

**INCREASING THE PERSUASIVENESS OF GAIN VS. LOSS FRAMING:
THE EFFECTS OF GENDER AND FEAR AROUSAL ON PROCESSING
GAIN- VS. LOSS-FRAMED BREAST CANCER SCREENING MESSAGES**

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at the University of Missouri-Columbia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

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Dr. Glen T. Cameron, Dissertation Supervisor

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

I would like to dedicate this dissertation to my parents, Heung Kwang Kim and Kyung Hee Oh, and my parents-in-law, Tae Joon Park and Ae Sook Lee. I am so grateful for their love and continued support during this entire process. I also want to thank my husband Jin Ho Park, who has been my best friend, study buddy, spiritual partner, and an important part of my loving family. Jin Ho, thank you for encouraging me and making me laugh through this challenging journey. Finally, I thank God for His endless mercy and patience. His grace is so amazing that I cannot even understand it sometimes, but one thing I am sure of is that, without God's helping hands, I could not have completed this journey. Thank you Lord for every time you heard me pray. Great is Thy faithfulness.

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ABSTRACT

Based on prospect theory, the present study investigated gain vs. loss framing effects in the context of breast cancer screening (BCS) intervention. This study specifically assessed how the framing effect would be moderated by the gender of message recipients and their fear arousal.

The study used a 2 (male vs. female) x 2 (gain vs. loss) between-subject design experiment with 128 African American participants (mean age = 45.9). The results showed that men and women processed the BCS messages with a different elaboration depth, and that such differences led men and women to perceive gain- vs. loss-framed messages differently. That is, loss frame was more effective for women in increasing their message elaboration and supportive thoughts about BCS, while gain frame was more effective for men in increasing their memory, favorable attitudes toward BCS, and behavioral intentions. The theoretical implications for the interactions between gender and frame type were discussed based on prior framing and elaboration literature.

The findings provide practical implications for health communication practitioners into how to strategically use gain vs. loss framing in accordance with their target publics. As for the role of fear arousal, the results suggest that practitioners may need to actively utilize fear appeals, but use them cautiously by considering that the advantage of fear arousal might be contingent upon the combined frame type especially for systematic processors.

CHAPTER ONE

INTRODUCTION

1-1. Statement of Purpose

Questions regarding how persuasive messages should be designed to accomplish the greatest effects have lain at the very center of persuasion research (Dillard & Pfau, 2002). Researchers have studied the persuasive effects of different message features in the media in a variety of contexts of strategic communication from advertising to social marketing. Such advances in media effects studies offer helpful opportunities for health communication practitioners to significantly enhance the effects of health messages to improve individual and community health status. As health became established as an important personal concern and healthcare became a major institution in the middle of the 20th century in the U.S., health communication emerged as one of the major fields in communication (Thomas, 2006). According to Thomas (2006), health communication “encompasses the study and use of communication strategies to inform and influence individual and community knowledge, attitudes and practices with regard to health and healthcare” (p.1). Additionally, the emphasis on prevention has grown over the last quarter of the 20th century, leading to the realization that intervention could actually play a greater role in improving health status than treatment could. As a result, virtually all Americans have been exposed to health messages through public campaigns and the media (Thomas, 2006). The purpose of this study is to propose an integrated framework

based on major health communication theories and, within that framework, examine how a message feature interacts with the audience's involvement level.

In particular, this study focuses on the effects of message framing (gain vs. loss) in the context of breast cancer screening messages. Here, framing effects refer to “the findings that decision-makers respond differently to different but objectively equivalent descriptions of the same problem” (Kuhberger, 1998, p.150). More specifically, framing research focuses on the differential effects on persuasion of presenting information in terms of the benefits gained (gain frame) or the consequences suffered (loss frame) in various decision-making contexts such as marketing and consumer psychology, mostly based on the theoretical framework of prospect theory (e.g., Kahneman & Tversky, 1979). In the health communication field, prospect theory has been extensively applied over the last few decades (McElroy & Seta, 2003). That is, in the context of health communication, information about a health behavior or a problem can focus on the benefits of taking a recommended action (i.e., a gain-frame) or the costs of failing to take the action (i.e., a loss-frame).

Based on prospect theory, a series of researchers have assessed how framing effects can provide a guideline for developing effective health messages (Rothman, Bartels, Wlaschin, & Salovey, 2006). Although many of them have revealed empirical evidence that gain-framed messages would work better for promoting *prevention* behaviors, and loss-framed messages for promoting *detection* behaviors, another line of researchers (e.g., Keller, Lipkus, & Rimer, 2003; Loro, 2007; Meyerowitz & Chaiken, 1987; Obermiller, 1995; O'Keefe & Jensen, in press) have claimed that the relative effectiveness of gain vs. loss framing can be moderated by various individual and

situational factors in addition to the simple distinction of prevention vs. detection behaviors. In particular, this study intends to examine how individuals' involvement level would moderate the effects of gain vs. loss framing. In the context of breast cancer screening messages, the present study uses participants' gender as a proxy for issue involvement. Most of the previous studies on breast cancer communication have typically involved middle-aged female participants only. However, in the real intervention contexts, many campaigns are taking notes of the role of men in promoting breast cancer awareness, prevention and treatment. For instance, the National Breast Cancer Awareness Month program has been conducting *Think Pink and Tell a Friend* campaign, which targets both men and women to foster them to encourage women in their lives to get an annual mammogram, and do monthly breast self-exams to help prevent the disease. This campaign asserts that inviting friends, family, neighbors, mothers and sisters to this program will provide encouragement and ease anxiety, resulting in a greater likelihood that the women invited will schedule a mammogram and do it annually (Sporer, 2007, August). In a similar sense, Clinton Administration's *Mommagram* campaign was proposed in an attempt to "give husbands, sons, daughters, grandchildren, friends and anyone else with a close relationship with an older woman a way to let that woman know that her family and friends care, that part of that caring means wanting her to get regular mammograms" (Clinton, 1995).

This study intends to generate deeper understanding of how to educate general publics, males and females both, to encourage women in their lives to get a regular breast cancer screening. Only a few researchers have considered the important role of families and friends in improving the breast cancer intervention rate among women (Tanjasi et

al., 2007; Wilkin et al., 2007; Xie, Turner, Lamm, & Southard, 2005). The current study intends to advance such literature by examining the effects of particular message features, and how such effects would be moderated by gender of the recipient in breast cancer screening messages. Previous studies have unanimously suggested that loss framing over gain framing would be more effective in breast cancer interventions. The question, however, is whether such advantage of loss framing will actually influence the male audiences, too. The present study aims to answer this question. Admittedly, most of the previous studies have overlooked the possibility that the advantage of loss framing may not work if the interventions target a male audience whose involvement level is relatively low.

Based on previous breast cancer research literature, this study proposes that males and females will have different involvement levels in the issue of breast cancer and, therefore, process a breast cancer intervention message with a different elaboration depth from each other. That is, females will process a breast cancer message in greater level of elaboration, as compared to males. Such differences in the involvement level and elaboration depth will then lead men and women to perceive gain vs. loss frames in breast cancer intervention messages differently. This study of the gender difference in processing a framed health message will provide important insight to the message framing effect. Health communication practitioners should understand not only how to frame their messages, but also which target publics are more likely to respond to the gain or loss framing, depending on the disease characteristics and the public sectors' involvement levels in that disease issue.

Specifically, the present study examines African American men and women's response to breast cancer screening advocacy messages that include African American breast cancer survivors' testimonies. According to the CDC (2010) report, African American women who get breast cancer are more likely to die from the disease than other ethnic groups and are less likely to survive for 5 years after diagnosis; studies suggest that this disparity is due to African American women being diagnosed with breast cancer at a later stage, and receiving treatment later after diagnosis. *Sisters Network*, the largest African American breast cancer survivorship, indicates that another reason for this disparity may include distrust of the health care system, or the belief that breast cancer screenings are not needed. The current study intends to further understanding for developing effective breast cancer intervention messages for African American communities.

In conclusion, drawing on prospect theory from psychology, dual-process models, and fear appeals literature, this study tests how the message framing effect is moderated by public's different involvement levels as well as emotional responses. The ultimate goal of the current study is, therefore, to explain the cognitive and emotional mechanism behind gain vs. loss framing effects, as well as to provide practical implications for practitioners to understand which target publics are more likely to respond to the gain vs. loss framing, depending on the public sectors' involvement levels in a given issue and their emotional responses to the messages.

CHAPTER TWO

LITERATURE REVIEW & HYPOTHESES

2-1. Public Information Processing of Health Messages

a. Theoretical Frameworks in Health Communication Campaigns

The study of health communication has exponentially developed since the late 1970s.

The Health Communication Divisions of international communication associations were founded in 1975 (ICA) and 1985 (NCA); the journals devoted specifically to the study of health communication were launched since the late 1980s, providing opportunities for the dissemination of research on health communication. Miller, Thompson, and Dorsey (2003) addressed that the health communication research has moved from atheoretical considerations of various health issues to sophisticated considerations that link the discipline to major theoretical traditions in social science. Health communication scholars have investigated this interesting area based on a variety of theoretical foundations from the field of communication as well as the other fields of social science and humanities.

The following sections will review three central theories of health communication campaigns that represent the dominant cognitive approach (Dutta-Bregman, 2005): theory of reasoned action (TRA), health belief model (HBM), and the extended parallel process model (EPPM). After reviewing the key propositions and the limitations of each theory, this study will propose an integrated model of those three theoretical approaches, which will serve as the theoretical framework to predict perceptions about breast cancer survivor testimonies and behavioral intention regarding breast cancer screening.

Theory of Reasoned Action (TRA)

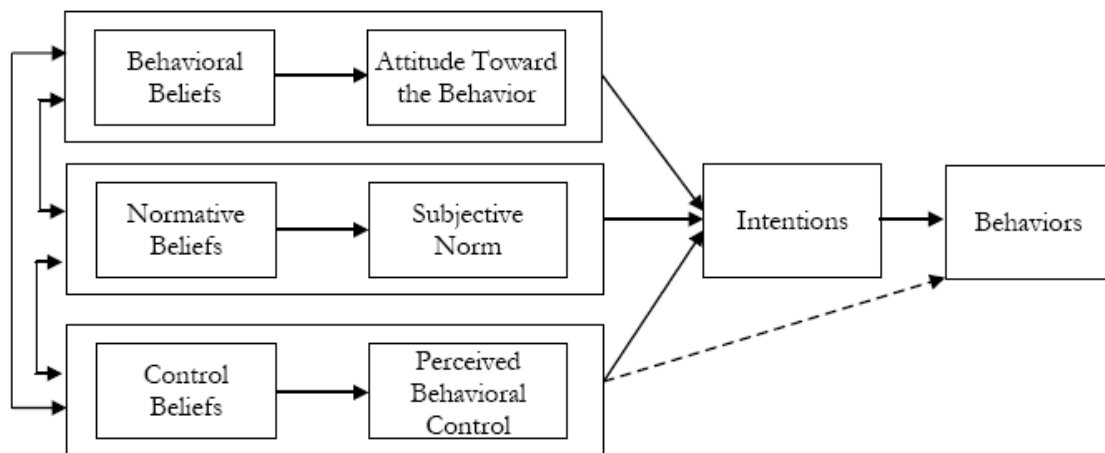
Fishbein and Ajzen's theory of reasoned action (TRA) (1975) has received considerable attention within the field of consumer behavior as it provides a relatively simple basis for predicting consumer intentions and behaviors, as well as for identifying how to target consumers' behavioral change attempts (Sheppard, Jon, & Warshaw, 1988). The TRA proposes that one's intention to perform or not perform a certain behavior is the strongest or most proximal determinant of voluntary behaviors (Fishbein & Ajzen, 1975, 1980). The TRA proposes two key factors to determine individual's behavioral intention: the individual's attitude toward the particular behavior, and his or her perception of others' evaluation of the behavior. That is, when individuals evaluate their performance of the suggested behavior as positive and when they think their significant others want them to perform the behavior, their behavioral intentions are more likely to increase.

Specifically, the attitude of an individual is defined as an individual's positive or negative evaluation of self-performance of a certain behavior. The individual's attitude is influenced by his or her salient belief about the consequences of the behavior (i.e., behavioral belief). Meanwhile, subjective norm is defined as an individual's perception of social normative pressure, or others' belief that the person should or should not perform the behavior. The individual's subjective norm is influenced by his or her perception about the judgment of significant others in their own social network (i.e., normative belief) and their motivation to comply with significant others. Although a high correlation of attitude toward the behavior and subjective norms to behavioral intention has been confirmed in many studies (Sheppard et al., 1998), a counter argument against the correlation between behavioral intention and actual behavior has also emerged,

emphasizing that behavioral intention does not always lead to actual behavior where an individual's control over the behavior is incomplete due to circumstantial limitations.

