewhat highly correlated with cancer worry (.55 and .46 respectively; see Table 4).

Finally, another EFA in Sample 1, with the reduced cancer fear and all cancer worry and cancer risk perception items, revealed a better fit:  $\chi^2(33) = 85.62, p < .001, RMSEA = .07, CFI = .97,$  and  $SRMR = .02$  (see Table 3). All cancer fear items highly loaded only on the cancer fear factor. Cancer risk perception items all loaded on the same factor, including items CRP3 and

CRP4 that were seen as affective by Dillard et al. (2012), thereby implying no need to delete one of the items. Thus, a tentative model was derived (see Figure 2).

Modification indices suggested several error term correlations. Error correlation can exist when items use similar language or appear near to each other (Bollen & Lennox, 1991; Rubio & Gillespie, 1995), but should be adopted with caution. The error correlation between CRP1 and CRP 2 can be justified, because they were measured by the same question. The difference was the response option: CRP1 was based on a numerical scale (*0% to 100%*), whereas CRP2 was on a verbal scale (*Almost zero to almost certain*). The error correlation between CW1 and CW2 was also suggested. Jensen et al. (2014) proposed error correlations between CW1 and CW2, and between CW1 and CW3, due to the use of similar language. Therefore, it was decided to allow for those two correlations in the subsequent analysis. However, error correlations between CF items were not adopted although suggested by the results. The cancer fear scale uses similar language in all items (i.e., When I think about cancer...), and thus there was no clear rationale to determine which error correlation should be allowed for.

Table 3

*Results of Exploratory Factor Analysis in Sample 1*

Item	First EFA			Second EFA (with a reduced CF scale)		
	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3
CF1	<b>.35*</b>	<b>.37*</b>	.01			
CF2	<b>.68*</b>	.20	-.07			
CF3	<b>.59*</b>	.10	.08			
CF4	<b>.73*</b>	.02	.02	<b>.65*</b>	.03	.12*
CF5	<b>.90*</b>	-.07	-.13	<b>.95*</b>	-.11	-.00
CF6	<b>.84*</b>	-.00	-.14	<b>.89*</b>	-.03	-.03
CF7	<b>.63*</b>	.20*	.03			
CF8	<b>.76*</b>	.08	.03	<b>.69*</b>	.09	.14*
CW1	.00	<b>.74*</b>	-.03	-.01	<b>.71*</b>	-.02
CW2	-.01	<b>.74*</b>	.19*	-.01	<b>.73*</b>	.19*
CW3	.16*	<b>.77*</b>	.03	.13*	<b>.78*</b>	.05
CW4	.19*	<b>.69*</b>	-.04	.20*	<b>.71*</b>	-.02
RP1	.10	-.04	<b>.93*</b>	.12	-.04	<b>.94*</b>
RP2	.02	.01	<b>.94*</b>	.04	.02	<b>.94*</b>
RP3	-.06	.06	<b>.70*</b>	-.04	.07	<b>.68*</b>
RP4	-.01	.08	<b>.69*</b>	-.02	.10	<b>.68*</b>
RMSEA		.11			.07	
CFI		.90			.97	
SRMR		.04			.02	

*Note.* Displayed values are geomin rotated loadings (\* significant at 5% level)

EFA = exploratory factor analysis, RMSEA = root mean square error of approximation CFI = a comparative fit index SRMR = the standardized root mean square residual

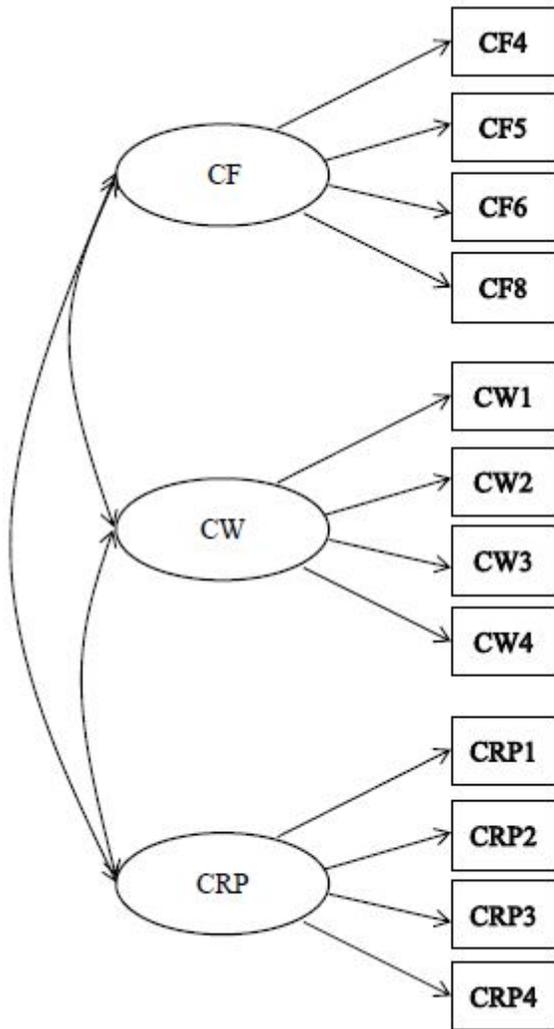
Table 4

*Bivariate Associations between Independent Variables and Dependent Variables in Sample 1 and Sample 2.*

Variable	1	2	3	4	5	6
1. CF	—					
2. Reduced CF	.97*** (.94***)	—				
3. CW	.56*** (.55***)	.53*** (.46***)	—			
4. CRP	.26*** (.28***)	.27*** (.21***)	.46*** (.45***)	—		
5. Ex	.21***	.21***	.25***	.26***	—	
6. Avoidance	.11***	.12***	-.11***	-.12***	-.18***	—
7. Intention	.13***	.10**	.31***	.31***	.20***	-.29***

*Note.* Numbers in parentheses are the results from Sample 1.

CF = cancer fear, CW = cancer worry, CRP = cancer risk perception, EX = cancer information exposure, Avoidance = cancer information avoidance, Intention = screening intention



*Figure 2.* A three-factor cancer-related mental condition model. CF = cancer fear; CW = cancer worry; CRP = cancer risk perception.

**Sample 2: Confirmatory factor Analysis.** Finally, CFA of Sample 2 revealed an acceptable model fit:  $\chi^2(51) = 354.75, p < .001, RMSEA = .07, CFI = .96,$  and  $SRMR = .03$ . Consistent with previous analyses, the error term correlations between CRP1 and CRP2 and between CW1 and CW3 were suggested. Because the pattern was consistent with Sample 1 and the previous study (Jensen et al., 2014), two error correlations were allowed for. As a result, the model showed an excellent fit:  $\chi^2(49) = 228.73, p < .001, RMSEA = .05, CFI = .97,$  and  $SRMR = .03$ . It was demonstrated that each three factor is distinct from one another.

**Predictive validity.** Next, Study 1 tested the predictive validity of the model using Sample 2-Wave 1 data before testing it with a two-wave data in Study 2. Specifically, the cancer-related mental condition model's relationship with information use/information avoidance which will be used as independent variables in Study 2, and with screening intention which will be used as a dependent variables in Study 2 was tested via SEM with *Mplus7.11*.

First, a full measurement model, including all latent variables, was tested by confirmatory factor analysis. The resulting model had an excellent fit:  $\chi^2(177) = 576.15, p < .001, RMSEA = .045, CFI = .97,$  and  $SRMR = .03$ . Next, the model's relationship with cancer information use, cancer information avoidance, and screening intention was tested simultaneously. In order to produce a simple model, among the control variables, only those showing a significant correlation with each dependent variable in the current data were included. Therefore, age, marital status, income, personal and family cancer history, and trait anxiety were used as controls for cancer information use (Rutten et al., 2006; Kelly et al., 2010). For cancer information avoidance, family cancer history, current smoking, and trait anxiety were included as controls (Barbour et al., 2012; Case et al., 2005). Marital status, monthly income, and family

cancer history were included as controls for screening intention (Beydoun & Beydoun, 2008; Kelly et al., 2010; Nguyen, McPhee, Nguyen, Lam, & Mock, 2002).

The model had an excellent fit:  $\chi^2(338) = 937.43, p < .001, RMSEA = .040, CFI = .97,$  and  $SRMR = .04$ . In the stomach cancer context, cancer fear and cancer information exposure had a positive relationship. However, cancer fear was also positively linked to information avoidance. Cancer worry and cancer risk perception were positively associated with information exposure, but negatively related to cancer information avoidance. In addition, a negative relationship between cancer fear and screening intention was detected, whereas cancer worry and cancer risk perception were positively associated with screening intention (see Figure 3).

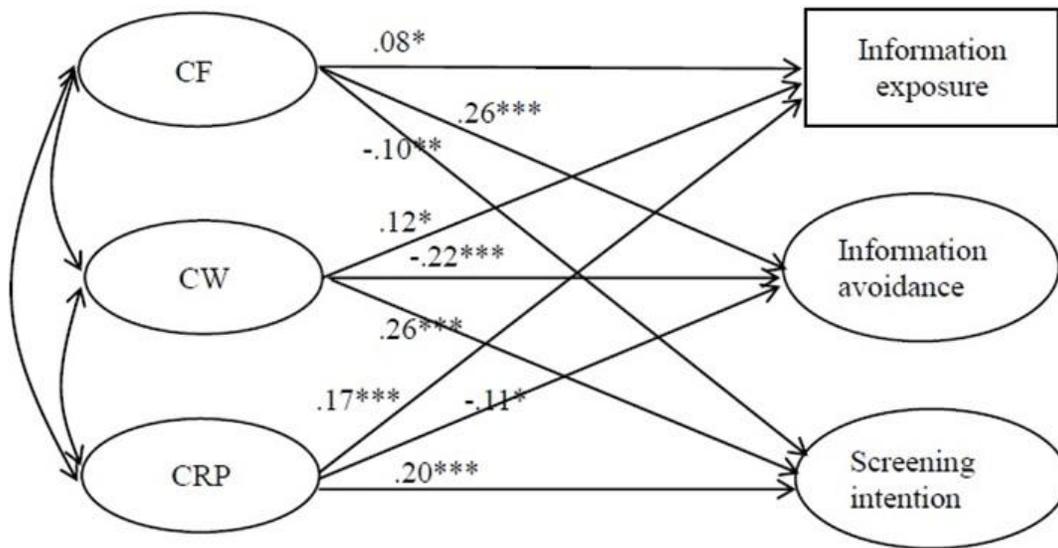


Figure 3. The relationship between cancer-related mental condition model and cancer information use/cancer information avoidance/screening intention in the stomach cancer context. This analysis was conducted using cross-sectional data (Sample2\_Wave1). Control variables are included in the analysis but not in the figure. Displayed values are standardized estimates. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

## **Discussion**

Previous studies have not distinguished cancer fear from cancer worry. Study 1 demonstrated two constructs are different. Specifically, cancer fear, cancer worry, and cancer risk perception are all distinct, and the three constructs are only moderately correlated with one another (divergent validity). Each construct's relationships with cancer communication and prevention variables revealed different patterns (predictive validity). The finding suggests that health communication researchers should clearly conceptualize and operationalize cancer-related affect and cognition to find their effects on cancer communication and prevention.

The most interesting finding of this study was the role of cancer fear. In the bivariate analysis, cancer fear was positively correlated to screening intention. However, when cognitive mental conditions (i.e., cancer worry and cancer risk perception) are controlled for in the multivariate analysis, it was negatively related to screening intention. Thus, the results suggest that fear of cancer as a purely affective state might play a negative role in cancer prevention; this will be tested using two-wave data in Study 2.

It was also interesting to learn that cancer fear is positively associated with both cancer information exposure and cancer information avoidance. In the bivariate associations, cancer fear's positive relationship with information exposure was stronger than its relationship with avoidance. However, when cancer worry and cancer risk perception were considered together in the multivariate analysis, cancer fear's relationship with avoidance was stronger than its relationship with information use. Again, the finding suggests that a purely emotional response to the threat of cancer causes negative outcomes in health communication.

In summary, Study 1 developed and validated the cancer-related mental condition model consisting of three factors (cancer fear, cancer worry, and cancer risk perception), and demonstrated the model's relationship with cancer-related variables. Study 2 will explore if the model can serve as a psychological mechanism through which cancer information use/avoidance influence cancer screening intention with a two-wave data.

## Chapter 6: Study 2

### Method

**Participants and procedures.** Sample 2 (Korean) Wave 1 and Wave 2 data were used. For descriptive statistics, see Table 1.

**Measures.** All variables used in Study 1 were adopted. In addition, proximal variables in the IM (attitude, norm, and self-efficacy) were added.

**Attitude.** Attitude was assessed by asking “Getting gastroscopy for stomach cancer prevention in the next two years would be...” which was followed by semantic differentials (four items), “bad–good,” “unpleasant–pleasant,” “difficult–easy,” and “harmful–beneficial” ( $\alpha = .87$  at Wave 1 and  $.87$  at Wave 2).

**Norm.** Norm was assessed by three items. As for injunctive norm, participants reported the degree to which they think people important to them would want them to undergo gastroscopy for stomach cancer prevention in two years. Descriptive norm was measured by the following two questions: “How many of the people who are most similar to you got at least one cancer screening in the past ten years?” and “How many of the people who are most similar to you will get screened for cancer in the next 12 months?” ( $\alpha = .76$  at Wave 1 and  $.81$  at Wave 2).

**Self-efficacy.** Self-efficacy was assessed by a single item asking how sure participants were that they could get gastroscopy in the next two years if they want to.

**Analytic procedures.** For Study 2 which aimed to test hypotheses and research questions, SEM was performed via *Mplus* 7.11. This is because the present study requires the test of mediation involving latent variables. To more precisely explore complex relationships among variables including mediation, SEM is recommended (Holbert & Stephenson, 2003). SEM

isolates measurement errors and provides a better understanding of communication as a process (Holbert & Stephenson, 2002; Holbert & Stephenson, 2003; Stephenson, Holbert, & Zimmerman, 2006).

Currently, two strategies that do not assume the normality of the indirect effect are regarded as the best methods to test mediation: the distribution of products approach and bootstrapping (Hayes, 2009). The distribution of products approach is also referred to as the empirical M test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004). This test is based on the distribution of the product of two normally distributed variables (Mackinnon et al., 2004) and acknowledges that the distribution of the products can be skewed (Preacher & Hayes, 2008). Holbert and Stephenson (2003) argued that this approach performs best among various methods to test the indirect effect. MacKinnon, Fritz, Williams, and Lockwood (2007) introduced a program called PRODCLIN, which provides asymmetric confidence intervals based on the distribution of the product approach. This method can be used even when the raw data are not available (MacKinnon et al., 2007). However, PRODCLIN has some limitations in that it cannot be run on popular statistical packages. Also, it makes errors when computing mediated effects with certain means and standard errors or when two coefficients are correlated (Tofighi & MacKinnon, 2011). More recently, Tofighi and MacKinnon (2011) introduced RMediation, which is based on the same method as PRODICLIN, but an updated version that corrects aforementioned errors in PRODCLIN. RMediation provides percentiles, quantiles, and the plot of the distribution and confidence intervals for the mediated effect, and especially recommended when the sample size is small (Tofighi & MacKinnon, 2011).

However, many scholars have recommended the use of bootstrapping as the best method for testing mediation (Bollen & Stine, 1990; Hayes, 2009; MacKinnon et al., 2004; Shrout & Bolger, 2002; Williams & MacKinnon, 2008). Bootstrapping generates a pseudo sample that is of equal size to the original dataset by randomly sampling observations. From the bootstrapped sample, the indirect effect is estimated and saved. The process is repeated a number of times, and the distribution of the estimates and its confidence interval are examined. If the confidence interval does not contain zero, the indirect effect is statistically different from zero (Shrout & Bolger, 2002). Bootstrapping can be used when sample sizes are relatively small (20 to 80; Efron & Tibshirani, 1993). Bootstrapping directly estimates the indirect effect itself, but does not assume the normality of the indirect effect. Moreover, it is a general approach that can be used in any type of mediation model (Hayes, 2009). Bootstrapping can be performed in most statistical packages, including SPSS, SAS, AMOS, and M-plus. For these reasons, the present study tested the hypothesized model via SEM with bootstrapping.

## **Results**

The hypothesized model was tested via SEM with bootstrapping. As previously stated, due to the high correlation between cancer information seeking and scanning, seeking and scanning were averaged. Thus, the model in Figure 1 has changed, like Figure 5 (See Figure 5).

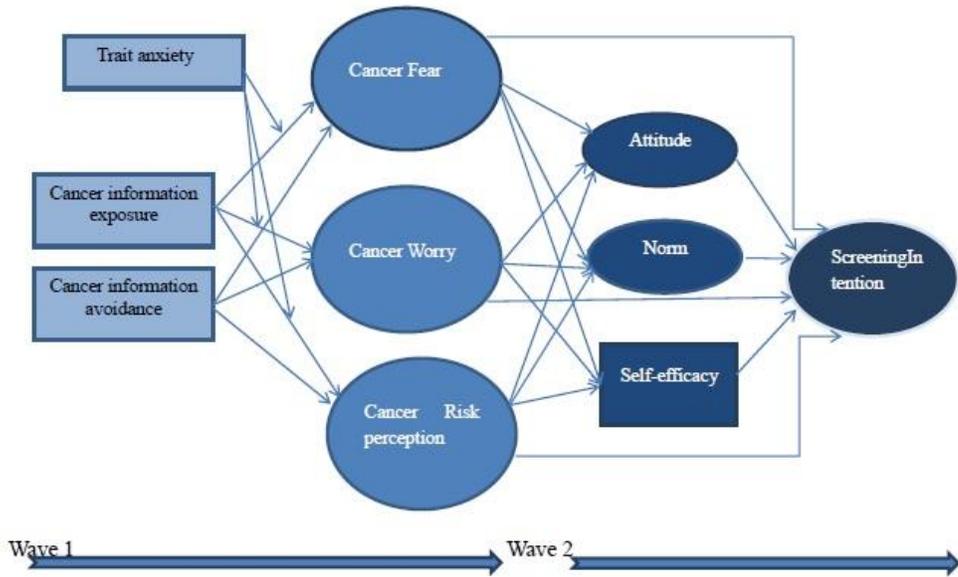


Figure 4. The revised model.

To recap, this study advanced 12 hypotheses and 15 research questions. H1 predicted a positive association between cancer information exposure and cancer fear. RQ1 asked how cancer information avoidance is associated with cancer fear. H2 expected a positive association between exposure to cancer information from television/the Internet and cancer fear.

H3 predicted a positive association between cancer information exposure and cancer worry. RQ2 asked how cancer information avoidance is associated with cancer worry. H4 predicted a positive association between the exposure to cancer information from the Internet and cancer worry.

H5 anticipated a positive association between cancer information exposure and cancer risk perception. RQ3 asked about the relationship between cancer information avoidance and cancer risk perception. H6 predicted a positive association between exposure to cancer information from interpersonal communication and cancer risk perception.

H7 through H9 were about the moderating role of trait anxiety on the relationship between cancer information exposure and cancer fear (H7), cancer worry (H8), and cancer risk perception (H9). RQ6 through RQ11 asked about the relationship between cancer fear and attitude/norm/self-efficacy (RQ4), between cancer fear and screening intention (RQ5), between cancer worry and attitude/norm/self-efficacy (RQ6), between cancer worry and screening intention (RQ7), between cancer risk perception and attitude/norm/self-efficacy (RQ8), and between cancer risk perception and screening intention (RQ9).

H10 through H12 were about the positive relationship between attitude and screening intention (H10), between norm and screening intention (H11), and between self-efficacy and screening intention (H12). Finally, RQ10 through RQ12 asked whether cancer fear (RQ10),

cancer worry (RQ11), and cancer risk perception (RQ12) serve as mediators between cancer information exposure and screening intention, or between cancer information exposure and attitude/norm/self-efficacy. Similarly, RQ 13 through RQ 15 asked if cancer fear (RQ13), cancer worry (RQ14), and cancer risk perception (RQ15) serve as mediators between cancer information avoidance and screening intention, or between cancer information exposure and attitude/norm/self-efficacy.

First, a full measurement model with all latent variables was tested by confirmatory factor analysis. The full information maximum likelihood method was adopted to address missing data at Wave 2 (Graham, 2009). Because *Mplus* does not allow the use of bootstrapping with the maximum likelihood estimator with robust standard errors, the maximum likelihood estimator was adopted. A preliminary analysis on the normality of data showed that the skewness and kurtosis of all variables in the data did not exceed the absolute value of 2. Curran, West, and Finch (1996) proposed that skewness over 2 and kurtosis over 7 means that the data are severely non-normally distributed. Only personal cancer history had a problematic non-normality, but as will be shown later, this variable was not included in the analysis because it was not related to any other variable.

The error term correlations that were confirmed in Study 1 and a previous study (Jensen et al., 2014) were included. In addition, error correlation between two items in the descriptive norm was allowed for, because the two items have almost the same wording, and modification indices showed that errors of these two items are highly correlated. The items were: “How many of the people who are most similar to you got at least one cancer screening in the past 10 years?”, and “How many of the people who are most similar to you will get screened for cancer in the

next 12 months?” The model fit the data perfectly:  $\chi^2 (356) = 1060.23, p < .001, RMSEA = .042, CFI = .972,$  and  $SRMR = .049$ . Bivariate correlations between all primary variables are presented in Table 5.

Next, the whole model was tested via SEM with bootstrapping. For cancer information exposure/avoidance and cancer fear/cancer worry/cancer risk perception, Wave 1 data were used. For IM variables, Wave 2 data were used. Therefore the present study cannot establish a causal relationship between information exposure and the cancer-related mental condition model. However, the causal relationship between information-related affect/cognition and IM variables could be demonstrated. IM variables at Wave 1 were controlled for. Again, the model showed an excellent fit:  $\chi^2 (636) = 1947.43, p < .001, RMSEA = .043, CFI = .95,$  and  $SRMR = .08$ .