Such critique resulted in the addition of a new factor to the original model: perceived behavioral control (Ajzen, 1988). Here the perceived behavioral control is defined as the perceived ease or difficulty of performing the behavior. Ajzen (1991) called this extended model the theory of planned behavior (TPB). The TPB is a theory which predicts deliberate behavior. According to Ajzen (2002a, 2002b), human action is guided by three kinds of considerations: beliefs about the likely consequences of the behavior (i.e., behavioral beliefs), beliefs about the normative expectations of salient others (i.e., normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behavior (i.e., control beliefs). These beliefs then produce the attitude toward the behavior, subjective norm, and perceived behavioral control, respectively. In combination, these three predictors lead to the formation of a behavioral intention (Ajzen, 1991, 2002) (see Figure 1).

Figure1. Conceptual Model of the Theory of Planned Behavior



Note: Adapted from Ajzen's website, <http://www-unix.oit.umass.edu/~ajzen/tpb.diag.html>

The perceived behavioral control was operationalized by measuring two sub-concepts: perceived self-efficacy and perceived controllability (Ajzen, 2002a), suggesting that this concept of perceived behavioral control is closely related to the concept of self-efficacy. Actually, Fishbein and Cappella's (2006) integrative model defined self-efficacy as the perceived control which is influenced by control beliefs and perceived power. Conceptually, self-efficacy reflects internal barriers and facilitators while perceived controllability reflects beliefs about the operation of external factors. Some earlier studies, which applied an expanded TPB model to the mammogram context, found that subjective norms, attitude, and self-efficacy were the key predictors of mammogram screening participation (Ajzen, 2002a).

In cognitive psychology literature, self-efficacy refers to the confidence one feels about performing a particular behavior, including confidence in overcoming the barriers to perform that behavior (Bandura, 1986). Self-efficacy has been considered as a similar concept to perceived behavioral control in many studies, which successfully added self-efficacy to the TPB model in various areas, such as alcohol use (Armitage & Conner, 1999a) and food choices (Armitage & Conner, 1999b; Povey, Conner, Sparks, James, & Sheperd, 2000). In fact, in those studies, self-efficacy was the strongest contributor to the behavioral intention. Moreover, the strong link between self-efficacy and intention has also been empirically established (Tolma, Reininger, Evans, & Ureda, 2006). Meanwhile, this concept of self-efficacy has been included as a critical component in other theories such as the health belief model (HBM) (Rosenstock, 1974) and the extended parallel process model (EPPM) (K. Witte, 1992). The concept of self-efficacy will be more fully discussed in the following sections in the context of the HBM and the EPPM.

As briefly mentioned above, in the field of health communication, the TRA and the TPB have been widely applied to predict health behaviors in a variety of health-related issues. According to O’Keefe (2002), “the TRA identifies three conditions under which a person’s intentions to perform behavior may change: if the attitudinal component changes (and is significantly weighted), if the normative component changes (and is significantly weighted), or if the relative weighting of the two component changes” (p. 109). A series of studies have verified such posited critical roles of attitude toward the behavior and subjective norms in predicting health-related behaviors such as condom use, dental hygiene, alcohol use, AIDS-related behaviors, safe driving, smoking, and mammography (e.g., Boyd & Wandersman, 1991; Brubaker, Prue, & Rychtarik, 1987; Chassin, Presson, Sherman, Corn, & Olshavsky, 1984; Fishbein & Middlestadt, 1989; Sheppard et al., 1988; Stasson & Fishbein, 1990; Yagil, 2001).

In the context of breast cancer screening, many studies have examined the contributors to mammogram participation based on the framework of the TRA. Those studies also included some additional variables, such as habit and perceived risk of breast cancer (Michels, Taplin, Carter, & Kugler, 1995), facilitating conditions (Montano & Taplin, 1991), and affect (Montano, Thompson, Taylor, & Mahloch, 1997), in addition to the two original components (i.e., attitudes toward the screening and subjective norms). For instance, Montano et al. (1997) found that subjective norm was the strongest predictor of screening intention, followed by facilitating conditions or barriers, attitudes, and affect. Here, facilitating conditions or barriers refer to the environmental conditions that facilitate or constrain the patient’s ability to obtain mammography screening. This concept of perceived facilitators or barriers was derived from the perceived control

component in the TPB and the self-efficacy component in social-cognitive theory (Montano, Selby, Somkin, Bhat, & Nadel, 2004). Meanwhile, Michels et al., (1995) found that habit and perceived risk of breast cancer were the most significant predictors of screening intention, followed by subjective norms and attitude.

In addition, several studies have also found that the TPB would help improve the predictability of health-related behavioral intention as compared the TRA (Ajzen, 1988). According to a review by Godin and Kok (1996) on the application of the TPB to health-related behaviors, the TPB predictors were found to explain on average 41 percent of the variance in health behavioral intention and 31 percent of the variance in health behavior. A series of researchers have explained or predicted the behavioral intention based on the TPB in a variety of health-related areas such as condom use (e.g., Albarracin, Fishbein, Johnson, & Muellerieile, 2001), leisure (e.g., Ajzen & Driver, 1992), exercise (e.g., Nguyen, Potvin, & Otis, 1997), diet (e.g., Conner, Kirk, Cade, & Barrett, 2003), and mammography (e.g., Godin et al., 2001; Tolma et al., 2006). Tolma et al. (2006) claimed that the TPB is appropriate to study mammogram screening intention for two reasons; first, the TPB helps understand the cultural perspectives affecting the behavior (Poss, 2001) since it offers a method for the elicitation of the salient cultural beliefs of the public sector in question; second, mammography screening behavior is not fully under voluntary control (Godin et al., 2001) since it is influenced by environmental factors and, thus, perceived behavioral control should be a critical theoretical component. In fact, a series of health communication researchers have used the TPB as a theoretical framework in examining the determinants of mammogram participation. For example, Rutter (2000) found that attitude was the most significant predictor of mammogram intention, followed

by perceived behavioral control and subjective norms. Similarly, Drossaert, Boer, and Seydel (2003) found that attitude was the main predictor of mammogram intention, followed by perceived control and expected difficulties. In another study, Godin et al. (2001) found that subjective norms and perceived behavioral control were the leading predictors of the mammogram intention, followed by the attitude toward mammogram.

Despite the theoretical contributions, however, the TRA and the TPB have been criticized for their limitations in predicting human behaviors in reality. First, Sheppard et al. (1988) noted that Fishbein and Ajzen's TRA (1975; 1980) has some limitations due to the generality of the model. Specifically, Sheppard et al. (1988) argued that there are situations that do not fit well within Fishbein and Ajzen's framework such as (1) when the target behavior is not completely under the individuals' volitional control, (2) when the situation involves a choice problem not explicitly as addressed by Fishbein and Ajzen, and (3) when individuals' intentions are assessed when it is impossible for them to have all of the necessary information to form a completely confident intention. Sheppard et al. (1988) conducted two meta-analyses to assess the effect of falling within one or more of the three limiting conditions on (1) the use of attitudes and subjective norms to predict intentions and (2) the use of intentions to predict the performance of behavior. As a result, the authors' review found that more than half of the TRA research had investigated activities for which the model was not originally intended. However, to their surprise, the model performed extremely well in the prediction of goals (e.g., losing 10 pounds) as well as behaviors (e.g., taking a diet pill), and in the prediction of activities involving an explicit choice among alternatives. That is, it seemed that Fishbein and Ajzen's TRA had strong predictability, even when it was applied to the situations that did not fall within the

boundary conditions that the model originally specified. Nevertheless, the authors argued that the results did not mean that further modifications of the model were unnecessary. Rather, the authors concluded that appropriate modification of the original TRA to predict and explain goal intentions, choice situations and differences between intention and estimation measures (e.g., “*Do you intend to do X?*” vs. “*Are you likely to do X?*”) should be further investigated to enhance the predictive power of the existing theory.

Ajzen’s (1988) revised model, the TPB, seemed to have provided proper modifications which complement such limitations. The newly added constructs, perceived behavioral control and control belief, expanded the boundary conditions originally specified in the TRA. Specifically, the TPB took into consideration goal intentions and the differences between intention and estimates. Although the TPB has improved the predictability of health-related behaviors, however, the model still has some limitations in identifying comprehensive antecedents of health behaviors.

First, the TRA and the TPB are both cognition-oriented. The models emphasize the role of cognition in determining human behaviors, by focusing on the effects of “beliefs” on the formation of attitudes, subjective norms and/or perceived behavioral control. Dutta-Bregman (2005) notes that these models, rooted in the ability of humans to reason, suggest that individuals systematically and rationally identify and weigh outcomes to determine their behaviors. Dutta-Bregman (2005) then criticizes that this is a critical limitation of the models, considering the affects-laden nature of decision-making involved in many health-related behaviors. Considering the affective element of health-related decision-making, many health communication researchers have increasingly studied the effects of affect-based campaigns (Dillard & Nabi, 2006; Dillard & Plotnick,

1996; Dunlop, Wakefield, & Kashima, 2008; Han, Moser, & Klein, 2006; Shen & Dillard, 2007). For instance, Han et al. (2006) examined how individuals' ambiguity perceptions of cancer prevention PSAs are related to their worry, risk perceptions, and perceptions of preventability. Dillard and Nabi (2006) proposed a series of propositions in developing cancer prevention/detection messages based on appraisal theory and CFM (Cognitive-Functional Model). Shen and Dillard (2007) explored individuals' emotional responses to various health-related messages in terms of message frames (advantage frames vs. disadvantage frames) and dispositional factors such as BIS/BAS (Behavioral Inhibition System vs. Behavioral Approach System). In fact, the growth in health communication research on dispositional factors such as BIS/BAS and sensation seeking underlines the importance of emotions in audience reception of health messages and the choice of health behaviors (Dunlop et al., 2008). As Dutta-Bergman (2005) noted, even though many health campaigns typically use information-based communication materials, individuals would selectively give their attention to those that match their existing predispositions or values. In this sense, the cognitive orientation of the TRA and the TPB is limited in taking into consideration the critical role of affects and dispositional factors in determining the health-related behaviors or the behavioral intentions.

Next, although the health campaigns based on TRA and TPB have focused on the role of attitudes, subjective norms and/or perceived behavioral controls, they did not specify the predictors to those components. That is, the models did not identify different conditions under which attitude and subjective norms can be changed (Dutta-Bergman, 2003; Greene & Banerjee, 2005). For instance, what factors would influence the formation of individual's behavioral belief? Would behavioral belief be the only

determinant to influence individuals' attitudes toward the health-related behavior? How would the health campaign message make a difference in promoting healthy behaviors? How would the different message formats or contents affect the individuals' beliefs or attitudes? Both the TRA and the TPB models have limitations in answering those questions. As Fishbein and Cappella (2006) noted, behavioral change theories like the TRA, the TPB, or social cognitive theories guide researchers to routes of persuasion and to beliefs to target in persuasive effort, but they do not tell us how to design messages to achieve these changes.

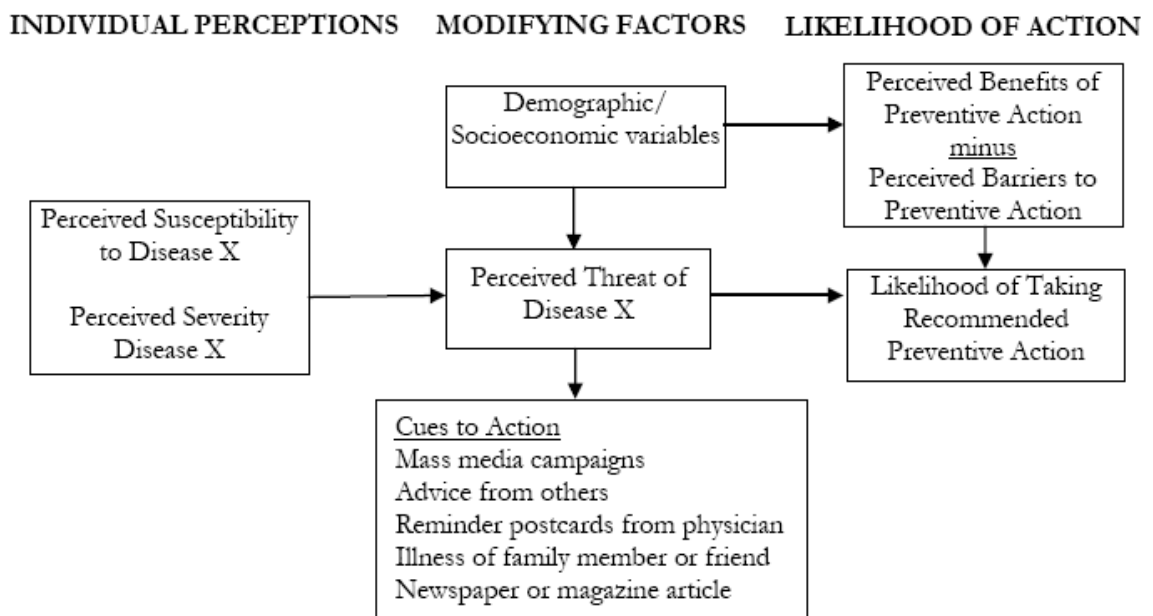
Health Belief Model (HBM)

The Health Belief Model (HBM) is one of the most widely used models to predict health-related behaviors (Lai & Cheng, 2004; K. Witte, Meyer, & Martell, 2001). This model is rooted in the expectancy-value theory, which posits that people consciously evaluate/calculate the potential costs and benefits, or value, associated with performing a particular behavior (Heib, Lukens, & Frank, 2005). The expectancy-value theory has three basic propositions. First, individuals respond to novel information regarding a particular item or action by developing a belief about it. Second, individuals assign a value to each attribute which a belief is based on. Third, individuals' expectation is created or modified based on the estimated outcomes based on beliefs and values.

According to the HBM, individual's motivation to engage in a particular behavior is influenced by several factors such as perceived susceptibility, perceived severity, perceived self-efficacy, perceived benefits, perceived costs, and cues to actions (Janz & Becker, 1984; Montano et al., 1997; Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1988). Perceived susceptibility is the belief that one is vulnerable and likely to be

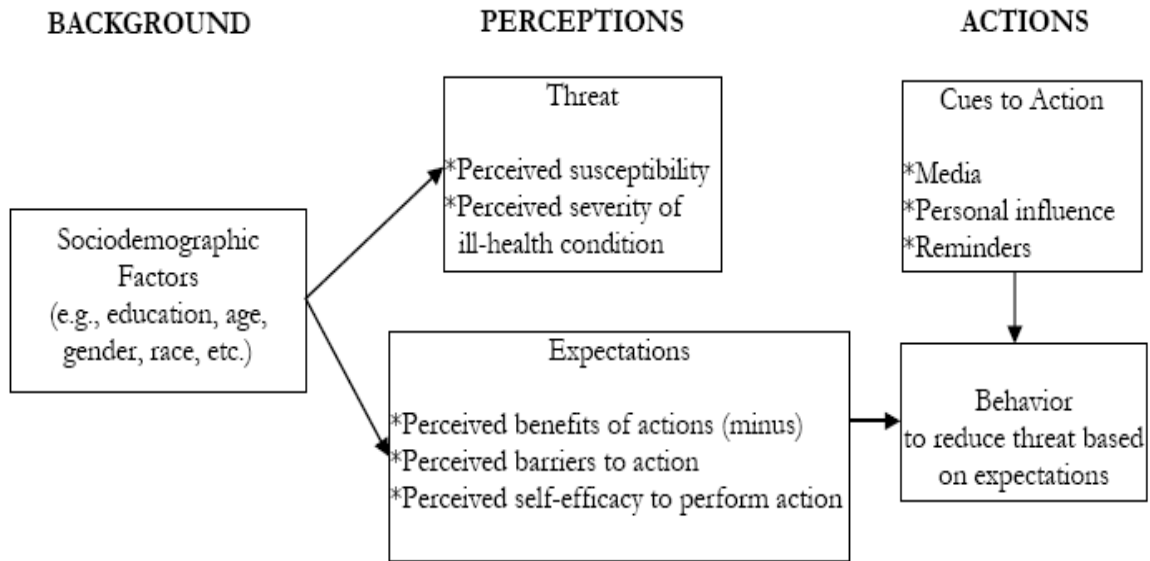
affected by a particular health problem. This perception is formed from negative physiological and psychological aspects associated with the health problem, uncertainty about the risks, and a desire to overcompensate for these by being overly optimistic or pessimistic about the risks (Covello & Peters, 2002). Perceived severity is the level of seriousness an individual attributes to the health condition (Silk et al., 2006). Perceived self-efficacy is the level of confidence in one’s ability to perform the recommended health behavior; perceived benefits is the level of one’s belief in the efficacy of the recommended behavior to actually reduce the risk or seriousness of the health problem; perceived barriers is the level of one’s opinion of the tangible and psychological costs of the advised behaviors; cues to action are any types of strategies and tactics to activate individuals’ “readiness” to take action (Glanz, Marcus Lewis, & Rimer, 1997). Figure 2 shows the original HBM (Janz & Becker, 1984; Rosenstock, 1974), and Figure 3 illustrates the revised HBM proposed later by Rosenstock (1990).

Figure2. Health Belief Model (Janz & Becker, 1984)



Note: Adapted from Janz & Becker (1984). *Health Education Quarterly*, 11, 1-47.

Figure3. The Health Belief Model – Revised (Rosenstock, 1990)



Note: Adapted from Rosenstock (1990). In Glanz, Lewis, & Rimer, *Health Behavior and Health Education: Theory, Research and Practice*.

According to the HBM, individuals weigh the benefits and costs in an effort to decide whether or not to perform a health-related behavior. In this process, perceived susceptibility and perceived severity should be high for the individual to consider changing his or her behaviors (Dutta-Bergman, 2005); both susceptibility and severity need to be high, but not higher than perceived efficacy in order for a new behavior to be adopted (Silk et al., 2006).

The HBM has been applied to predict a variety of health-related behaviors including food safety (e.g., Achille et al., 2006), AIDS risk-taking behaviors (e.g., Norris & Ford, 1995), contraceptive use (e.g., Vanlandingham, Suprasert, Grandjean, & Sittitrai, 1995), seniors' safety self-advocacy behaviors (e.g., Elder et al., 2007), skin cancer prevention (e.g., Weissman, 2008), and breast cancer screening (e.g., Calnan & Moss, 1984; Silk et al., 2006; Stein, Fox, Murata, & Morisky, 1992).

With respect to breast cancer interventions, Calnan and Moss (1984) reviewed a series of HBM studies regarding breast self-examination (BSE). For instance, Grady, Kegeles, Lund, Wolk, and Farber (1983) surveyed female patients who had been offered BSE instructions, and found that beliefs and barriers regarding the effectiveness of the examination differentiated participants from nonparticipants, while susceptibility and salience (i.e., an index of thinking about breast cancer) did not. Calnan and Moss (1984) then interviewed a group of middle-aged women in U.K. who were invited to attend a BSE class, and found that the major predictors of attending a BSE class were perceived vulnerability to breast cancer, general control over health (i.e., self-efficacy), and personal behavioral behaviors.

Stein et al. (1992) surveyed 1,057 American women over the age of 35 years in order to assess the relative influence of HBM constructs on prior mammography usage and the intention to receive mammograms. As a result, they found that cues to action (i.e., as a physician influence variable), prior mammography, and perceived susceptibility were the most powerful predictors of future intentions to obtain a mammogram. Socio-economic status (SES) of the respondents was only related significantly to perceived barriers, and cues to action, and did not directly influence prior mammography and future intentions.

Recently, Silk et al. (2006) conducted 10 focus groups (n = 91) of adolescent and adult females to examine the public's perceptions of risks associated with breast cancer, based on the framework of the HBM. Results revealed that both adolescent and mother groups recognized gender and heredity as relevant risk factors related to susceptibility, and detection as a strategy to decrease severity of breast cancer. Also, while adolescent

girls communicated more about efficacy issues, mothers tended to focus on the role of government and industry in breast cancer prevention and treatment. The findings of Silk et al. (2006) is meaningful in that they provide practical insights in developing breast cancer prevention campaigns for different target publics.

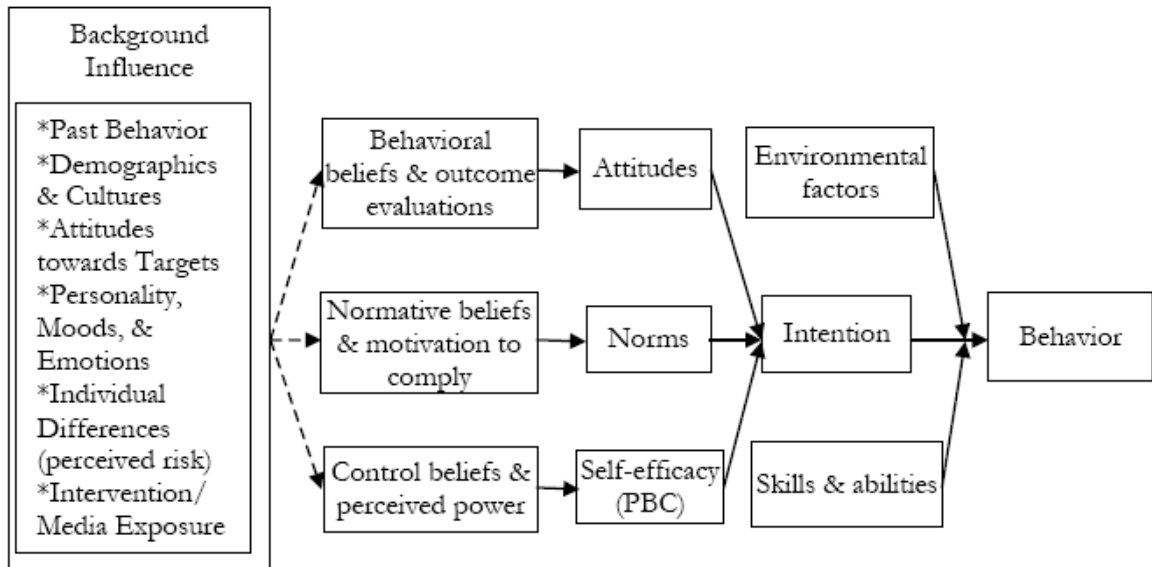
Meanwhile, Janz and Becker (1984) noted that general limitations of the HBM include: (1) most HBM-based studies have incorporated selected components of the HBM, rather than testing the model as a whole; (2) the model does not take into consideration other environmental or socio-economic factors that may influence health behaviors; (3) the model does not include the influence of social norms or peer influences on people's health decisions.

More recently, Roden (2004) addressed many criticisms that have been leveled at the HBM, such as the assumption that individuals perform health behaviors in a rational way; the lack of evidence to support the belief-behavior relationship; no suggestion of strategies for modifying or changing beliefs; the focus on individual factors without considering socio-environmental factors; unclear construct and relationship development. Roden (2004) then suggested that the TPB framework would be useful when undertaking modifications to the HBM. Roden (2004) noted that Ajzen's (1985) constructs such as "perceived behavioral control" and "intention" would fit better in some contexts of health-promoting campaigns. According to her, the TPB is "ideally placed to assist in the modification and reorientation of the HBM to reflect a health promotion emphasis, not only because of its new construct 'perceived behavioral control' but because it is also classified as an expectancy-value theory like the HBM" (p.4). Although Roden's (2004) revised model was proposed to assess only a specific case (i.e., families with young

children) and also limited in explaining why the original construct of “self-efficacy” should be replaced with the similar concept of “perceived behavioral control,” her suggestions shed some light on the present study, which will propose an integrative model of health-related behaviors.

Roden’s (2004) revised model integrated the TPB and the HBM, but still failed to take into consideration how individuals’ emotional, and sometimes irrational, responses influence one’s message processing, attitudes, and behavior intentions, as well as specific implications for effective health communication message development. In a similar but much broader sense, Fishbein (2000) proposed an integrative model of behavior that attempts to bring together a number of behavioral theories including the TPB, the TRA, the HBM, social cognitive theory (Bandura, 1994), the theory of subjective culture and interpersonal relations (Triandis, 1972, 1977), the trans-theoretical model of behavior change (Prochaska & DiClemente, 1986, 1992; Prochaska, Redding, Harlow, Rossi, & Velicer, 1994), the information/ motivation/ behavioral-skills model (Fisher & Fisher, 1992)(See Figure 4). Fishbein’s (2000) integrative model helps identify a number of variables which possibly influence one’s behavior, not only psychological factors but also environmental factors, based on a series of behavioral theories. Fishbein’s (2000) integrative model, however, is limited in that those behavioral theories have nothing to say about message design (Cappella, 2006) or how individuals process the health messages differently depending of the message elements. The Extended Parallel Process Model (EPPM), reviewed in the following section, will provide complementary insights for the current study by addressing those missing components, which should be considered for developing an integrated model of health behaviors.