To summarize the results, cancer information exposure was positively associated with cancer fear, cancer worry, and cancer risk perception. H1, H3, and H5 were supported. Cancer information avoidance was positively correlated with cancer fear, but negatively correlated with cancer worry and cancer risk perception (RQ1, RQ2, and RQ3). Regarding the moderating role of trait anxiety, none of the three hypotheses (H7, H8, H9) was supported. Cancer fear at Wave 1 did not predict attitude, norm, or self-efficacy at Wave 2 (RQ4), but predicted screening intention at Wave 2 (RQ5), and the relationship was negative. Thus, it was demonstrated that cancer fear at Wave 1 reduced screening intention at Wave 2. Similarly, cancer worry at Wave 1 did not influence attitude, norm, and self-efficacy at Wave 2 (RQ6). Cancer worry at Wave 1 predicted screening intention at Wave 2 directly (RQ7), and the relationship was positive. Cancer risk perception influenced norm at Wave 2 (RQ8), but did not directly affect screening intention (RQ9). Attitude, norm, and self-efficacy at Wave 2 were all positively associated with screening

intention, consistent with the IM, supporting H10, H11, and H12.

Bootstrapped confidence intervals (at the .05 level with 1,000 resamples) were examined to check the indirect effect. If the confidence interval does not contain zero, it indicates a significant indirect effect. The results showed that the path from information use via cancer fear to attitude/norm/efficacy was not significant, but that cancer fear mediated the effects of cancer information exposure on screening intention: information exposure → cancer fear → screening intention (RQ10). The path from information exposure → cancer worry → screening intention was significant (RQ11). Also, the path from information exposure → cancer risk perception → norm → screening intention was significant (RQ12). Regarding RQ 13 through RQ 15, the path from information avoidance → cancer fear → screening intention (RQ13), information avoidance → cancer worry → screening intention (RQ14), and information avoidance → cancer risk perception → norm → screening intention (RQ15) were all significant. The confidence intervals are presented in Table 6.

Table 5

*Bivariate Correlations between Variables in Study 2*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Ex_1	1											
2. Avo_1	-.18***	1										
3. CF_1	.21***	.11***	1									
4. CW_1	.25***	-.11***	.56***	1								
5. CRP_1	.26***	-.12***	.26***	.46***	1							
6. Att_1	.18***	-.17***	.07*	.17***	.18***	1						
7. Norm_1	.26***	-.24***	.14**	.26***	.26***	.38***	1					
8. Effi_1	.21***	-.27***	.06*	.23***	.24***	.41***	.61***	1				
9. Intent_1	.20***	-.29***	.13***	.31***	.31***	.46***	.63***	.70***	1			
10. Att_2	.05	-.12***	.09**	.12**	.14***	.48***	.26***	.32***	.38***	1		
11. Norm_2	.14***	-.19***	.17***	.22***	.26***	.32***	.50***	.40***	.44***	.36***	1	
12. Effi_2	.16***	-.21***	.15***	.22***	.20***	.39***	.47***	.56***	.57***	.44***	.59***	1
13. Intent_2	.16***	-.26***	.14***	.29***	.28***	.43***	.51***	.59***	.70***	.50***	.58***	.74***

Table 5 (Continued)

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

1. EX\_1 = Cancer information exposure at Wave 1
2. Avo\_1 = cancer information avoidance at Wave 1
3. CF\_1 = cancer fear at Wave 1
4. CW\_1 = cancer worry at Wave 1
5. CRP\_1 = cancer risk perception at Wave 1
6. Att\_1 = attitude toward cancer screening at Wave 1
7. Norm\_1 = Norm about cancer screening at Wave 1
8. Effi\_1 = self-efficacy about cancer screening at Wave 1
9. Intent\_1 = intention to get screened for cancer at Wave 1
10. Att\_2 = attitude toward cancer screening at Wave 2
11. Norm\_2 = Norm about cancer screening at Wave 2
12. Effi\_2 = self-efficacy about cancer screening at Wave 2
13. Intent\_2 = intention to get screened for cancer at Wave 2

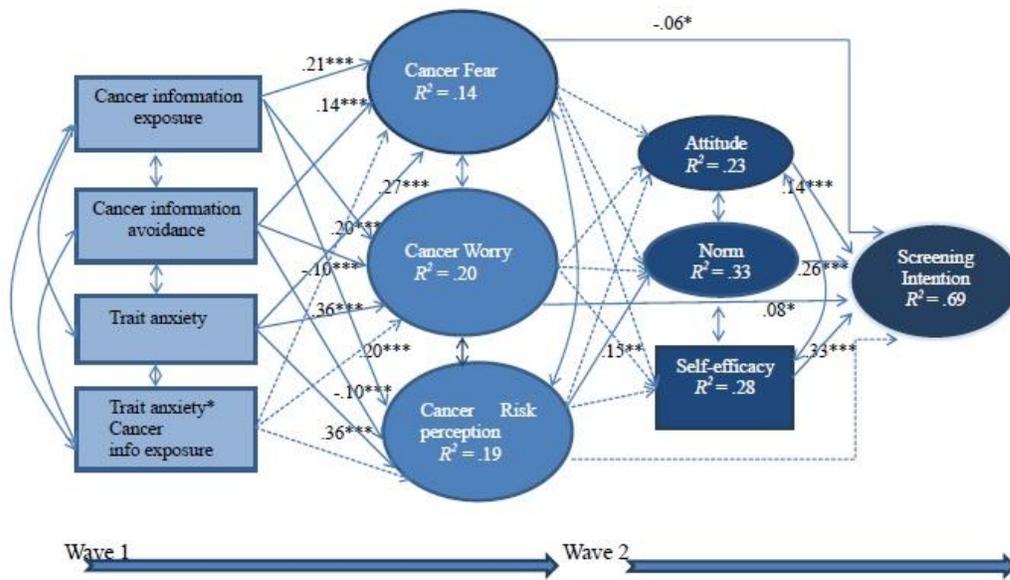


Figure 5. Results of Study 2 (Information exposure as an independent variable).  $*** p < .001$ ,  $** p < .01$ ,  $* p < .05$ .  $\longrightarrow$  significant,  $\cdots\cdots\longrightarrow$  Not significant.

For visual clarity, covariances/residual covariances between constructs are presented below, not in the figure.

Information use with information avoidance:  $-.18^{***}$

Information use with trait anxiety:  $.11^{***}$

Information use with trait anxiety\*information use:  $.03$

Information avoidance with trait anxiety:  $.07^*$ , Information avoidance with trait anxiety\*information use:  $.08^*$

Trait anxiety with trait anxiety\*information use:  $.08^{**}$

Cancer fear with cancer worry:  $.52^{***}$

Cancer worry with cancer risk perception:  $.42^{***}$

Cancer risk perception with cancer fear:  $.19^{***}$

Attitude\_W2 with Self-efficacy\_W2:  $.28^{***}$

Attitude\_W2 with norm\_W2:  $.31^{***}$

Norm\_W2 with self-efficacy\_W2:  $.58^{***}$

Table 6

*Bootstrapped Confidence Interval*

<b>Effects from cancer information exposure to screening intention in the stomach cancer context</b>	<b>95% Confidence Interval (1000 bootstrap samples)</b>
<b>Info → CF → Intention</b>	<b>-.027, -.001</b>
<b>Info → CW → Intention</b>	<b>.001, .030</b>
Info → CRP → Intention	-.016, .005
Info → CF → Efficacy → Intention	-.001, .011
Info → CW → Efficacy → Intention	-.002, .010
Info → CRP → Efficacy → Intention	-.004, .006
Info → CF → Norm → Intention	-.002, .010
Info → CW → Norm → Intention	-.003, .011
<b>Info → CRP → Norm → Intention</b>	<b>.003, .015</b>
Info → CF → Attitude → Intention	-.001, .005
Info → CW → Attitude → Intention	-.003, .003
Info → CRP → Attitude → Intention	-.001, .004
<b>Avoidance → CF → Intention</b>	<b>-.027, -.001</b>
<b>Avoidance → CW → Intention</b>	<b>-.030, -.001</b>
Avoidance → CRP → Intention	-.004, .017
Avoidance → CF → Efficacy → Intention	-.001, .013
Avoidance → CW → Efficacy → Intention	-.009, .001
Avoidance → CRP → Efficacy → Intention	-.006, .003

Table 6 (Continued).

Avoidance → CF → Norm → Intention	-.002, .012
Avoidance → CW → Norm → Intention	-.009, .002
<b>Avoidance → CRP → Norm → Intention</b>	<b>-.016, .002</b>
Avoidance → CF → Attitude → Intention	-.001, .005
Avoidance → CW → Attitude → Intention	-.002, .002
Avoidance → CRP → Attitude → Intention	-.005, .001

---

*Note.* Info = cancer information exposure, CF = cancer fear, CW = cancer worry, CRP = cancer risk perception. Avoidance = cancer information avoidance

Another model for medium-specific results was tested. Instead of overall cancer information exposure, cancer information exposure from print media (newspapers and magazines, averaged), television (television news and shows, averaged), the Internet (professional health-related websites, social media, and online news, averaged), and interpersonal communication (lay people and healthcare professionals, averaged) at Wave 1 were used as independent variables. As this analysis aimed to show the effects of specific medium exposure, information avoidance was not included in the analysis.

The model showed a nearly excellent fit:  $\chi^2(657) = 1976.83, p < .001, RMSEA = .042, CFI = .95,$  and  $SRMR = .81$ . Cancer fear was positively associated with interpersonal communication. Cancer worry was positively related to television exposure. Cancer risk perception was positively associated with television and print media. Thus, H2, which predicted a positive association between television/the Internet and cancer fear, was not supported. H4, which was about a positive association between the Internet and cancer worry, was not supported. H6, which expected a positive relationship between interpersonal communication and cancer risk perception, was not supported (see Figure 6).

Additionally, mediation tests were performed to see whether each medium exposure at Wave 1 leads to screening intention at Wave 2. The results indicated that the television exposure at Wave 1 indirectly predicted screening intention at Wave 2 through cancer worry: television  $\rightarrow$  cancer worry  $\rightarrow$  intention. Also, the use of print media at Wave 1 indirectly predicted screening intention at Wave 2 through both cancer risk perception and norm: print media  $\rightarrow$  cancer risk perception  $\rightarrow$  norm  $\rightarrow$  intention. For the bootstrapped confidence interval, see Table 7. Table 8 presents the summary of findings with all hypotheses and research questions.