Figure4. An Integrative Model of Behavioral Prediction (Fishbein, 2000)



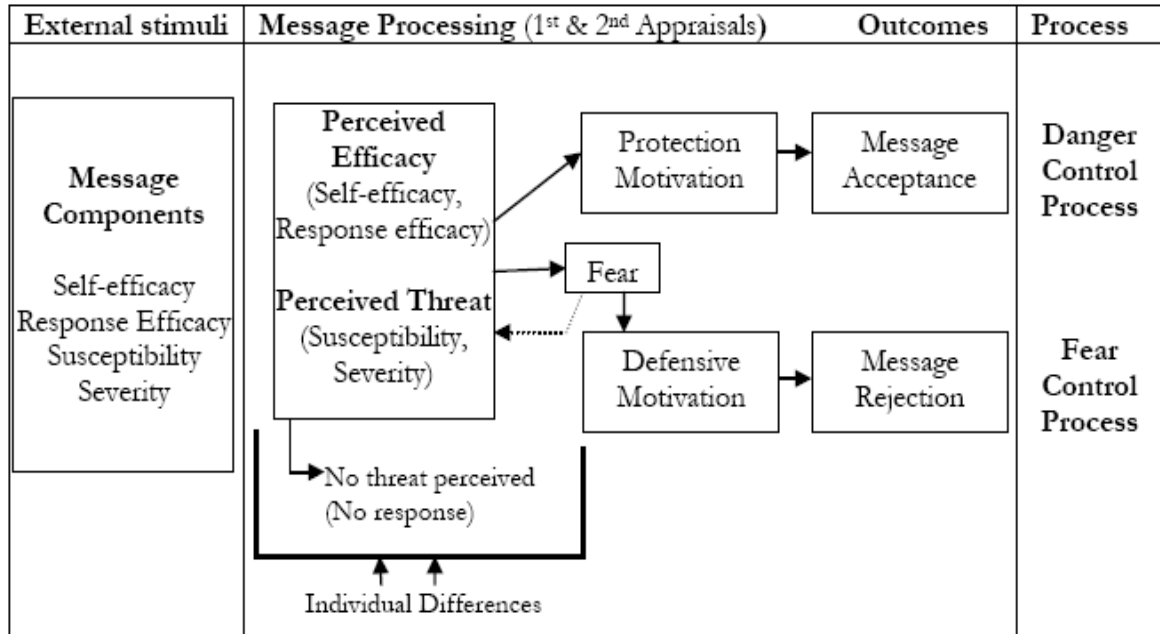
Note: Adapted from Fishbein & Cappella (2006).

Extended Parallel Process Model (EPPM)

The Extended Parallel Process Model (EPPM) (K. Witte, 1992) is a theory regarding the effectiveness of fear appeal messages, which attempts to explain when and why such threatening messages may work or fail (Gore & Bracken, 2005). The EPPM posits that the evaluation of perceived threat and perceived efficacy related to a particular message determine the processing route taken by the individual after being exposed to the threatening health-related message (K. Witte, 1992; K. Witte & Allen, 2000). After being exposed to a threatening message, the individual either attempts to control the danger by performing the recommended actions, or control the fear through avoiding or denying the message. As illustrated in Figure 5, an individual first evaluates the perceived threat of the problem (i.e., “appraisal of the threat”). If the perceived threat is low, he or she is not motivated to further process the message. Meanwhile, if the perceived threat is moderate or high, the individual moves to the next step (i.e., “appraisal of the efficacy of the message’s recommended response,” K. Witte et al., 2001, p.24). If

the perceived threat and the perceived efficacy are both high, the individual will likely perform the recommended action (i.e., “danger control process”). On the other hand, if the perceived efficacy is not as high as the perceived threat, the individual attempts to avoid or deny the message in order to control the fear (i.e., “fear control process”).

Figure5. Extended Parallel Process Model (EPPM)



Note: Adapted from Witte (1994).

The perceived threat consists of two critical dimensions: susceptibility and severity (Gore & Bracken, 2005). Susceptibility refers to one’s subjective perception of the likelihood that they will face the problematic situation (e.g., “I could get breast cancer”); severity refers to subjective perceptions about the magnitude or significance of the situation (e.g., “Breast cancer could kill me”) (Wotter, Meyer, & Martell, 2001). The perceived efficacy is composed of two dimensions: perceived self-efficacy and perceived response efficacy. The perceived self-efficacy refers to one’s perception of his/her ability to perform the recommended action to avert the threat (e.g., “I can obtain mammogram”); the perceived response efficacy refers to one’s belief about the effectiveness of the

recommended responses in deterring the threat (e.g., “Mammograms can be used to prevent or combat breast cancer”)(K. Witte, 1992; K. Witte et al., 2001).

As reviewed above, these four components (i.e., susceptibility, severity, perceived self-efficacy, and perceived response efficacy) determine the processing pathway taken by the individual: either danger control process or fear control process. The danger control process dominates when individuals perceive they are susceptible to a severe threat, but believe they are able to avoid it. Such cognitive process produces “protection motivation,” which in turn leads to change individual’s attitudes, intentions, or behaviors that reduce the threat (M. T. Stephenson & Witte, 2000). On the other hand, the fear control process dominates when individuals perceive they are susceptible to a serious threat, and do not believe they can avert it. In contrast to the cognitive danger control processes, fear control processes are basically emotional, where people attempt to control their fear. According to Stephenson and Witte (2000), such heightened fear arousal usually leads people to defensive avoidance (e.g., “I will just not think about breast cancer since it makes me scared”), denial (e.g., “I am not going to get breast cancer”), or message manipulation (e.g., “This message is just trying to scare me, but it will not work on me”). In sum, the EPPM posits that recommendations made by a fear appeal message are accepted when danger control processes dominate, but are rejected when fear control dominates (M. T. Stephenson & Witte, 2000).

The EPPM takes into consideration both the cognitive and emotional factors related to fear appeal message processing. Witte used previous fear appeal theories and developed this integrated model based on Leventhal’s Parallel Process Model (PPM) as a basic framework. Leventhal’s (1970) PPM posits that when exposed to a threat, if

individuals think about strategies to avert the threat, a threat control process is activated and changed attitudes, intentions, and behaviors follow. On the contrary, if individuals focus on the fear, a fear control process is activated and maladaptive attitudes and behaviors are likely to occur. Rogers followed Leventhal's lead, but focused specifically on the cognitive aspects of a threat control process. Rogers' Protection Motivation Theory (PMT) posits that adaptive vs. maladaptive responses to a health threat is a result of two appraisal processes: threat appraisal and coping appraisal. The appraisal of the health threat (i.e., intrinsic/extrinsic rewards minus severity and vulnerability) and the appraisal of the coping responses (i.e., response/self efficacy minus response costs) result in "protection motivation," which may lead to adaptive responses (i.e., actions) or maladaptive responses (e.g., inhibition of actions) (Rogers, 1983). Roger's PMT provides an understanding of when fear appeals work (i.e., the danger control processes), but was not clear about when and why fear appeals fail (i.e., the fear control processes). That is, the PMT focuses on the cognitive aspects of how individuals process fear appeal messages, but fails to explain how emotional and often irrational aspects can intervene in the processing. In this sense, the EPPM (Witte, 1992) incorporated the cognitive component of the PMT and the emotional component of the PPM. That is, individuals first appraise the perceived threats (i.e., perceived vulnerability and severity). If the threat is moderate to high, then individuals move to the second appraisal (i.e., response efficacy and self-efficacy). If the perceived efficacy is high enough, then individuals are likely to accept the message. In contrast, if the efficacy is low, then individuals will focus on the internal emotions and physiological reactions to their fear and attempt to control the fear by denial, avoidance, or suppression (C. E. Brown & M. L. Lewis, 2003).

In the context of health communication, the EPPM shares common ground with the HBM. Although the EPPM is specifically about the role of fear appeals while the HBM generally predicts health-related behaviors, these two models share many same or similar constructs such as perceived severity, perceived susceptibility, and perceived self-efficacy (Mattson & Kline, 2000). Matteson and Kline (2000) also point out that “benefits” of and “barriers” to actions are subcategories of “response efficacy” and “self-efficacy,” respectively. Despite all these similarities, however, the EPPM offers a unique implication for health communicators who intend to design effective health messages. The EPPM posits that there is a critical point when perceived threats from the message begin to outweigh perceived efficacy (Witte, 1992), providing practical guidelines for message designs. According to the EPPM, a successful fear appeal message should lead the audience to the path of danger control where they perceive the threat and attempt to control the danger, and not be swayed by their emotions through the path of fear control.

The EPPM has been empirically tested and practically applied in several health contexts. The initial test of this model was conducted in the context of AIDS (M. T. Stephenson & Witte, 2000). That is, the high threat component (e.g., depicting the severity of STD), in combination with a high efficacy message (e.g., condom usage) produced the participants’ healthy behaviors and decreased unprotected sex. In contrast, the high threat component in combination with the low efficacy message elicited strong fear responses and produced no increase in condom use (K. Witte, 1994). Additionally, a series of researchers have applied the EPPM to various health contexts such as STDs (K. Witte, Berkowitz, Cameron, & Lillie, 1998), radon awareness (K. Witte et al., 1998), skin

cancer (M.T. Stephenson & Witte, 1998), cervical cancer (C. Brown & M. Lewis, 2003), and tractor safety (K. Witte et al., 1993).

In the context of breast cancer intervention, Mattson and Kline (2000) analyzed breast self-examination pamphlets with a coding scheme derived from the EPPM. The authors note that effective self-examination messages must “incorporate messages that address the four variables of severity and susceptibility (i.e., threat) and response and self-efficacy” (Mattson & Kline, 2000, p. 4). More recently, Hubbel (2006) interviewed 48 Mexican American women in rural areas to examine why those women would or would not perform cancer prevention behaviors, based on the framework of the EPPM. Findings revealed that the women had perceived high self-efficacy and susceptibility regarding breast cancer but did not perceive it as severe. Hubbel (2006) also found that these perceptions were positively and negatively associated to cancer prevention behaviors. Similarly, but in a broader context, Wong (2009) surveyed a national sample of 2,226 adults ages 40 to 70 to examine the interaction between comparative cancer risk and efficacy perceptions on individuals’ adherence for colon, prostate, and breast cancer screenings. Results found some significant interaction effects between risk and efficacy on colonoscopy adherence, colonoscopy intentions, and mammogram intentions. That is, only when efficacy perceptions were high, high risk perception would have an impact on those behavioral outcomes. Wong’s (2009) findings validated the practical implications of the EPPM for health campaigns, specifically the need to increase efficacy perceptions about reducing cancer risks when designing health campaign messages.

The EPPM provides more practical implications for designing health messages than do other behavioral theories; however, the EPPM is still limited in that the model

specifically focuses on fear appeal messages. A fear appeal message is one of the widely used tactics in health campaigns, but it is certain that there are many other message factors which could be applied for developing effective health messages (e.g., frames, tailoring, narratives, exemplars, emotional functions, etc.). The following section will examine a series of studies on message effects in the context of health communication.

b. Health Message Design Framework

According to Cappella (2006), many researchers have developed a series of message effect theories to predict the format and content of messages that produce effects on cognitive, attitudinal, and emotional outcomes. Cappella (2006) also notes that theory-driven research about message effects allows us to isolate which message features are most responsible for the consequences of a given message, as well as to understand the mechanism to be applied across contexts.

According to Keller and Lehmann (2008), message tactics are key controllable variables for health communicators. Keller and Lehmann (2008) conducted a meta-analysis of 60 studies to examine the influence of 22 message tactics and individual characteristics on intentions to follow health recommendations. The message tactics that the authors examined include fear, gain vs. loss frames, vividness, physical vs. social consequences, female vs. male communicator, source credibility, argument strength, two-sided arguments, multiple exposures, tailored message, emotional message, encourage vs. discourage behavior, and prevention vs. detection vs. remediation behavior. The results from the full regression model of meta-analysis supported the majority of the message effects observed in the literature. Specifically, Keller and Lehmann (2008) found support for the use of case information, social consequences, other-referencing, and female

communicators to increase health intentions. One of the surprising results of this meta-analysis was that it did not find any significant gain or loss frame effect on health behavioral intentions. It might be due to the fact that the effect of gain vs. loss frame is usually differentiated by a variety moderating factors. In fact, Keller and Lehmann (2008) note that the effectiveness of message frames often depends on individual differences (e.g., gain-framed messages are more effective for promotion-oriented people, while loss frames are more effective for prevention-oriented people; see Lee & Aaker, 2004). The current study will specifically examine how the effectiveness of gain vs. loss frames in breast cancer prevention messages are moderated by recipients' issue involvement levels.

Meanwhile, Thompson (1984) once claimed that “too many researchers start from scratch rather than investigating variables that may moderate processes uncovered in earlier research” (p. 149). Based on Thompson's claims, Murray-Johnson and Witte (2003) identified the overlapping variables across several health communication theories (e.g., HBM, TRA, TPB, EPPM) and placed them within a message design framework. Specifically, Murray-Johnson and Witte (2003) noted four categories of the common variables across the theories: (1) stimuli, (2) motivational variables, (3) appraisals of environment and resources, and (4) outcome variables. First, message designers should develop effective health communication *stimuli* by choosing various message features such as vividness, repetition, and placement in the mass media; the message would be salient if it is considered important, significant, or relevant by the audience. Second, although stimuli are critical in grasping the audience's attention, *motivation* is important to how a message is processed and leads to behavioral change; Murray-Johnson and Witte (2003) identified four variables (i.e., fear, threats, perceived severity, and perceived

susceptibility) as key factors which trigger the motivation in an individual to process the message. Third, the strength of the motivation influences the extent to which the individual feels compelled to *appraise* his or her resources and environment to determine his or her coping mechanism; Murray-Johnson and Witte (2003) noted that the appraisal process includes (a) the individual's perceived efficacy, (b) the individual's beliefs about subjective norms, and (c) factors that can affect the individual's beliefs about his or her ability to perform the action (i.e., perceived barriers, benefits, locus of control, attitudes, etc.). Finally, the outcome variables encompass behavioral intentions and behaviors, no response, danger control response, and fear control responses (e.g., denial, defensive, avoidance, or reactance). Having delineated these key variables, Murray-Johnson and Witte (2003) noted that the four categories provided "a checklist of the necessary steps to ensure not only that a health message is heard and processed but that the audience actually engages in the recommended behaviors (p.488)." Additionally, the authors also claimed that future researchers might need to examine how such individual variables work together. To date, researchers have used one or two theories to explain how individual message features work at a time, but little has been known about how those variables work together in one overall framework; "all the various interactions, indirect effects, and unintended effects that can occur (p.488)."

The present study intends to propose an integrated framework based on major health communication theories, and, within that framework, examine how different message effects (i.e., gain vs. loss frames and emotional effects) work together. Initially, this study will assess how an individual factor (i.e., gender) affects the information processing of breast cancer prevention messages in terms of involvement levels. Notably,

the current study will serve as an initial study that addresses the crux of this new model, which will be synthesized through a series of subsequent studies. Such an overall framework will provide theoretical as well as practical guidelines for health communicators who attempt to design effective health messages for different target publics. Meanwhile, in order to develop a comprehensive framework, it is necessary to integrate another theory to explain individuals' information processing of health messages. The behavioral theories such as TRA, HBM, EPPM and message effect theories are limited in explaining and predicting the mental process of how an individual processes a given health message. In a similar sense, Cappella (2006) claims that it is critical to investigate the integration of three streams of studies in their applications to the health communication context: (1) behavioral change theories, (2) message effect theories, and (3) human information processing. Thus, this study will integrate the key concepts of the dual-process models of information processing into the integrated health message processing framework. The following section will review the dual-process models in the context of health communication, and then propose an integrated theoretical framework for this study.

c. Dual-Processing Models of Information Processing

The dual-processing approach posits that there are two different modes of thinking that a person may employ when processing information. Petty and Cacioppo (1986) called the two modes central route vs. peripheral route (Elaboration Likelihood Model); Chaiken (1980, 1987) called them systematic processing vs. heuristic processing (Heuristic Systematic Model). Elaboration Likelihood Model (ELM) and Heuristic Systematic Model (HSM) are two classic models of dual-process theories that embody this process

of message reception, attitude change and possibly, behavioral change. According to both ELM and HSM, a host of variables (either situational or dispositional) can trigger qualitatively different information processing modes. Systematic (central) mode refers to thinking carefully and attentively with much cognitive effort. In contrast, heuristic (peripheral) mode refers to “skimming” the information carelessly with less attention or cognitive effort. Whether an individual will process the message by either the systematic or heuristic mode is determined by several factors such as motivation (i.e., how much he or she is motivated to elaborate the message), ability (i.e., how much ability he or she has to elaborate the message), and relevance/involvement. (i.e., how much the message is perceived as relevant to the recipient) (Petty & Cacioppo, 1986).

One of the critical concepts of the dual-processing models is the message recipient’s involvement with (or perceived relevance to) the message. The involvement level could promote or impede the recipient’s elaborated message processing. Petty, Priester, and Brinol (2002) noted that the perceived personal relevance of the message is one of the most important determinants leading individuals to elaborate the message. Petty and Cacioppo (1979) conducted an experiment by manipulating the level of personal relevance and the argument strength, and found that people were more persuaded by high relevance messages when the arguments were strong. On the other hand, when the arguments were weak, people were *less* persuaded by high relevance messages than by low relevance messages. This finding shows that when an individual is highly involved in the message, he or she will most likely to be persuaded by message characteristics that are central to the issue. In contrast, when an individual is lowly involved in the issue, then he or she will most likely to be persuaded by “peripheral cues”

that are extraneous to the message (Petty et al., 2002). The fact that individuals' involvement level affects the way they process persuasive messages provides an important implication for health communicators. When health communication practitioners design health messages, it is critical to consider the different involvement (relevance) levels of different target publics with the issue, as well as how such involvement differences will interact with the message features in persuading the message recipients. Specifically, the present study will examine the possible interaction between individuals' involvement level in breast cancer issue and the gain vs. loss frame message feature in breast cancer prevention message processing. It should be noted that this study focus on individuals' *issue* involvement (i.e., perceived importance of a given health issue) that the individuals originally hold, rather than *message* involvement which researchers often manipulate using actual evoking stimulus object and/or situation.

Also, the dual-processing approach is meaningful in that it shows that an individual's emotion can actually change one's attitudes, as opposed to the traditional behaviorist learning paradigm which posits that the emotional cues are secondary and can function only when the "peripheral" mode is on. As noted above, the dual-processing approach claims that persuasion occurs through different mechanisms, depending on the level of cognitive effort an individual allocates when considering persuasive appeals (Cacioppo & Petty, 1989; Chaiken, 1987). That is, at the systematic mode, the attitude-relevant information (e.g., argument, reasoning, facts, etc.) can have an impact on attitude change. On the other hand, at the heuristic mode, the individual's affective state can have an impact on his attitudes (e.g., emotional cues, attractiveness, friendliness, etc.). That is,

at the heuristic mode, people tend to use their affective state as information to process the message (Schwarz & Clore, 1988).

Additionally, Petty and his colleagues (2003) recently extended their earlier version of “cognitive-oriented” dual-processing model, demonstrating that emotion can influence the cognitive processing in more various ways than was previously proposed. They argued that the affect can influence the persuasion process at the high elaboration mode as well. There are several affects that influence the persuasive process including mood-biasing information processing (i.e., individuals tend to do selective processing since the mood can change their perceptions of likelihood or desirability of events), the influence of congruency effects (i.e., individuals tend to scrutinize the message whose emotional tone is congruent with their mood), and substantive processing (i.e., individuals tend to be influenced by their mood when they process novel, atypical, or complicated messages) (Forgas, 2000).

Additionally, Petty, Fabrigar, and Wegener (2003) argued that when the elaboration is modest, the emotional state itself can determine the depth of processing. That is, a positive mood tends to promote heuristic processing, whereas a negative mood tends to promote systematic processing. In a similar sense, Forgas (2000) and Bless (2000) argued that a positive affect generates a top-down, schematic, heuristic processing while a negative affect produces a bottom-up, data-at-hand, systematic processing.

This extended model of dual-processing provides a broad view of how individuals’ emotional states play a critical role in determining how and what they think about a persuasive message. That is, in the context of health communication messages, the emotional states induced by the messages would, in turn, influence how the audience

thinks about the messages. Specifically, this study intends to examine how individuals' issue involvement levels and the gain vs. loss frame interplay in eliciting different emotional responses (i.e., valence and arousal) from the recipients, and then how such emotional responses, in turn, influence the recipients' elaborated processing, attitudes, and possibly behavioral intentions. More literature on dual-processing models in terms of health message processing will be further reviewed in the next chapter. For now, Figure 6 shows an integrative framework of health message processing, encompassing the key concepts of HBM, EPPM, and dual-processing models and TRA.

Figure6. An Integration Framework of Health Message Processing

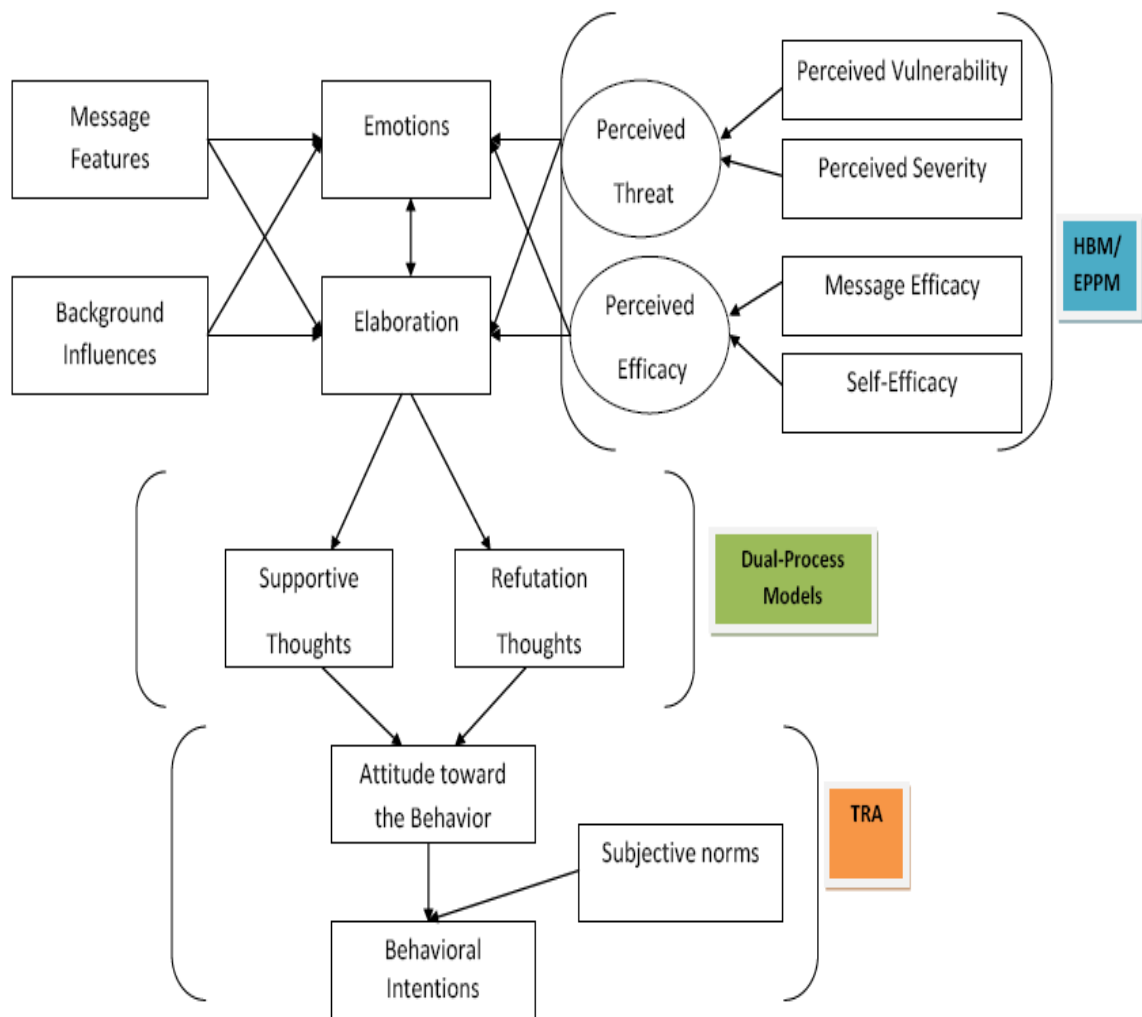


Figure 6 shows an overall framework where a message factor (i.e., gain vs. loss framing) and an individual factor (i.e., issue involvement) interact with the recipients' message perceptions (i.e., perceived threat and perceived efficacy) in eliciting emotional response and leading to cognitive processing (i.e., determining elaboration depth). Further, the framework could explain how central or peripheral processing of information leads to attitude change and ultimately intention to change a health behavior.