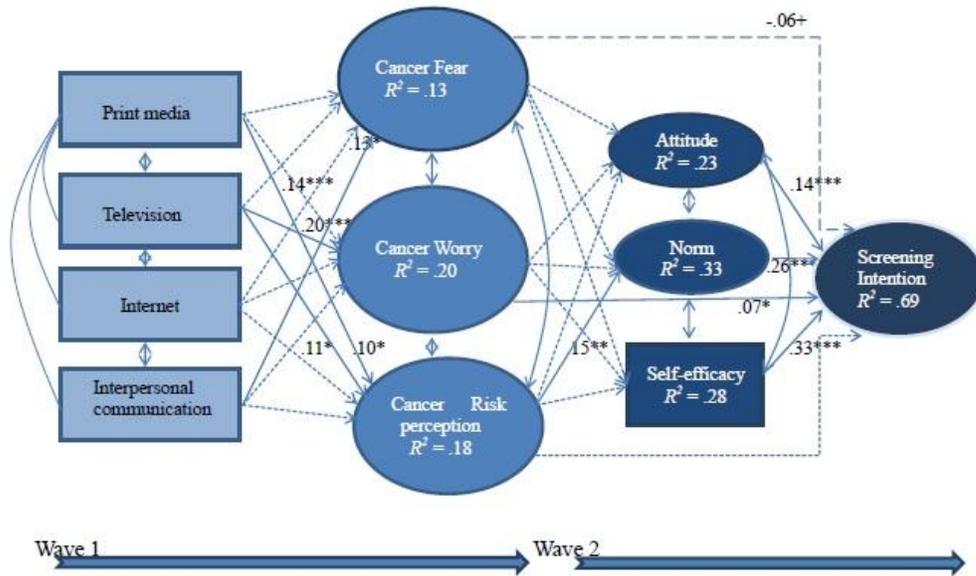


Figure 6. Results of Study 2 (Medium-specific analysis). \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ , +  $p = .05$ . —————> Significant, .....> Not significant, - - - ->  $p = .05$ .

For visual clarity, covariance/residual covariance between constructs are presented below, not in the figure.

- Print media with TV: .67\*\*\*
- Print media with the Internet: .67\*\*\*
- Print media with interpersonal communication: .64\*\*\*
- TV with the Internet: .71\*\*\*
- TV with interpersonal communication: .69\*\*\*
- The Internet with interpersonal communication: .70\*\*\*
- Cancer fear with cancer worry: .49\*\*\*
- Cancer worry with cancer risk perception: .42\*\*\*
- Cancer risk perception with cancer fear: .16\*\*\*
- Attitude with norm: .31\*\*\*
- Norm with self-efficacy: .58\*\*\*
- Attitude with self-efficacy: .28\*\*\*

Table 7

Bootstrapped Confidence Interval for the Medium-specific Analysis

<b>Effects from each medium to screening intention in the stomach cancer context</b>	<b>95% Confidence Interval (1000 bootstrap samples)</b>
<i>From print media to intention</i>	
Print media → CF → Intention	-.006, .002
Print media → CW → Intention	-.002, .008
Print media → CRP → Intention	-.007, .001
Print media → CF → Self-efficacy → Intention	-.001, .002
Print media → CW → Self-efficacy → Intention	.000, .003
Print media → CRP → Self-efficacy → Intention	-.001, .002
Print media → CF → Norm → Intention	.000, .002
Print media → CW → Norm → Intention	.000, .003
<b>Print media → CRP → Norm → Intention</b>	<b>.001, .007</b>
Print media → CF → Attitude → Intention	.000, .001
Print media → CW → Attitude → Intention	-.001, .000
Print media → CRP → Attitude → Intention	.000, .002
<i>From television to intention</i>	
Television → CF → Intention	-.008, .000
<b>Television → CW → Intention</b>	<b>.001, .015</b>
Television → CRP → Intention	-.007, .001
Television → CF → Self-efficacy → Intention	.000, .003

Table 7 (Continued)

Television → CW → Self-efficacy → Intention	-0.001, .005
Television → CRP → Self-efficacy → Intention	-0.001, .002
Television → CF → Norm → Intention	.000, .003
Television → CW → Norm → Intention	-0.002, .005
Television → CRP → Norm → Intention	.000, .006
Television → CF → Attitude → Intention	.000, .002
Television → CW → Attitude → Intention	-0.002, .001
Television → CRP → Attitude → Intention	.000, .002

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***From the Internet to intention***

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Internet → CF → Intention	-0.002, .005
Internet → CW → Intention	-0.008, .001
Internet → CRP → Intention	-0.002, .002
Internet → CF → Self-efficacy → Intention	-0.002, .001
Internet → CW → Self-efficacy → Intention	-0.003, .000
Internet → CRP → Self-efficacy → Intention	-0.001, .002
Internet → CF → Norm → Intention	-0.003, .000
Internet → CW → Norm → Intention	-0.003, .000
Internet → CRP → Norm → Intention	-0.002, .002
Internet → CF → Attitude → Intention	-0.001, .000
Internet → CW → Attitude → Intention	.000, .001
Internet → CRP → Attitude → Intention	-0.001, .001

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Table 7 (Continued)

*From interpersonal communication to intention*

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IC → CF → Intention	-0.011, .000
IC → CW → Intention	.000, .012
IC → CRP → Intention	-.006, .001
IC → CF → Self-efficacy → Intention	.000, .005
IC → CW → Self-efficacy → Intention	.000, .003
IC → CRP → Self-efficacy → Intention	-.001, .002
IC → CF → Norm → Intention	.000, .005
IC → CW → Norm → Intention	-.001, .004
IC → CRP → Norm → Intention	.000, .005
IC → CF → Attitude → Intention	.000, .002
IC → CW → Attitude → Intention	-.001, .001
IC → CRP → Attitude → Intention	.000, .001

---

*Note.* CF = cancer fear, CW = cancer worry, CRP = cancer risk perception, IC = interpersonal communication

Table 8

Summary of Results with Hypotheses and Research Questions

Hypotheses and Research questions	Results
H1: Cancer information exposure will be positively associated with cancer fear.	Supported
RQ1: How is cancer information avoidance associated with cancer fear?	A positive association
H2: Exposure to cancer information from television or the Internet will be positively associated with cancer fear.	Not supported. Cancer fear was positively associated with interpersonal communication.
H3: Cancer information exposure will be positively associated with cancer worry.	Supported
RQ2: How is cancer information avoidance associated with cancer worry?	A negative association
H4: Exposure to cancer information from the Internet will be positively associated with cancer worry.	Not supported. Cancer worry was positively associated with television.
H5: Cancer information exposure will be positively associated with cancer risk perception.	Supported
RQ3: How is cancer information avoidance associated with cancer risk perception?	A negative association
H6: Exposure to cancer information from interpersonal communication will be positively associated with cancer risk perception.	Not supported. Cancer risk perception was positively associated with television and print media.
H7: Trait anxiety will moderate the association between cancer information exposure and cancer fear.	Not supported
H8: Trait anxiety will moderate the association between cancer information exposure and cancer worry.	Not supported

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Table 8 (Continued)

H9: Trait anxiety will moderate the association between cancer information exposure and cancer risk perception.	Not supported
RQ4: How is cancer fear associated with attitude, norm or self-efficacy?	Not associated
RQ5: How is cancer fear associated with intention to get screened for cancer?	A negative association
RQ6: How is cancer worry associated with attitude, norm or self-efficacy?	Not associated
RQ7: How is cancer worry associated with intention to get screened for cancer?	A positive association
RQ8: How is cancer risk perception associated with attitude, norm or self-efficacy?	Cancer risk perception is positively associated with norm, but not with attitude or efficacy.
RQ9: How is cancer risk perception associated with intention to get screened for cancer?	Not associated
H10: Attitude toward cancer screening will be positively associated with screening intention.	Supported
H11: Norm about cancer screening will be positively associated with screening intention.	Supported
H12: Self-efficacy about cancer screening will be positively associated with screening intention.	Supported
RQ 10: Does cancer fear mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy which is positively associated with screening intention?	Information use → cancer fear → screening intention was significant.

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Table 8 (Continued)

RQ 11: Does cancer worry mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy which is positively associated with screening intention?	Information use → cancer worry → screening intention was significant. In the medium-specific analysis, television → cancer worry → Intention
RQ 12: Does cancer risk perception mediate the effect of cancer information exposure on screening intention? Otherwise, does it mediate the effect of cancer information exposure on attitude/norm/self-efficacy which is positively associated with screening intention?	Information use → cancer risk perception → norm→screening intention was significant. In the medium-specific analysis, print media → cancer risk perception → Norm → Intention.
RQ13: Does cancer fear mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy which is positively associated with screening intention?	Information avoidance → cancer fear → screening intention was significant.
RQ14: Does cancer worry mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy which is positively associated with screening intention?	Information avoidance → cancer worry → screening intention was significant.
RQ15: Does cancer risk perception mediate the effect of cancer information avoidance on screening intention? Otherwise, does it mediate the effect of cancer information avoidance on attitude/norm/self-efficacy which is positively associated with screening intention?	Information avoidance → cancer risk perception → norm→screening intention was significant.

## **Discussion**

**Cancer information exposure and cancer information avoidance.** Cancer information exposure was positively associated with cancer fear, cancer worry, and cancer risk perception to a similar extent. Previous studies have not investigated the associations between information exposure and cancer fear or cancer worry, but this study has shown that even in the model where each affective and cognitive factor control for each other, all three components of the mental condition model are independently and positively related to cancer information use. This finding suggests that cancer information use has the potential to increase the level of cancer-related affect and cognition.

On the other hand, the relation between cancer information avoidance and the mental condition model was an unexpected result. Information avoidance was positively related to cancer fear, but negatively related to cancer worry and risk perception. Information avoiders want to maintain their uncertainty by not exposing themselves to new stimuli. It is hard to understand why the absence of stimuli led people to experience higher levels of fear and lower levels of cancer worry and risk perception. However, according to the delay hypothesis by Jensen, Bernat, Wilson, and Goonewardene (2011), media effects may occur over time influenced by memory and information processing, especially when the effects were generated by vivid images and contents. Although the authors' study was about the exposure to fictional narratives, it is also possible that vivid cancer information that participants were exposed to in the past was positively associated with cancer fear. On the contrary, regarding cancer worry and cancer risk perception which are more closely related to personal relevance than cancer fear which is a fear about the disease itself, no exposure might decrease personal relevance of the

disease. Thus, the results suggest that information avoiders might develop cancer fear while ignoring one's own chance of getting the disease.

**Cancer fear (affect).** The most interesting finding of Study 2 was the direct effect of cancer fear on cancer screening. Cancer fear at Wave 1 predicted screening intention at Wave 2, and the relationship was negative. Notably, cancer fear was positively correlated to cancer worry, cancer risk perception, cancer information use, information avoidance, and screening intention in the bivariate analysis. In particular, it was somewhat highly correlated with cancer worry ( $r = .56$ ,  $p < .001$ ). However, in the multivariate analysis where the cognitive part of mental condition was controlled for, it predicted a lower level of intention to get screened for stomach cancer, unlike cancer worry. Although cancer fear and cancer worry are similar, in the cancer context they function differently in the analysis using two-wave data as well as cross-sectional analysis in Study 1.