In the context of breast cancer prevention messages, this integrated framework may explain how people process persuasive messages regarding the threat of breast cancer and may help predict likelihood of breast cancer screening behaviors (e.g., obtaining mammogram, or recommending others to obtain mammogram). More specifically, the current study intends to examine how different target publics (i.e., male vs. female recipients), who have different involvement levels in the issue of breast cancer, would process gain- vs. loss-framed messages concerning the threat of breast cancer. Depending on the type of message features (e.g., gain vs. loss frame), individual's issue involvement level (high vs. low), and perceptions of the message (i.e., the magnitude of perceived threat and efficacy), the integrated framework proposes that the individual will process that information centrally or peripherally. The framework also proposes that the individual's cognitive processing can produce either supportive or refutative thoughts regarding the behaviors recommended in the messages, depending on the individual's message perceptions and emotional responses. Whether supportive or refutative, the individual's thoughts will influence his or her attitudes toward the behavior and, along with subjective norm perceptions, ultimately intentions regarding the behavior. Taken together, the integrated model provides an overall framework to explain and predict how

recipients process health messages, as well as practical guidelines for developing effective health messages by employing certain message features for particular target audiences. The current study will serve as an initial study that addresses one of the key cruxes of this framework by focusing on the interaction between a message factor (i.e., framing) and an individual factor (i.e., issue involvement).

2-2. Message Framing

a. Prospect Theory (Gain vs. Loss Frame)

Persuasion researchers and practitioners have been interested in the relative effectiveness of gain vs. loss framing of messages for changing recipients' attitudes, intentions, and possibly behaviors. Framing effects refer to "the findings that decision-makers respond differently to different but objectively equivalent descriptions of the same problem" (Kuhberger, 1998, p.150). More specifically, framing research focuses on the differential effects on persuasion of presenting information in terms of the benefits gained (gain frame) or the consequences suffered (loss frame) in some decision-making contexts (Loroz, 2007). As McElroy and Seta (2003) noted, predictions concerning framing have been typically derived from the theoretical framework of prospect theory (Kahneman & Tversky, 1979). The basic assumption of prospect theory is that individuals' decisions in the context of "risky choice" are not necessarily rational. Kahneman and Tversky (1979) defined framing as "the use of decision-relevant information by a buyer to make comparative evaluation about a product or service relative to a reference point" (recited in Smith & Wortzel, 1997, p.123); Kahneman and Tversky (1979) suggested that "the psychophysics of how alternatives are described influences decision making, and that decision makers frequently engage in heuristic rather than analytic processing. (p.123)"

According to prospect theory (Kahneman & Tversky, 1979), an individual's decision-making process consists of two phases. The first phase involves simplifying and reorganizing the available options; the options are coded as gains or losses, relative to a neutral reference point. The next phase involves evaluating the coded options; the subjective values and the probabilities for each of the options are evaluated. In this evaluation phase, the relative advantage of gain vs. loss frame is illustrated as the S-shaped value function, which is concave for gains and convex for losses. This figure illustrates prospect theory's prediction of risk aversion for gains (i.e., preference for the sure gain) and risk-seeking for losses (i.e., rejection of sure gain for gamble of lower probability). That is, an individual in the concave curve should prefer 100 dollars for sure rather than a 50/50 chance to win either 200 dollars or nothing. An individual in the convex curve should prefer a 50/50 chance to lose 200 dollars or nothing rather than losing 100 dollars for sure (McElroy & Seta, 2003).

This propensity to choose risk-averse options when a problem is framed as gain, and risk-seeking options when a problem is framed as loss has been applied to the context of persuasive message design. That is, a gain-framed message would be more effective than a loss-framed message in promoting cautious behaviors. On the other hand, a loss-framed message would be more effective than a gain-framed message in promoting behaviors that involve some risk or risk perception. There have been a series of studies on message framing in the field of marketing and consumer psychology. For instance, Smith and Wortzel (1997) noted that valence framing engages consumers into comparison of positive or negative consequences that are contingent on the purchase decision. Puto (1987) found a consistent relationship between buyers' reference points and subsequent

buying decisions. Ross (1991) investigated salespersons' choice between risky or conservative sales calls, depending on where he or she stood in relationship to making quota as the reference point. More recently, Witte, Grunhagen, and Gentry (2008) examined consumer negotiating pricing in a real estate context, and found that the selection of a reference point (i.e., sale price vs. equity) influenced sellers' perceptions of the magnitude of concessions, leading to different levels of concession tendency. That is, home sellers using sales price as a reference point showed greater willingness to make concessions than those who use equity as the reference point (C. L. Witte et al., 2008).

As demonstrated through the previous studies, prospect theory is inconsistent with the rational predictions of expected utility theory (McElroy & Seta, 2003), which argues that the way the options are framed should not change individuals' tendency of either risk-aversion or risk-seeking behavior (von Neumann & Morgenstern, 1944). Rather, prospect theory suggests that the way in which the messages are framed does influence the message recipients' perceptions and behavioral intentions. That is, logically equivalent choice alternatives which are differently described will result in different preferences. Kühberger (1998) provided empirical evidence to support this perspective of prospect theory by conducting a meta-analysis of framing effects in a variety of areas such as experimental, social, and applied psychology, medicine, management, advertising, business, and other applied disciplines. The result of this meta-analysis of 136 empirical studies (experiments with about 30, 000 total participants) shows that the overall framing effect between gain vs. loss conditions is of small to moderate size, concluding that framing is a reliable phenomenon; the results also reported a tendency of risk aversion for

positively framed problems and a tendency of risk-seeking for negatively framed problems.

b. Message Framing in Health Communications Research

Message framing has been extensively applied in the area of health communication over the last few decades (McElroy & Seta, 2003). In the context of health communication, information about a health behavior or a problem can focus on the benefits of taking a recommended action (i.e., a gain-framed message) or the costs of failing to take the action (i.e., a loss-framed message) (Rothman et al., 2006). According to Rothman et al. (2006), for decades, health communication researchers have explored the impact of fear appeals; however, the premise that the way information is *framed* can influence individuals' decisions was motivated by the theoretical propositions of prospect theory. Based on prospect theory, a series of researchers have assessed how framing effects can provide guidelines for developing effective health messages (Rothman et al., 2006). Since health-related information is often presented in terms of risks (i.e., loss) or benefits (i.e., gain), health messages can be developed as loss-framed or gain-framed messages to promote health-related behaviors. Rothman and Salovey (1997) noted that prior studies that applied prospect theory to the health context have produced some inconsistent results. Rothman and Salovey (1997), therefore, argued that researchers should consider the specific context of the health issue, where either gain- or loss-frames are more effective than the other. Specifically, Rothman and Salovey (1997) proposed that, given the premise that people are more willing to take risks when exposed to loss-framed messages but more risk averse when exposed to gain-framed messages, the influence of a given frame on health behavior should be contingent on whether the behavior is perceived as

either risk-seeking or risk-averse. As to the question of what determines whether a particular health behavior is considered risk averse or risk-seeking, Rothman et al. (2006) proposed a particular health behavior is perceived as a risky or safe course of action depending on “the extent to which people perceive the behavior will afford an unpleasant outcome” (p.205). For instance, when people are considering a behavior that may involve some risk of potentially unpleasant outcomes (e.g., detecting a health problem such as breast cancer), loss-framed health messages will be more effective; when people are considering a behavior that may involve a “relatively low risk of an unpleasant outcome” (e.g., preventing the onset of a health problem), gain-framed health messages will be more persuasive (p. 205, Rothman et al., 2006).

In this sense, many researchers have claimed that loss-framed appeals are more effective in promoting detection behaviors (e.g., cancer screening), while gain-framed appeals are more effective in promoting prevention behaviors (e.g., using a sunscreen). Indeed, this conceptual framework has been supported by a large body of empirical research (Apanovitch, McCarthy, & Salovey, 2003; Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999; Gerend & Cullen, 2008; Kiene, Barta, Zelenski, & Cothran, 2005; Rivers, Salovey, Pizarro, Pizarro, & Schneider, 2005; Robberson & Rogers, 1988; Schneider et al., 2001). For instance, the messages which recommend detection behaviors can be perceived as “risky,” since there is the possibility of detecting a health problem. Literature has shown that loss-framed messages over gain-framed messages are generally more effective for breast self-examination post-test behaviors (Meyerowitz & Chaiken, 1987; Williams, Clarke, & Borland, 2001), mammography post-test behaviors (Banks et al., 1995; Schneider et al., 2001), and blood cholesterol screening attitudes (Maheswaran

& Meyers-Levy, 1990). Recently, O’Keefe and Jensen (in press) conducted a meta-analytic review of 53 studies and found that in the messages which encourage disease detection behaviors, loss-framed appeals were slightly, but statistically significantly, more effective than gain-framed appeals.

On the other hand, the messages which recommend prevention behaviors may involve little or no risk. Several studies have found that gain-framed messages are more persuasive for encouraging disease prevention behaviors as compared to loss-framed messages. For instance, Toll and his colleagues (Toll et al., 2007) conducted an experiment to examine the effects of gain- vs. loss- framed message for encouraging smoking cessation (i.e., prevention behavior), and found that prospect theory suggests that among 170 treatment completers, a significantly higher proportion of participants were continuously abstinent in the gain-framed condition than in the loss-framed condition. In a similar sense, Gerend and Cullen (2008) conducted an experiment in the context of college students’ alcohol use, and found that students exposed to a gain-framed message reported lower alcohol use than those exposed to a loss-framed message, specifically when they read about short-term consequences of alcohol use as compared to long-term consequences. The meta-analysis by O’Keefe and Jensen (2007) examined 93 previous studies and found a small but significant advantage for gain-framed over loss-framed messages for promoting disease preventions behaviors such as dental hygiene behaviors.

In the context of breast cancer communication, Rothman et al. (2006) noted that, although behaviors such as mammography provide long-term benefits, characterizing them as *risky* accurately captures individuals’ perceptions of such behaviors. Since a

majority of breast cancer-related messages involve detection behaviors (e.g., mammography, self-examinations), loss-framed appeals over gain-framed appeals have been considered as more effective in encouraging breast cancer-related behaviors. For instance, Meyerowitz and Chaiken (1987) found that pamphlets with loss-framed appeals were more effective in increasing undergraduate women's positive attitudes toward and engagement in breast self-examination (BSE), as compared to those with gain-framed appeals. Banks, Salovey, Greener, Rothman, Moyer, and Beauvais (1995) also found that women who were previously not complying with National Cancer Institute (NCI) screening guidelines were more likely to obtain a mammogram one year after viewing a loss- vs. gain-framed videotape. More recently, Abood, Coster, Mullis, and Black (2002) evaluated a loss-framed telephonic message for the effects on mammography utilization among women living in rural counties in Florida and found that women who received a loss-framed message were six times more likely to obtain a mammogram than those who did not receive the loss-framed message. Indeed, in the recent meta-analysis of O'Keefe and Jensen (in press), the authors examined 17 studies regarding breast cancer detection behaviors ($N = 2,736$), and found that a dependable advantage for loss-framed appeals was apparent for breast cancer detection behaviors (mean $r = -.056$).

Meanwhile, although many studies have supported the principle that gain-framed messages would work better for promoting *prevention* behaviors, and loss-framed messages for promoting *detection* behaviors, another line of researchers have claimed that the relative effectiveness of gain vs. loss framing can be moderated by various individual and situational factors in addition to the simple distinction of prevention vs.

detection behaviors. The next section will review previous literature on various moderating variables which possibly influence gain vs. loss framing effects.

c. Moderating Factors of Message Framing

A number of variables have been suggested as possible moderators of gain vs. loss message framing effects (O'Keefe & Jensen, in press). Lee and Cameron (2006) also noted that message framing effects are likely to be moderated by situational factors (e.g., mood, issue salience, etc.) or individual characteristics (e.g., regulatory focus, motivational orientation, NFC, etc.).