The result is consistent with Nabi's CFM (1999), which posited that fear is an avoidance tendency that diminishes the motivation to accept a persuasive message. According to the model, when exposed to a threat-related message, an individual experiences a discrete emotion. The motivation to engage in message processing depends on the type of emotion. If the person experiences fear, he/she is less motivated, while the experience of anger would make the person more motivated. With fear, an individual wants to avoid thinking about the threat. Whether the individual accepts the message or not also depends on their appraisal of the effectiveness of recommendations (Nabi, 2002a). Nevertheless, Nabi's model is consistent with the present study in that fear, as an avoidant tendency, can prevent people from adopting healthy behaviors.

The different functions of cancer fear and cancer worry/cancer risk perception is in accord with the arguments of Loewenstein et al. (2001). The author argued that *affect as information hypotheses* (Schwarz & Clore, 1983) or *affect heuristic* (Slovic et al., 2002) did not allow for the possibility that emotion and cognition can have different effects. They stated that:

“...In contrast, other strands of literature in psychology most closely associated with the clinical literature suggest that emotions often conflict with cognitive evaluations and can in some situations produce pathologies of decision making and behavior. Research on anxiety, for example, shows that emotional reactions to a risky situation often diverge from cognitive evaluations of risk severity (Ness & Klaas, 1994). When such departures occur, moreover, the emotional reactions often exert a dominating influence on behavior and frequently produce behavior that does not appear to be adaptive” (p. 269).

In other words, although people who fear cancer also perform a cognitive evaluation on the threat of cancer, which can lead to positive health outcomes, their fear can independently result in negative outcomes. This view coincides with the finding of the current study.

**Cancer worry (affective-cognitive).** The present study, unlike previous studies on cancer, has conceptualized cancer worry as an affective-cognitive condition, following the taxonomy of Ortony et al. (1987). Consistent with this conceptualization, the results showed that cancer worry has both affective and cognitive aspects. Specifically, cancer worry was similar to cancer fear in that it directly influenced screening intention without the mediating effect of attitude/norm/efficacy. At the same time, it was similar to cancer risk perception in that it had a positive effect on screening intention.

The finding is in line with psychologists' view that considers worry as a process of problem-solving (Davey, 1994). Although excessive worry can cause negative outcomes for health (Tallis et al., 1994), worry can serve as "alarm, prompt, and preparation" (Tallis & Eysenck, 1994, p. 42) helping individuals prepare for a threat. In the cancer context, it has already been found that worry predicts cancer screening (Hay et al., 2006), but the present study illustrated how a positive relationship is possible; worry directly influences intention without any cognitive mediators.

**Cancer risk perception (cognitive).** As for cancer risk perception, the findings of the present study emphasized the fact that risk perception is a cognitive evaluation of a risky situation. As noted, the IM is a cognitively oriented model. Of the three components of the mental condition model, only cancer risk perception exerted an influence on screening intention through an IM variable (i.e., norm).

The association between cancer risk perception and norm might be related either to a cancer screening context or a Korean context. Regarding the cancer context, it should be noted that cancer is a threat not only to the self, but also to the family members/important others. Compared to other IM variables such as attitude and self-efficacy, which are primarily concerns about individual cognitive evaluation, norm is an individual's cognitive evaluation of others' expectations and behaviors. In other words, in thinking about the personal risk of getting cancer, an individual cannot help thinking about their family members' expectations. Thus, being at risk of developing cancer can be more related to norm than other types of risk that are not as critical as the threat of cancer.

The association could also be linked to Korean culture. Indicators of norm in the current study include the descriptive norm as well as the injunctive norm. Descriptive norm involves the evaluation of how similar others would respond to a given issue. Based on Hofstede's (1980) cultural dimensions framework, Korean culture is closer to collectivism than individualism. In a collectivist society, individuals care about their ingroup and tend to have similar opinions to others, in contrast to an individualist society in which people focus on the self or immediate family (Hofstede, 1983). Thus, in the cancer context, it is likely that Koreans put more emphasis on how similar others would react in the same risky situation, which might explain the positive impact of risk perception on norm in this study.

**Attitude/norm/self-efficacy and intention.** Fishbein and Cappella (2006) stated that, of three determinants of intention, which one is more important can vary according to a type of behavior or population in the study. They indicated that attitude can be the strongest predictor for a certain type of behavior, but for other sorts of behavior, norm or self-efficacy can be the primary predictor. Likewise, a behavior that is mainly determined by attitude in one culture can be determined by norm or efficacy in another (see Fishbein & Cappella, 2006, p. S8-S9). In the cancer context, for example, Smith-McLallen and Fishbein (2008) tested an association between three predictors of intention, and the intention to get colonoscopy, mammography, and a prostate-specific antigen (PSA) test. For mammography, self-efficacy was the strongest predictor, but for PSA and colonoscopy, norm was the strongest predictor. This study dealt with stomach cancer (gastroscopy), and intention was most strongly predicted by self-efficacy, followed by norm and attitude. Thus, overall, it seems that cancer screening intention is more influenced by self-efficacy and norm than attitude.

However, the correlation between intention and efficacy was too high (.70 at Wave 1 and .74 at Wave 2), which might be related to the study population or a problem in the measurement. This study adapted items from Busse et al. (2010) in which the correlation between self-efficacy and intention was .39. The reason for the high correlation needs further investigation in the Korean samples. However, rather than being a translation issue, it might be related to the Korean cancer context. As previously stated, it is easy to get screened for cancer in Korea because of low cost and accessible medical facilities. A stomach cancer specialist in Korea argued that getting gastroscopy is not greatly influenced by income level, but by individual characteristics such as being afraid of gastroscopy or simply putting the procedure off (Huh, 2014). Thus, in the Korean context, cancer screening is heavily dependent on individual will, and high self-efficacy and intention almost coincides. Future research should examine how IM variables are correlated with each other in the cancer context again.

**Mediation results.** Bootstrapped confidence intervals revealed that mediating effects exist regarding the aforementioned significant relationships. Specifically, information use indirectly and negatively affects screening intention through cancer fear, and positively influences screening intention through cancer worry. In addition, information use has a positive indirect effect on screening intention through cancer risk perception and norm. As previously stated, the results are in accord with the premise of this study that makes a distinction between affect, cognition, and affective-cognitive condition. As mediators between information use and cancer screening intention, affective and cognitive factors function differently, and the affective cognitive factor was somewhere in the middle between affect and cognition. The results show the validity of the cancer-related mental condition model.

The cancer-related mental condition model also mediates the relationship between information avoidance and screening intention. Cancer information avoidance at Wave 1 decreases screening intention indirectly through cancer fear. Cancer information avoidance at Wave 1 increases screening intention indirectly through cancer worry, or cancer risk perception and norm.

Therefore, the results of mediation analysis were consistent. The use of cancer information has a potential to decrease negative emotion while cancer information avoidance has a potential to increase negative emotion. In turn, that negative emotion predicted lower levels of screening intention. The finding suggests that cancer communication that arouses fear may have a negative impact on cancer prevention. On the contrary, cancer communication that is related to cognitive activity, cancer worry and cancer risk perception, plays a positive role in cancer prevention. Thus, for cancer prevention, cancer communication should make more efforts to help cognitive activities of target audience.

**Medium specific analysis.** This study also investigated the effects of each medium on screening intention through the cancer-related mental condition model. Hypotheses related to medium-specific effects were not supported at all. However, interesting relationships were detected. Given that previous cancer-related research has disregarded medium-specific effects, this study could provide a stepping stone for future research.

First, regarding the relationship between each medium and the cancer-related mental model, associations between cancer fear and interpersonal communication, between television and cancer worry, and between print media/television and cancer risk perception were detected. A positive association between interpersonal communication and cancer fear is understandable,

although it was not expected by the present study. Based on Loewenstein et al. (2001), this study anticipated that information from television or the Internet would be positively associated with cancer fear, because information from these sources often contains vivid images. However, it seems that information can be vivid even without images. When reading newspaper articles, people with a high ability to form mental images would feel stronger emotions than people without such ability (Loewenstein et al., 2001). Another important factor that arouses fear is personal experience (Loewenstein et al., 2001). Personal experience influences people's emotion, which then leads to certain behaviors (Weinstein, 1989). Supporting this, personal cancer history was positively associated with cancer fear in the current data ( $r = .06, p < .05$ ). In this sense, it is possible that individuals take information more seriously when it comes from people around them, such as family, friends or doctors. Although information from television and the Internet includes vivid cases, individuals might still regard it with detachment—as other people's stories rather than the more directly relevant experiences and advice from people around them.

The positive association between television and cancer worry was an unexpected result. However, it should be noted that Sample 2 participants were people aged 40 or older. Although Korea is a highly wired country where 99.9% of people in their teens and twenties, and 99.5% of people in their thirties use the Internet, the ratio of Internet use drops after the age of 40: 96.8% of people in their forties use the Internet, 80.3% in their fifties, 41.8% in their sixties, and 11.3% in their seventies (Ministry of Science, ICT, and Future Planning, 2013). In addition to the use ratio, one can expect that the frequency of use and the type of online activities would differ according to age. Thus, although the Internet is the primary source of health information in contemporary society, the impact of the Internet might be smaller for the older groups. In

contrast, the effect of television might be larger for older people compared to younger people.

Cancer risk perception was positively related both to print media and television. The association between print media and cancer risk perception seems relevant, given the characteristics of print media. According to Dutta-Bergman (2004), print media are an active channel that requires high cognitive activity and involvement from health consumers. Moreover, users of such active channels already have higher levels of health orientation than people who use passive media like television. As cancer risk perception involves a rational judgment, it is plausible that the use of print media would be associated with increased risk perception.

However, the relationship between television and cancer risk perception cannot be explained in this way. Television was also positively related to cancer worry, and thus had more effect than other media in this study. The result regarding television might be related to the Korean broadcasting environment. Until 2011, Korea had three terrestrial broadcasting networks and many cable channels specializing in certain content such as music, film, or news. At the end of 2011, four television comprehensive programming channels, which can provide any content like terrestrial broadcasting networks, began broadcasting. Targeting middle-aged people, such channels have produced several medical programs called “medi-tainment” (i.e., medical + entertainment), a development that was encouraged by the low production costs of such programs and middle-aged people’s greater interest in health (Min & Chung, 2013). In short, older people tend to pay more attention to health, and Korean broadcasting companies provide more health-related programs than other media, which might contribute to the effects of television on cancer-related affects and cognitions. Supporting this, Sample 2 participants used television for cancer information ( $M = 2.91$ ) more than other media (print media = 1.27; the

Internet = 1.87; interpersonal communication = 1.94).

Finally, a mediation analysis by bootstrapping indicated that cancer worry mediates the association between television and screening intention, and print media indirectly affects screening intention through cancer risk perception and norm. As stated, with the increase in health information on television, television programs deliver interesting information that can influence health consumers, which is associated with cancer worry, and in turn, screening intention. Regarding cancer risk perception, only the effects of print media survived. The influence of television did not reach screening intention through risk perception in the mediation analysis. This result is logically consistent with the characteristics of the medium and cognition. That is, an active medium is associated with a rational judgment on one's vulnerability, which results in a higher level of screening intention.

## Chapter 7: General Discussion

The present study has demonstrated how cancer information exposure and cancer information avoidance lead to screening intention through cancer-related affect and cognition. Specifically, Study 1 developed a cancer-related mental condition model that encompasses affective states, affective-cognitive condition, and cognitive condition, and shows that each component of the model is distinct. With two-wave data in the stomach cancer context, Study 2 found an effect of information use at Wave 1 on screening intention at Wave 2 through the cancer-related mental condition model. This chapter discusses the implications of the results and makes suggestions for future research.

### Theoretical Implications

The present study has following theoretical implications. First, this study integrated various perspectives in communication and psychology and created a new model that explains the process of communication effects. Specifically, the hypothesized model in the present study resulted from combining media effects studies and the *risk-as-feeling* perspective (Loewenstein et al., 2001) in the context of the IM (Fishbein, 2000). Through the integration, this study more clearly explained the process through which communication brings about changes in behavioral intention. Other than carefully planned health interventions, we are exposed to a large amount of health information from the media and people around us. Existing behavior change theories show how individuals adopt behavior change (Cappella, 2006), but mainly focus on how beliefs leads to intention, not how those beliefs are formed. In this study, mediated or interpersonal sources of health information are positively associated with cancer-related affect and cognition, which predict behavioral intention.

Second, this study extended the IM framework and suggested the inclusion of affective variables in the model. The results suggest that behavior change theories such as IM can benefit from paying more attention to disease-related affect and cognition that precede the formation of attitudes, norms, and self-efficacy. Behavior change theories such as TRA (Ajzen & Fishbein, 1980), TPB (Ajzen, 1985), and the IM do not consider affective conditions. The IM includes emotions and risk perception as background variables, and posits that these distal variables indirectly affect intention or behavior through attitudes and norms (Fishbein & Cappella, 2006; Fishbein & Yzer, 2003). However, consistent with recent studies that have shown that distal variables can directly influence intention or behavior (Busse et al., 2010; Cappella, 2007), the present study indicated a direct effect of distal variables on screening intention. The findings imply that in predicting behavioral change, researchers need to utilize various affects and cognitions related to disease. The present study used only three constructs that have been frequently used in cancer-related research. However, in case of other disease, different types of emotion such as anger or happiness might be more relevant.

Furthermore, studies that examined cancer-related affects and cognitions have been empirically oriented and have focused on the outcomes of such mental conditions (e.g., the relationship between cancer worry/risk perception and screening behavior), but have not theoretically explained how cancer-related mental condition results in healthy or unhealthy behaviors. By relying on one of the most frequently used theories in behavioral prediction, this study showed how mental condition related to cancer information plays a role in cancer prevention, and how the process of effect differs depending on the type of mental condition.

Third, the present study reorganized the relationship between distal variables in the IM. As noted, in the IM, personal background variables such as demographics, emotion, and media exposure are all placed on the same level, but this study sought to establish relationship between information exposure and affect/cognition. Although the relationship was cross-sectional, this study raised a possibility of mutual influence between those variables.

### **Practical Implications**

These results have following practical implications for health campaign practitioners and journalists. First, cancer information should avoid arousing excessive fear that might inhibit the adoption of healthy behaviors. However, as previously stated, content analyses on mass media reporting about cancer have shown problems in mediated information on cancer. Kilne (2006) reviewed previous research on health content in the media and identified some patterns. One of these was that health reporting often provides ambiguous and incomplete knowledge. For example, Pribble et al. (2006) found that most local television news reports omit recommendations, data sources, and information about prevalence. Online health information might be even more problematic because it does not always come from experts. This implies that health consumers are sometimes influenced by incorrect and unbalanced information that could result in unnecessary fear about disease.

Furthermore, mediated information about health is greatly influenced by the commercialism of media and the medical industry. As Finnegan, Viswanath, and Hertog (1999) pointed out, the content of commercial media is closely related to profits from advertising, based on ratings, and health information is no exception. In most cases, health news in the media is not originally planned by health reporters, but provided by public relations departments in the

medical industry (Tanner, 2004). Due to the technical language, reporters, mostly without formal education in health and medicine, are heavily dependent on health experts (Tanner, 2004), who must represent the interests of affiliated organizations. These findings are in line with the results of content analyses on media reporting about cancer mentioned earlier; U.S. mainstream media have focused on the treatment of cancer rather than prevention or detection (Slater et al., 2008; Stryker et al., 2005). Thus, it seems that commercial interests in the medical industry might encourage people to think about disease and medical treatment more than necessary, and it is highly likely that they arouse fear in the process.

Although fear appeal has been extensively used in health campaigns, the present study argues that the effects of fear appeal might be largely due to worry and risk perception that have not been clearly differentiated from fear in previous research. Thus, rather than arousing excessive fear that can result in negative outcomes, health reporters should make people think about the disease and correctly perceive their risk of getting cancer. In order to encourage people to accept recommendations without excessive fear, media reporting on cancer should focus on cancer prevention. In doing so, the media should give the audience clear evidence that cancer can be prevented, using data sources and statistics. At the same time it is important to help people to make a rational judgment. This study showed that cancer screening behavior involves some type of cognition (i.e., cancer worry and cancer risk perception). One thing that health reporters can do to promote rational thinking is to include hedging in cancer reporting. Jensen et al. (2011) found that the use of hedging, limitations, and caveats in cancer news stories reduces fatalistic beliefs about cancer. The authors argued that if a scientist expresses uncertainty, this can help people to categorize new information effectively without information overload (Jensen et al.,

2011). In summary, cancer information should promote logical thinking that leads to the adoption of healthy behaviors, and should not emphasize the fear about disease.

### **Limitations and Future Research**

The results of this study should be interpreted with caution in that this study is an investigation based on Korean people in the context of stomach cancer; other samples in different contexts could yield different findings.

**Sample.** Two samples in this study are not nationally representative and are non-random samples. The use of non-random samples can cause several problems. According to Reinard (2007), non-random samples are more likely to be biased compared to random samples. With non-random samples, it is impossible to assess sampling error and it is difficult to generalize the results. While admitting these limitations, the present study tried to compensate for the weakness of the samples. Sample 1 (U.S. undergraduates) is a convenience sample, but the sample was used only in Study 1 to develop the cancer-related mental condition model. Sample 2 (Korean people aged 40 or older) was recruited by a survey company in Korea. Although Sample 2 participants were chosen from the company's online panels, the company performed a quota sampling that reflects population characteristics. For example, gender ratio for each age group (forties to seventies) in Korea was considered, with the result that the number of female and male participants was almost the same (49.8% female). Also, the ratio of each age group in the Korean population was taken into account. Due to the relatively small number of online panels aged 60 to 70, quota sampling according to age did not perfectly fit the real ratio of those age groups in the Korean population. Therefore, future studies should confirm the findings of the present study using a random sample.

**Measurement.** This study had several measurement issues. The first problem involved indicators in latent variables. Screening intention was measured with two items. Two indicators in a latent variable is a statistical minimum, and such a latent variable has to borrow covariance information from other parts of the model (Kline, 2005). As the screening intention variable was part of a larger model, it could be identified. Also, indicators in cancer fear, cancer worry, and cancer risk perception might have some problems. The present study allowed for error term correlations only when they were confirmed in previous studies (CW1 and CW3; CRP 1 and CRP2), or when the two items were almost the same (two items in the descriptive norm). Although this study strictly limited the use of error term correlations, the model fit was excellent. Nevertheless, modification indices suggested several error term correlations regarding the cancer fear scale, which might imply a problem in the instrument, such as the use of similar language. Future research should revise the items and test this model in more diverse cancer contexts.

Another issue involves observed variables. As seen in the introduction and literature review, one of the purposes of the present study was to show the differential effects of cancer information seeking and scanning. However, the correlation between seeking and scanning was too high to be simultaneously included in the model. For the Korean version of seeking/scanning items, Kelly et al.'s items (2010) were directly translated (see Appendix). In previous research that used the same items with U.S. samples, the correlation between seeking and scanning was around .30 to .40 (Chae, 2014). This high correlation could be attributed to the way the items were translated, but the items did not include any ambiguous words that could be interpreted differently. The items were presented with detailed examples. Moreover, items first translated to Korean and back-translated to English by two college students, and there were no major

differences. Thus, it might be due to cultural difference. Future research should explore how information-use patterns differ between people in the U.S. and other countries. Another speculation is related to participants' age in the current study. As participants were 40 years or older, they were more likely to be interested in cancer issues, and they scan cancer information as much as they seek it. To scan health information, people need to pay attention to the information. For this reason, some researchers used attention to health information as a proxy of information scanning (e.g., Shim et al., 2006).

**Causal relationship.** For information use and the cancer-related mental model, this study used Sample 2, Wave 1 data. For IM variables and screening intention, Sample 2, Wave 2 data were used. Thus, this study found a causal relationship between the cancer-related mental model and screening intention, but could not demonstrate a causal relationship between information use and the cancer-related mental model. At Wave 1, participants indicated their use of cancer information for the past 12 months. The Wave 2 survey was conducted three months later, so it would be unlikely that participants would have retained the affects and cognitions caused by cancer information to which they were exposed three to 15 months previously. As McCaul et al. (1988) showed, the level of cancer worry changed even during a one-month period. The causal relationship between information and affect/cognition should be investigated by an experimental study, because the effects of cancer information can be immediate and decrease over time. Therefore, what this study found is not the effect of affect and cognition, which is caused by cancer information, on screening intention, but the effect of cancer-related affect and cognition, which is associated with information use, on screening intention.

## **Conclusion**

In conclusion, this study makes four important contributions to the existing literature. First, this study clearly conceptualized cancer-related affect and cognition which have frequently used in cancer literature, and demonstrate their different role in cancer communication and prevention. Second, the study showed the importance of the affective states in behavior change, and thus extended the highly cognitively oriented behavior-change theories, suggesting the inclusion of affective variables in cancer communication and prevention research. Third, by presenting the path from each medium to screening intention, the study demonstrated that our feelings and thoughts about cancer might be influenced by the type of medium from which information is sought. Finally, this study provided practical advice for health campaign practitioners and health reporters by showing how they can achieve desirable outcomes through cancer information that stimulates cognitive activity rather than arousing fear.

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## Appendix A: Questionnaire of Study 1

### General fearfulness

Please indicate how much fear you have about each of the following.

	None	Very little	A little	some	much	Very much	Terrified
Death							
Illness							
Auto accidents							
Losing a job							
Suffocating							
Making mistakes							
Looking foolish							
Being criticized							
Arguing with parents							
Crowded place							
Social life							
Other people							
Open places							
Being with a member of opposite sex							
Dental injection							
Sharp objects							
Hypodermic needles							
Blood							
Dark places							
Spiders							
Stinging insects							
Snakes							

### Cancer fear

Please indicate whether you agree or disagree with each of the following.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
The thought of cancer scares me					
When I think about cancer, I feel nervous					
When I think about cancer, I get upset					
When I think about cancer, I get depressed					
When I think about cancer, I get jittery					
When I think about cancer, my heart					

beats faster					
When I think about cancer, I feel uneasy					
When I think about cancer, I feel anxious					

**Cancer worry**

	Never	Rarely	Sometimes	Often	Always
During the past week, how often have you worried about getting cancer sometime in your lifetime?					
	Not at all	Slightly	Moderately	Very	Extremely
How bothered are you by thinking about getting cancer?					
How worried are you about getting cancer?					