For instance, Keller, Lipkus, and Rimer (2003) conducted two experiments which revealed that the gain vs. loss framing effects depend on the affective state (i.e., mood) of female participants. That is, using mammogram promotion messages, the authors found that participants induced with a positive mood were more persuaded by the loss-framed messages, while those induced with a negative mood were more persuaded by the gain-framed message. Additionally, it was also found that participants in a positive mood had greater risk perceptions of getting breast cancer and lower costs of getting a mammogram in response to the loss-framed message as compared to the gain-framed message; the reverse was true for those in a negative mood. These findings were consistent with the authors' expectation that "people in a positive state would be more concerned about losses since they have more to lose; so receiving a loss-framed message is consistent with their thoughts" (p. 56). That is, according to Keller, Lipkus, and Rimer (2003), the effectiveness of gain vs. loss frames would be moderated by prior affective state due to the increased focus on potential losses among those in a positive mood.

Obermiller (1995) examined the role of “issue salience” in moderating the gain vs. loss framing effects. Specifically, the results of his experiment revealed that the relative effectiveness was determined by the issue relevance. For the issue holding a high salience (i.e., recycling), there was no significant difference between gain and loss framing; for the issue holding a low salience (i.e., solid waste reduction), loss-framed messages were more persuasive than gain-framed messages.

Ganzach and Karsahi (1995) investigated the relative effectiveness of gain- vs. loss-framed message (i.e., credit card advertisements) on consumer buying behaviors in the laboratory setting vs. natural marketing environment. The findings showed that gain-framed messages were more persuasive than loss-framed messages in laboratory settings, whereas loss-framed messages were more persuasive than gain-framed messages in the natural environment.

On the other hand, a series of studies have examined various individual factors which possibly moderate the gain vs. loss framing effects. That is, several researchers have revealed that individuals’ sensitivity to favorable and unfavorable outcomes moderates their reactions to gain- vs. loss-framed appeals (Rothman et al., 2006). For instance, Mann, Sherman, and Updegraff (2004) argued that individuals’ motivation system, either an approach system (as the behavioral activation system, BAS; Gray, 1990) or an avoidance system (such as the behavioral inhibition system, BIS; Gray, 1990), influences their selective cognitive processing of reward vs. punishment cues. Particularly, in the context of framing effects, Mann et al. (2004) argued that gain-framed messages should be more effective with an individual who is predominantly approach-oriented, and loss-framed messages more effective with one who is predominantly

avoidance-oriented (Mann et al., 2004). Recently, Sherman (2006) and Updegraff, Sherman, Luystera, and Mann (2007) also found that health messages framed to be congruent with individuals' approach/avoidance motivations were more effective in promoting health behaviors than those incongruent with approach/avoidance motivations.

Using a different but conceptually similar framework on the regulatory focus (a promotion-oriented orientation vs. a prevention-oriented orientation, Cesario, Higgins, & Scholer, 2008; E. Higgins, 1997), several researchers have found that gain-framed messages were more persuasive for promotion-oriented people, whereas loss-framed messages were more persuasive for prevention-oriented people (Cesario, Grant, & Higgins, 2004; A. Y. Lee & Aaker, 2004).

Zhang and Buda (1999) investigated how one's need for cognition (NFC) could moderate framing effects in the context of consumer advertising. Zhang and Buda (1999) argued that individuals with high NFC are more likely to exert greater cognitive effort to process persuasive messages. Based on such an information processing approach, the authors expected that high NFC participants would recognize no difference between gain- and loss-framed messages, whereas low NFC participants would tend to process the messages by relying on easily processed heuristics. The findings generally supported the expectation. There were no significant differences between gain- vs. loss-frames effects for high NFC participants, while gain-framed messages were more persuasive than loss-framed messages for low NFC participants, confirming the advantage of gain-frame over loss-frame in *promotion* messages.

In the context of health communication, Rothman et al. (2006) argued that the experience of close friends and family would also moderate the gain- vs. loss-framing

effects since such experience would influence how an individual construes a particular behavior. In a similar sense, Cho and Boster (2008) investigated the effects of gain- vs. loss-framed antidrug ads on adolescents with different social and behavioral characteristics. Specifically, Cho and Boster (2008) conducted an experiment and found loss-framed ads, over gain-framed ads, were more persuasive for adolescents whose friends use drugs. There was no difference between gain- vs. loss- framed ads for those who reported that their friends do not use drugs. Based on such findings, the authors argued that individual differences may influence how one perceives a particular behavior as “risky” and such risk perceptions would in turn affect the effectiveness of gain- vs. loss-framed messages.

Meanwhile, a series of researchers have examined the role of gender in the gain- vs. loss-framing effects of persuasive messages. For instance, Braun and Gaeth (1997) created two versions of chocolate bar packaging, gain frame (“80% fat-free”) vs. loss frame (“20% fat”), and examined how such framed attributes were differently perceived by male vs. female participants. The authors expected that females and males would have different levels of involvement (motivation to process) regarding the “fat” issue. The findings revealed that framing effects emerged only from female participants. That is, the gain-frame was more effective to female participants than the loss-frame, whereas there was no difference to male participants.

In the context of health communication, Meyerowitz and Chaiken (1987) showed that loss-framed messages are more effective in persuading *women* to use breast self-examination (BSE), as compared to gain-framed messages. O’Keefe and Jensen (in press) noted that, based on Meyerowitz and Chaiken’s (1987) findings, one might suspect that

on disease detection topics, loss-framed messages are more persuasive than gain-framed messages for *females* but not for males. To answer this question, O’Keefe and Jensen (in press) examined the relationship between a study’s effect size and the proportion of female participants in that study in their meta-analysis of 36 studies. Results revealed that there is little evidence that men and women are differentially susceptible to gain- vs. loss-framed messages regarding disease detection behaviors. In fact, in the context of testicular cancer communication, Umphrey (2003) revealed that loss-framed messages are more effective in persuading *men* to perform testicular self-examination. Umphrey’s (2003) findings, along with Meyerowitz and Chaiken’s (1987), provide an interesting insight that the level of involvement, rather than gender itself, would be one of the significant factors which moderate loss- vs. gain-framing effects.

Loroz (2007) examined the role of “involvement level” by conducting two experiments where frame (gain vs. loss) and reference point (self vs. self-others) were manipulated in persuasive messages promoting two types of behaviors (either recycling or STD prevention/detection). The results revealed that loss-framed messages were most persuasive with self-referencing appeals, whereas gain-framed messages were most persuasive when self and others were both emphasized. Loroz (2007) argued that people exposed to a self-referencing message had higher levels of involvement, and that loss-framed messages were more effective for them since loss-framed messages might require more resources to process than gain-framed messages. Her experiments were somewhat limited in explaining the psychological process behind framing effects of health-related messages in that the STD-related message that Loroz (2007) used in the experiment involved both prevention and detection by mixing the cues in one message. Nevertheless,

her finding is meaningful in light of the fact that these findings suggest a significant role of *involvement* in determining framing effects of health messages from a cognitive processing approach.

Arguably, many of the moderating factors reviewed above are related to the involvement levels of individuals. For instance, such factors as individuals' motivational orientation, NFC level, issue salience, and the experience of close friends and family are closely related to an individual's involvement level in a particular message, and consequently the level of cognitive elaboration. This fact is particularly important to the current study which intends to examine the framing effects of breast cancer screening messages for males and females whose involvement level in the issue of breast cancer are different from each other. The following section will review prior literature related to the relations among issue involvement, cognitive processing depth, and framing effects.

d. Issue Involvement, Elaboration Depth, and Framing

A series of framing literature indicates that the involvement level of the message recipient is an important factor that moderates the persuasiveness of message frames (Loroz, 2007). For instance, Rothman, Salovey, Anton, Keough, and Martin (1993) argued that issue involvement should moderate the effects of framing, such that framing effects would be increased for highly involved recipients. In the context of skin cancer detection messages, Rothman et al. (1993) used participants' gender as a proxy for issue involvement, since females are generally more concerned about skin care than males are (experiment 1). The results revealed that, for female participants whose personal relevance was high, loss-framed messages were more effective in promoting a skin cancer detection test than gain-framed messages. In contrast, for male participants whose

personal relevance was low, gain-framed messages were more effective than loss-framed messages. In a similar sense, Detweiler, Bedell, Salovey, Pronin, and Rothman (1999) examined the framing effects of sunscreen use (i.e., skin cancer prevention) messages among individuals approached on a public beach. The authors noted that the fact that all the participants were at the beach may have meant that they all felt involved in that issue. Results showed that gain-framed messages were more effective in promoting preventive health behavior (i.e., sunscreen use) as compared to loss-framed messages for those highly-involved recipients.

Meanwhile, there are two main research streams which attempt to explain the relationship between involvement level and framing effects in light of elaboration depth. First, Rothman and his colleagues (1997; 2006) propose that “framing effects may *only* be obtained when people care about a health issue and, thus, are systematically processing the information in the message” (p.207, 2006). In a similar sense, with respect to involvement, a series of studies have found framing effects only when people are involved with the issue and process information systematically.

In a similar sense, Loro (2007) explained the moderating role of involvement on framing effects under the prevention-detection paradigm. That is, in a *detection* behavior context, individuals highly-involved in the issue and engaged in elaborative processing are more likely to be persuaded by *loss-frames* recommending detection behaviors for heart disease (Maheswaran & Meyers-Levy, 1990), STD and skin cancer (Block & Keller, 1995), or breast cancer (Cox & Cox, 2001). On the other hand, in a *prevention* behavior context, individuals highly-involved in the issue and engaged in elaborative processing

are more likely to be persuaded by *gain-frames* recommending prevention behaviors for skin cancer (Rothman et al., 1993, experiment 2) or safe driving (Millar & Millar, 2000).

This perspective, however, did not provide clear explanations about the cases when individuals are *not* involved with a particular issue. Rather, Rothman and his colleagues (1997; 2006) implied that framing effects would simply *not* occur for those whose involvement levels were low (i.e., null effect). However, there are a few studies which did find the opposite pattern of the prevention-detection paradigm for lowly-involved participants. That is, in the context of heart disease blood tests (i.e., detection behavior messages), Maheswaran and Meyers-Levy (1990) found that loss-framing was more effective than gain-framing when the level of personal relevance was high. In contrast, interestingly, gain-framing was more effective than loss-framing when the level of personal relevance was low. Such findings are not consistent with, or not explainable by, the arguments that framing effects may *only* be obtained when individuals process messages systematically. In short, this line of research is somewhat limited in explaining and predicting the framing effects for individuals who are not, or lowly, involved with an issue.

On the other hand, another line of researchers have proposed that when individuals are highly-involved with an issue and are systematically-processing the message, loss-framing will be more persuasive than gain-framing. On the contrary, when individuals are not involved with an issue and are heuristically-processing the message, gain-framing will be more persuasive than loss-framing. According to this perspective, when individuals rely predominantly on systematic processing, perhaps due to the high-level of issue involvement, loss-framed messages should be more persuasive because

“negative information has been shown to be non-normative and often unexpected, and thus viewed as more diagnostic than positive information, causing systematic processors to assign it greater weight during judgment formation” (Meyers-Levy & Maheswaran, 2004). In contrast, when individuals rely predominantly on heuristic processing, perhaps due to the low-level of issue involvement, gain-framed messages should be more persuasive because heuristic processors tend to base their judgments on simple decisions related to “surface features,” and generally approach what is positive but eschew what is negative (E. T. Higgins, 1998).

This perspective is consistent with Maheswaran and Meyers-Levy’s (1990) aforementioned findings that loss-framing was more effective than gain-framing for systematic processors, whereas gain-framing was more effective than loss-framing for heuristic processors. However, Rothman et al. (2006) criticized this perspective, arguing that Millar and Millar (2000) found a gain-framing advantage of prevention messages for people highly-involved in the issue. Moreover, Rothman et al. (2006) noted that several studies had found that gain-framed appeals were more effective in promoting prevention behaviors using samples that are likely to be involved with the issue, as opposed to the expectation that loss-framing would be effective for systematic processors and gain-framing would be effective for heuristic processors.

The contrast and apparent conflicts between these two lines of research are stark and clear. Although this is an area that will require further study, there exists a specific context that these two lines of research would be possibly compatible: the detection behavior context. *In the context of detection behaviors, both lines of research would predict the advantage of loss-framing over gain-framing for highly-involved individuals.*

The current study intends to examine framing effects at the intersection of these two lines of research.