Please indicate how much you think about each of the following.

	Not at all -1	2	3	4	5	6	Very much -7
I am afraid of the physical consequences of getting cancer.							
I worry about my health because of my chances of getting cancer.							
I feel anxiety when I think of the possible consequences of getting cancer.							
I brood about the physical consequences of getting cancer.							

Please indicate how frequently the following thoughts and feelings about cancer happened for you during the past seven days.

	Never -1	2	3	4	5	6	Always -7
I had trouble falling asleep or staying asleep, because of pictures or thoughts about cancer that came to mind.							
I had waves of strong feelings about cancer.							
I had dreams about cancer.							
Pictures about cancer popped into my mind.							

**Risk perception**

Please indicate what you think about each of the following.

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
If I don't get screened, I think my chances of getting cancer sometime in my life are. . .											

	Almost zero						Almost certain
If I don't get screened, I think my chances of getting cancer sometime in my life are. . .							
	Much lower			About the same			Much higher
Compared to the average person your age, gender, and race, how would you rate your chances of developing cancer sometime in your life?							
	Strongly disagree						Strongly agree
If I don't get screened, I would feel very vulnerable to getting cancer sometime in my life							

	Very unlikely	Unlikely	Neither unlikely nor likely	Likely	Very likely
I can get cancer in the next year.					
I can get cancer in the next 5 years.					
I can get cancer in the next 10 years.					
I can get cancer in my lifetime.					

Please indicate how much you agree or disagree with each of the following.

	Strongly disagree	disagree	Neither disagree nor agree	Agree	Strongly agree
Cancer is a severe disease that can kill.					
When someone has cancer, they will die from the disease.					
Cancer is one of the most serious diseases.					
Cancer is more deadly than any other disease.					

Please indicate whether you agree or disagree with each of the following.

	Strongly disagree	disagree	Neither disagree nor agree	Agree	Strongly agree
It is likely that I will get cancer.					
I am at risk for getting cancer.					
It is possible that I will get cancer.					

	Strongly disagree	disagree	Neither disagree nor agree	Agree	Strongly agree
I believe that cancer is a severe health problem.					
I believe that cancer has serious negative consequences.					
I believe that cancer is extremely harmful.					
I believe that cancer is a serious threat to my health.					

**Intention**

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely
I am willing to get screened for cancer in the next 12 months.					
I intend to get screened for cancer in the next 12 months.					

People find out about **health and medical issues** from a variety of sources. Please indicate how often you have done each of the following in the **past 30 days**.

	Not at all	1 time per week	2 times per week	3 times per week	4 or more times per week
Read about health issues in newspapers					
Read health issues in magazines or newsletters					
Watched special health segments of television news					
Watched television programs which address health issues or focus on doctors or hospitals.					
Read about health issues in online newspapers					
Read about health issues in professional health-related websites					
Read about health issues from social network sites or online communities					
Talk to family or friends					
Contact with healthcare professional					

Some people are actively looking for information about cancer while other people just happen to hear or come across such information.

Thinking about the past 12 months, how often did you **actively look for information about cancer** from any of the following sources?

	never	1 or 2 times	3 or 4 times	5 or 6 times	More than 7 times
Newspapers					
Magazines or newsletters					
Television news					
Television health programs					
Online newspapers					
Professional health-related websites					
Social network sites or online communities					
Family and friends					
Healthcare professionals					

Think about the past 12 months, how often did you hear or come across **information about cancer** from each of the following sources when you were **NOT actively looking for it?**

	never	1 or 2 times	3 or 4 times	5 or 6 times	More than 7 times
Newspapers					
Magazines or newsletters					
Television news					
Television health programs					
Online newspapers					
Professional health-related websites					
Social network sites or online communities					
Family and friends					
Healthcare professionals					

Sometimes people would rather not hear about a health issue or concern. Thinking about **the past 12 months**, please indicate whether you agree or disagree with the following statements.

	Strongly disagree	disagree	Neither disagree nor agree	agree	Strongly agree
I prefer not to think about cancer					
I avoid reading things about cancer from newspapers or magazines.					
I avoid reading things about cancer on the Internet.					
I avoid watching TV news or health programs about cancer					
I avoid talking about cancer with family or friends.					
I avoid talking about cancer with healthcare professionals.					
I do not want any more information about cancer.					

### Trait anxiety

	Almost never	sometimes	often	Almost always
I feel pleasant				
I feel nervous and restless				
I feel satisfied with myself				
I wish I could be as happy as others seem to be				
I feel like a failure				
I feel rested				
I am 'calm, cool, and collected'				
I feel that difficulties are piling up so that I can't overcome them				
I worry too much over something that really doesn't matter				
I am happy				
I have disturbing thoughts				
I lack self-confidence				
I feel secure				
I make decisions easily				
I feel inadequate				
I am content				

Some unimportant thought runs through my mind and bothers me				
I take disappointments so keenly that I can't put them out of my mind				
I am a steady person				
I get in a state of tension or turmoil as I think over my recent concerns and interests				

**Emotion**

Over the past 2 weeks, how often have you experienced:

	Not at all	Several days	More than half the days	Nearly everyday
Little interest or pleasure in doing things?				
Feeling down, depressed or hopeless?				
Feeling nervous, anxious or on edge?				
Not being able to stop or control worrying?				

**Demographics**

What is your age? ( )

Are you male or female?

Male	Female

Are you a student at University of Illinois at Urbana-Champaign?

Yes	No

Which one or more of the following would you say is your race?

American Indian/Alaska native	Asian	Black/African American	Native Hawaiian/Other Pacific Islander	Hispanic or Latino	White

Thinking about members of your family living in your household, what is your combined annual income, meaning the total pre-tax income from all sources earned in the past year?

\$ 0 to \$ 9,999	
\$ 10,000 to \$14,999	
\$15,000 to \$19,999	
\$20,000 to \$34,999	
\$35,000 to \$49,999	
\$50,000 to \$ 74,999	
\$75,000 to \$99,999	
\$100,000 to 199,999	
\$200,000 or more	

In general, would you say your health is:

Poor	Fair	Good	Very good	Excellent

Are you currently smoking?

Yes	No

**Cancer history**

Please indicate each of the following

	Yes	No
Have you ever been diagnosed as having cancer?		

	Yes	No	Not sure
Have any of your family members or close friends ever had cancer?			

## Appendix B: Questionnaire of Study 2 (English)

### Cancer fear

Please indicate whether you agree or disagree with each of the following.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
The thought of cancer scares me					
When I think about cancer, I feel nervous					
When I think about cancer, I get upset					
When I think about cancer, I get depressed					
When I think about cancer, I get jittery					
When I think about cancer, my heart beats faster					
When I think about cancer, I feel uneasy					
When I think about cancer, I feel anxious					

### Cancer worry

Please indicate how much you think about each of the following.

	Not at all -1	2	3	4	5	6	Very much -7
I am afraid of the physical consequences of getting cancer.							
I worry about my health because of my chances of getting cancer.							
I feel anxiety when I think of the possible consequences of getting cancer.							
I brood about the physical consequences of getting cancer.							

Please indicate how frequently the following thoughts and feelings about cancer happened for you during the past seven days.

	Never -1	2	3	4	5	6	Always -7
I had trouble falling asleep or staying asleep, because of pictures or thoughts about cancer that came to mind.							
I had waves of strong feelings about cancer.							
I had dreams about cancer.							
Pictures about cancer popped into my mind.							

### Risk Perception

Please indicate what you think about each of the following.

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
If I don't get screened, I think my chances of getting cancer sometime in my life are. . .											

	Almost zero						Almost certain
If I don't get screened, I think my chances of getting cancer sometime in my life are. . .							
	Much lower			About the same			Much higher
Compared to the average person your age, gender, and race, how would you rate your chances of developing cancer sometime in your life?							
	Strongly disagree						Strongly agree
If I don't get screened, I would feel very vulnerable to getting colon cancer sometime in my life							

Please indicate your response to each of the following.

**Intention**

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely
I am willing to get screened for cancer in the next 12 months.					
I intend to get screened for cancer in the next 12 months.					

**Norms**

	Definitely should not	Probably should not	Probably should	Definitely should
Do most people who are important to you think you should or should not get screened for cancer within the next year?				
	None or very few	Some	Most	All or almost all
How many of the people who are most similar to you got at least one cancer screening in the past ten years?				
How many of the people who are most similar to you will get screened for cancer in the next 12 months?				

**Efficacy**

	Very unsure	Somewhat unsure	Neither sure nor unsure	Somewhat sure	Very sure
If you wanted to, how sure are you that you can get screened for cancer in the next year?					

**Attitudes**

In the next question, you will see a scale from 1 to 7. The number 1 represents “extremely bad” or “extremely unpleasant” and the number seven represents “extremely good” or “extremely pleasant.” The numbers 2 through 6 represent your feelings in between these two points of the scale. Please select the numbers that best reflect your feelings about getting screened for cancer in the next year.

My getting screened for cancer in the next year would be:

Extremely bad	1	2	3	4	5	6	7	Extremely good
Extremely unpleasant	1	2	3	4	5	6	7	Extremely pleasant
Extremely Difficult	1	2	3	4	5	6	7	Extremely easy
Extremely harmful	1	2	3	4	5	6	7	Extremely beneficial

Some people are actively looking for information about cancer while other people just happen to hear or come across such information.

Thinking about the past 12 months, how often did you **actively look for information about cancer** from any of the following sources?

	never	1 time	2times	3times	4 times	5times	6times	7times	8times or more
Newspapers									
Magazines or newsletters									
Television news									
Television health programs									
Online newspapers									
Professional health-related websites									
Social network sites or online communities									
Family and friends									
Healthcare professionals									

Think about the past 12 months, how often did you hear or come across **information about cancer** from each of the following sources when you were **NOT actively looking for it?**

	never	1 time	2times	3times	4 times	5times	6times	7times	8times or more
Newspapers									
Magazines or newsletters									
Television news									
Television health programs									
Online newspapers									
Professional health- related websites									
Social network sites or online communities									
Family and friends									
Healthcare professionals									

Sometimes people would rather not hear about a health issue or concern. Thinking about **the past 12 month**, please indicate whether you agree or disagree with the following statements.

	Strongly disagree	disagree	Neither disagree nor agree	agree	Strongly agree
I prefer not to think about cancer					
I avoid reading things about cancer from newspapers or magazines.					
I avoid reading things about cancer on the Internet.					
I avoid watching TV news or health programs about cancer					

I avoid talking about cancer with family or friends.					
I avoid talking about cancer with healthcare professionals.					
I do not want any more information about cancer.					

**Trait anxiety**

State-Trait anxiety scale Spielberger, Gorsuch, and Lushene, 1970

Please indicate how you *generally* feel about each of the following.

	Almost never	sometimes	often	Almost always
I feel pleasant				
I feel nervous and restless				
I feel satisfied with myself				
I wish I could be as happy as others seem to be				
I feel like a failure				
I feel rested				
I am 'calm, cool, and collected'				
I feel that difficulties are piling up so that I can't overcome them				
I worry too much over something that really doesn't matter				
I am happy				
I have disturbing thoughts				
I lack self-confidence				
I feel secure				
I make decisions easily				
I feel inadequate				
I am content				
Some unimportant thought runs through my mind and bothers me				
I take disappointments so keenly that I can't put them out of my mind				
I am a steady person				
I get in a state of tension or turmoil as I think over my recent concerns and interests				

**Cancer history**

Please indicate each of the following

	Yes	No
Have you ever been diagnosed as having cancer?		

	Yes	No	Not sure
Have any of your family members or close friends ever had cancer?			

**Demographics**

What is your age? (            )

Are you male or female?

Male	Female

What is your occupation status?

Employed	Unemployed	Homemaker	Student	retired	disabled	Other

What is your marital status?

Employed	Living as married	divorced	widowed	separated	single (never been married)

What is the highest grade or level of schooling you completed?

Elementary school	
Middle school	
High school	
Some college	
College graduate	
Postgraduate	

Thinking about members of your family living in your household, what is your combined annual income, meaning the total pre-tax income from all sources earned in the past year?

\$ 0 to \$ 9,999	
\$ 10,000 to \$14,999	
\$15,000 to \$19,999	
\$20,000 to \$34,999	
\$35,000 to \$49,999	

\$50,000 to \$ 74,999	
\$75,000 to \$99,999	
\$100,000 to 199,999	
\$200,000 or more	

In general, would you say your health is:

Poor	Fair	Good	Very good	Excellent

Are you currently smoking?

Yes	No

### Appendix C: Questionnaire of Study 2 (Korean)

#### 암에대한두려움

다음질문에답하세요.

	매우그렇지않 다	그렇지않다.	보통이다	그렇다	매우그 렇다.
암에대해생각하면겁난다.					
암에대해생각하면긴장된다.					
암에대해생각하면화가난다.					
암에대해생각하면우울해진다.					
암에대해생각하면신경이과민해진다.					
암에대해생각하면심장박동이빨라진다.					
암에대해생각하면불안하다.					

#### 암에대한걱정

	전혀하지않 았다.	아주가끔 했다.	가끔했 다.	자주했 다.	항상했 다.
지난일주일간, '언젠가는암에걸릴지도모른다'는걱정을얼마나 자주했습니까?					
	전혀	약간	보통	매우	극단적 으로
암에걸릴가능성에대해생각하면얼마나괴롭습 니까?					
암에걸릴까봐어느정도로걱정이 됩니까?					

	전혀그렇지 않다 -1	2	3	4	5	6	매우그렇 다. -7
나는암에걸렸을때생길신체적변화가두렵다.							
나는암에걸릴까봐걱정이된다.							
내가암에걸렸을때일어날일들에대해생각하면불안하다.							
나는암에걸렸을때일어날신체적변화에대해공공이생각해 본다.							

지난일주일간, 얼마나자주다음과같이생각했는지대답해주시오. (은현정)

	Never -1	2	3	4	5	6	Always -7
암에관련한장면이나생각들이떠올라잠을자는데어려움이있었다.							
나는암에대한강한감정이몰밀듯밀려오는것을느꼈다.							
나는암에대해꿈을꾸었다.							
암과관련된장면들이나의마음속에갑자기떠오르곤했다.							

위험인지

	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
만약암검진을받지않는다면, 내가사는동안언젠가암에걸릴확률은...											

	거의없다 1	2	3	4	5	6	거의확실히걸린다. 7
만약암검진을받지않는다면, 내가사는동안언젠가암에걸릴확률은..							
	다른사람보다훨씬낮다. 1	2	3	다른사람과비슷하다.4	5	6	다른사람보다훨씬높다. 7
같은나이의평균적인사람들과비교할때, 내가사는동안언젠가암에걸릴확률은...							
	매우그렇지않다. 1	2	3	4	5	6	매우그렇다. 7
만약암검진을받지않는다면, 나는내가암에걸릴가능성이높다고느낄것이다.							

의도

	전혀그렇지않을 것이다.	그렇지않을 것이다.	보통이다.	그럴 것이다.	매우그럴 것이다.
나는향후 2년안에위암검진(위내시경또는위조영술)을받을 의도가있다.					
나는향후 2년안에위암검진(위내시경또는위조영술)을받을 계획이다.					

	절대로그렇지않다.	아마도그렇지않다.	아마도그럴 것이다.	절대로그럴 것이다.
나에게소중한사람들(가족, 친구등) 대부분은내가향후 2년내에위암검진(위내시경또는위조영술)을받아야한다고생각할것이다.				
	거의없거나 극소수	어느정도의 사람들	상당수의사람들	거의대부분

당신과가장비슷한사람들 (성별나이사회경제적지위등에서)을생각 할때, 그중얼마나많은사람들이지난 10년간최소한번의위암검진을받았을거라 고생각하십니까?				
당신과가장비슷한사람들 (성별나이사회경제적지위등에서)을생각 할때, 그중얼마나많은사람들이향후 2년내에암검진을받을거라고생각하십니까 ?				

	매우확신하지않 는다.	다소 확신하지않 는다.	보통이 다	다소 확신한 다.	매우확신 하다.
만약당신이정말원할경우, 향후 2년내에위암검진을받을수있다고확신 하십니까?					

다음질문에대해, 1에서 7까지의숫자를보시게됩니다. 1은 “극단적으로나쁘다” 또는  
“극단적으로불쾌하다”를의히마고, 7은 “극단적으로좋다” “극단적으로유쾌하다”를의미합니다. 2에서  
6까지의숫자는그사이의감정을나타냅니다.

12개월내에암검진을받는것에대해귀하의감정을가장잘나타내는숫자를고르세요.

내가향후 2년내에위암검진 (위내시경또는위조영술)을받는것은

극단적으로나쁘다	1	2	3	4	5	6	7	극단적으로좋다
극단적으로불쾌하다	1	2	3	4	5	6	7	극단적으로유쾌하다
극단적으로어렵다	1	2	3	4	5	6	7	극단적으로쉽다
극단적으로해롭다	1	2	3	4	5	6	7	극단적으로유익하다

어떤사람들은적극적으로암에대한정보를찾아보고, 어떤사람들은우연히암에대한정보를보고듣게됩니다.

지난 12개월동안, 다음의매체나사람들을통해, 총몇번이나암에대한정보를적극적으로찾아보셨습니까?

	전혀찾지않았다	1-2번	3-4번	5-6번	7번이상
신문					
잡지					
텔레비전뉴스					
텔레비전의건강관련프로그램					
인터넷뉴스					
건강전문인터넷사이트					
소셜네트워크사이트또는온라인커뮤니티					
가족과친구					
의료인					

지난 12개월간, 암에 대한 정보를 특별히 찾고 있지 않을 때 (우연히),  
얼마나 자주 암에 대한 정보를 보거나 듣게 되었습니까.

	전혀 접하지 못했다.	1-2번	3-4번	5-6번	7번 이상
신문					
잡지					
텔레비전 뉴스					
텔레비전의 건강 관련 프로그램					
인터넷 뉴스					
건강 전문 인터넷 사이트					
소셜 네트워크 사이트 또는 온라인 커뮤니티					
가족과 친구					
의료인					

어떤 사람들은 건강 관련 뉴스나 정보를 접하고 싶지 않아 합니다.  
암에 관한 다음의 문장을 읽고 이에 얼마나 동의하는지 응답해주세요.

	매우 그렇지 않다.	그렇지 않다.	보통이다.	그렇다.	매우 그렇다.
나는 암에 대해 생각하고 싶지 않다.					
나는 암 관련 정보를 신문이나 잡지에서 읽는 것을 피한다.					
나는 인터넷에서 암 관련 정보를 보는 것을 피한다.					
나는 텔레비전 뉴스나 건강 관련 프로그램에서 암 관련 정보를 보는 것을 피한다.					
나는 친구나 가족과 암에 대해 얘기하는 것을 피한다.					
나는 의료인 (의사 간호사 한의사) 과 암에 대해 얘기하는 것을 피한다.					
나는 암에 대한 정보를 더 원하지 않는다.					

### 특성 불안

	거의 그렇지 않다.	가끔 그렇다.	자주 그렇다.	거의 항상 그렇다.
나는 유쾌하다.				
나는 쉽게 피곤을 느낀다.				
나는 쉽게 울고 싶은 기분이다.				
나도 남들처럼 행복했으면 좋겠다.				
나는 결정이 더디어서 매사에 손해를 본다.				
나는 느긋하다.				
나는 평온하고 침착하다.				
나는 어려움이 많아서 감당해 내지 못할 것 같다.				
나는 대수롭지 않은 일에 너무 걱정하는 편이다.				
나는 행복하다.				
나는 매사를 어렵게 생각하는 편이다.				

나는자신감이부족하다.				
나는안전하다.				
나는위기나어려움을피하려고애쓰다.				
나는우울하다.				
나는만족스럽다.				
나는사소한생각으로마음을쓰고괴로워한다.				
나는한번낙담하면헤어나오기힘들다.				
나는쉽게동요하지않는다.				
나는당면한문제들로긴장되고짜증스럽다.				

	예	아니오
귀하는암으로진단받은적이있습니까?		

	예	아니오	모르겠다.
귀하의가족이나친한친구가암에걸린적이있습니까?			

**인구통계학적 질문**

귀하의연령은만으로어떻게되십니까? ( )

귀하의성별은어떻게되십니까?

남성	여성

귀하의고용상태는어떻습니까?

취업(자영업포함)	실업	주부	학생	퇴직	기타

귀하의결혼여부는어떻게되십니까?

기혼	동거	이혼, 사별, 별거	미혼 (결혼한적없음)

실례지만, 귀하의최종학력은어떻게되십니까?

초등학교졸	
중학교졸	
고등학교졸	
전문대졸	
4년제대학졸	
대학원졸	

실례지만, 귀하가정의월가소득 (맞벌이인경우부부소득합산) 은얼마나되십니까?

0 - 99만원	
100만원 - 199 만원	
200만원 - 299 만원	
300만원 - 399만원	

400만원 - 499만원	
500만원 - 599만원	
600만원 - 699만원	
700만원 - 799만원	
800만원 - 899만원	
900만원 - 999만원	
1000만원 - 1499만원	
1500만원 이상	

귀하의건강상태는어떻습니까?

매우나쁘다.	나쁘다.	보통이다.	좋다.	매우좋다.

현재담배를피우고계십니까?

네	아니오