Specifically, in the context of breast cancer screening (BCS) messages, the present study will use participants' gender as a proxy for issue involvement. Previous studies on breast cancer communication have typically involved female participants only. However, in real intervention contexts, many campaigns are noting the role of men in promoting breast cancer awareness, prevention and treatment. For instance, the National Breast Cancer Awareness Month program has been conducting *Think Pink and Tell a Friend* campaign which targets both men and women to encourage women in their lives to get an annual mammogram and do monthly breast self-exams to help prevent the disease. This campaign asserts that inviting friends, family, neighbors, mothers, and sisters to participate will provide encouragement and ease anxiety, resulting in a greater likelihood that the women invited will schedule a mammogram and do so annually (Sporer, 2007, August). In a similar sense, Clinton Administration's *Mommagram* campaign was proposed in an attempt to “give husbands, sons, daughters, grandchildren, friends and anyone else with a close relationship with an older woman a way to let that woman know that her family and friends care, that part of that caring means wanting her to get regular mammograms.” Also, *Men Against Breast Cancer* (MABC) is one of the nonprofits which empower men to cope with the impact of a loved one's breast cancer diagnosis, as well as target and educate men as to the early detection of breast cancer.

Meanwhile, only a few researchers have considered the important role of men in improving breast cancer screening rates among women. For instance, Tanjasiri, Kagawa-Singer, Foo, Maichew, Linayao-Putman, and Nguyen (2007) developed a breast cancer

intervention for Hmong women in California targeting not only women but men to support their wives' breast cancer screening. The authors then argued that instrumental and emotional support from husbands and other men are important for the early detection behaviors of women. In a similar sense, Lyttle and Stadelman (2006) conducted six focus groups among Appalachian women aged 25 to 64 years and found that almost all women said that they would be motivated to schedule a mammogram if a family member or friend would go with them to the clinic. In sum, the encouragement from family members, either males or females, plays a significant role in encouraging women to obtain breast cancer examinations.

The current study intends to examine how loss- vs. gain-framing effects would be moderated by gender of recipients in breast cancer screening messages. Previous studies have unanimously suggested that loss-framing over gain-framing would be more effective in breast cancer interventions. The question, however, is whether such advantage of loss-framing will actually influence male audiences, too. The present study intends to answer this question. Admittedly, most of the previous studies have overlooked the possibility that the advantage of loss-framing may not work if the interventions target male audiences whose involvement levels are relatively low. In fact, gain-framing may be more effective to persuade men to encourage their close female family members to obtain a mammogram than loss-framing, as opposed to what previous researchers have suggested.

Based on the literature reviewed above, this study proposes that male vs. female participants will have different involvement levels in the issue of breast cancer, and process breast cancer intervention messages in a different elaboration depth from each

other (Braun & Gaeth, 1997; McQueen et al., 2008; Petty, Priester, & Brinoal, 2002; Petty & Cacioppo, 1986; Rothman et al., 1993; Umphrey, 2003). It is hypothesized that such differences in the involvement levels and elaboration depths will then lead men and women to perceive loss- vs. gain-frame in breast cancer intervention messages differently. Thus, the following hypotheses are suggested:

H1: Participant's gender will influence his or her involvement in the issue of breast cancer, such that female participants will be more highly-involved in the breast cancer issue than male participants will.

H2: Participant's gender will influence his or her message elaboration in breast cancer intervention messages, such that female participants will have greater message elaboration than male participants will.

With respect to the interaction between gender and framing effects, the two research streams discussed above both propose a loss-framing advantage over gain-framing for highly-involved individuals/ systematic processors in the context of breast cancer screening behaviors. For lowly-involved individuals/ heuristic processors (i.e., male participants in this study), however, there has been a disagreement. For instance, while one line of research (e.g., Rothman et al., 1997; 2006) proposed that framing effects would not occur for those whose involvement levels are low (i.e., null effect), another line of research (e.g., Meyers-Levy & Maheswaran, 2004) argued that gain-framing would be more effective than loss-framing when the level of personal relevance was low. The current study will examine this yet unclear area based on the latter stream of research. The reason why the current study chose the latter perspective as a theoretical guideline is that some of the researchers (Maheswaran & Meyers-Levy, 1990) did empirically find that gain-framing was more persuasive for those lowly-involved in the issue than loss-framing. As Meyers-Levy and Maheswaran (2004) argued, gain-framed

messages would be more persuasive than loss-framed messages for lowly-involved individuals, because heuristic processors tend to base their judgments on superficial aspects of the message, and generally approach what is positive but avoid what is negative (E. T. Higgins, 1998). Thus, the following hypotheses are given:

H3: Participant's gender will interact with the type of frame in breast cancer intervention messages to increase message elaboration.

H3a: Female participants will have greater elaboration for the loss-framed message than the gain-framed message.

H3b: Male participants will have greater elaboration for the gain-framed message than the loss-framed message.

The dual-processing theorists (e.g., Petty and Cacioppo, 1986) predict that greater issue involvement will result in greater attention to message-relevant arguments and potentially, depending on the quality of those arguments, lasting attitude change (Slater and Rouner, 2002, p.180). Based on this proposition, Slater and Rouner (2002) argued that the impact of persuasive subtexts imbedded in the narrative will be a function of the extent of engagement with the narratives. In the present study, since the messages will include relatively strong arguments from breast cancer survivors' testimonies, which were developed by a credible non-profit organization, the extent of elaboration will increase the chance that people process the persuasive information in the messages, rather than generating counterarguments. That is, individuals who process pro-social messages with high-quality, strong arguments in the greater depth of elaboration will be more likely to produce supportive thoughts about the issue because they have more chances to reflect on the benefits of following a recommended action (i.e., a gain-framed message) or the costs of failing to take the action (i.e., a loss-framed message). Such supportive thoughts about the issue will then influence the individuals' attitudes toward the issue and

behavioral intentions regarding the issue positively, as discussed above (Ajzen, 1988; Fishbein & Ajzen, 1975, 1980). Therefore, the following hypotheses are proposed:

H4: Participants' breast cancer message elaboration will increase their supportive thoughts about breast cancer screening.

H5: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their attitude toward BCS positively.

H6: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their behavioral intentions regarding BCS positively.

The proposed interaction between gender and framing type in the message elaboration depth will also influence individuals' attitudes toward the issue and behavioral intentions regarding the issue. Therefore, the following hypotheses are proposed:

H7: Participant's gender will interact with the type of frame in breast cancer messages to increase their attitudes toward breast cancer screening (BCS) positively.

H7a: Male participants will have more favorable attitudes toward BCS when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H7b: Female participants will have more favorable attitudes toward BCS when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

H8: Participant's gender will interact with the frame type in breast cancer messages to increase their behavioral intentions regarding breast cancer screening.

H8a: Male participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H8b: Female participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

H9: Participants' attitudes toward breast cancer screening will influence their behavioral intentions regarding breast cancer screening.

Although previous studies on framing effects generally have not measured memory as a dependent variable, the outcome measure of memory may be crucial in determining the effectiveness of message strategies designed for health campaigns (Lumpkins, 2007). According to Flora and Maibach (1990), message design research has commonly focused on memory to ensure that there is an influence on health outcomes. That is, recall of information in breast cancer intervention messages will be one of the important indications of how highly-involved and lowly-involved individuals process the message's recommendations. Therefore, the following hypotheses are proposed:

H10: Participant's gender will interact with frame type in breast cancer messages to increase their memory of breast cancer message.

H10a: Male participants will have greater memory of the breast cancer message when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H10b: Female participants will have greater memory of the breast cancer message when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

3-3. Emotion in Health Communications

a. Role of Emotion in Persuasive Communications

Human emotion has been postulated to influence persuasive communications by several ancient philosophers such as Socrates, Plato, and Aristotle. For instance, Aristotle emphasized how persuasive messages could elicit specific emotions from the audience,

and these emotions, in turn, influence the audience's decision-making. Despite such early postulates, however, scientific inquiries into the role of emotion in persuasion were not conducted until the 1980s, when the information-processing paradigm emerged in the field of psychology. Since the advent of the information-processing paradigm, psychologists have closely examined the mysterious relation between emotion and cognition – how these two possibly influence each other in information-processing, based on a series of theoretical frameworks.

In the field of media communication, the role of emotion has been mainly examined in advertising, empirically rather than theoretically. According to Bagozzi, Gopinath, and Nyer (1999), audience's emotional responses to ads have been used as a "marker" of their attitudes toward the ads. For instance, advertisers have evaluated the effectiveness of ad copy by examining individuals' emotional responses to the ads, which might in turn influence their attitudes toward the ads, brands, and, possibly, purchase intentions. They have measured emotional responses by multi-item self-report measures such as Edell and Burke's (1987) 52-item and Holbrook and Batra's (1987) 34-item questionnaire. However, since these questionnaires were empirically assembled rather than theoretically constructed, imitations exist. Bagozzi et al.(1999) criticize such empirical measures as follows: (1) such measures tend to obscure the subtle difference between emotions (lack of discriminant validity), (2) they cannot capture some critical emotions in marketing such as hope, guilt, shame, and (3) they cannot tell us under which conditions emotion is likely to be elicited. The present study also agrees that such a reactive approach to emotion has deferred communication researchers and practitioners from utilizing emotions in developing effective communication strategies. Meanwhile, a

series of researchers have been accumulating empirical evidence that persuasion is the result of both cognitive and affective processes (e.g., Dillard & Shen, 2005; Nabi, 2002; Shen & Dillard, 2007; Stephenson, 2003), based on several theories from social psychology discipline. Shen and Dillard (2007) argue that such understanding is very important since it can highlight the variables that are proximal to opinion and behavior change. The current study intends to advance the understanding of the role of message variables (e.g., message framing) in activating both cognitive and emotional processes as well as their impact on persuasion. Before proposing expectations for the interplay of framing and emotion, the following section will briefly review two theoretical frameworks in psychology in light of the effects of emotion to cognitive processing: a distinct model and a dimensional model. This review will provide a theoretical structure within which questions are posed regarding the interplay of message framing and emotion in the context of breast cancer interventions.

b. Theoretical Perspectives on Emotion

A distinct model of emotion

The appraisal theories of emotion have dealt with a wide range of distinct emotions and explained specific conditions that a certain emotion would arise. A series of appraisal theorists (e.g., Lazarus, 1991; Roseman, 1991; Bagozzi et al., 1999; Dillard & Peck, 2000; Tiedens & Linton, 2001; Nabi, 2003) examine the process by which emotions are elicited as a result of an individual's subjective interpretation or evaluation of important events or situations (i.e., appraisal).

According to Lazarus (1991), there are two types of appraisal: primary appraisal and secondary appraisal. Primary appraisal is an individual's evaluation of whether or not

the event poses a threat to his well-being. Secondary appraisal is the evaluation of whether or not the individuals perceive they have the resources (inner and outer) to cope with it. More specifically, Roseman (1991) categorized 16 distinct emotions based on 5 types of appraisal: valence appraisal (e.g., positive vs. negative), appetitive vs. aversive appraisal (e.g., sad vs. disgust), agent appraisal (e.g., anger vs. guilt), power appraisal (e.g., strong vs. weak), and probability appraisal (e.g., fear vs. anger).

With respect to persuasion, Tiedens and Linton (2001) examined the effect of certainty appraisal on the persuasion process, suggesting that emotion associated with certain feelings promotes heuristic processing regardless of valence. For instance, they found that the participants who watched fear-inducing (i.e., fear as one of the uncertain emotions) films were more likely to rely on argument strength and source cues of persuasive messages than those who watched disgust-inducing (i.e., disgust as one of the certain emotions) films.

In the field of communication research, Bagozzi et al. (1999) claim that marketing researchers need to measure the audience's emotional responses to ads based on the three-way interactions of appraisals: valence, agent, and expectancy appraisals. While Bagozzi et al. (1999) attempted to develop a measurement scale to measure audience's emotional responses based on the type of appraisal; recently, a growing body of researchers is pursuing the appraisal theory to develop an effective persuasive message in a more active manner.

For instance, Dillard and Peck (2000) exposed eight different types of PSAs to participants and measured their emotional responses, perceived persuasiveness, and attitudes toward the message, finding that specific emotions were related to certain PSAs'

success in persuasion. Based on such findings, Dillard and his colleagues (2000; 2006; 2007) claim that communication practitioners need to choose a specific emotion which is best fitted to their persuasive goal, and then develop the message based on the guidelines of appraisal theory. In a similar sense, Eisenberg and his colleagues (2003) explored how empathy-inducing messages promote helping behaviors, and Lindsey (2005) examined how guilt-inducing PSA messages promote individuals' intentions to donate bone marrow. Specifically, Nabi (2003) attempted to integrate the appraisal theory and dual-process models by exploring the role of emotion in framing individuals' evaluation of a social issue. Her experiment (2003) involved driving while intoxicated, a controversial issue. She expected that, when the anger frame was primed respondents would attribute more blame to individuals' behaviors and prefer solutions such as punishment. However, when the fear frame was primed, individuals would attribute more responsibility to the environment (e.g., social norm) and desire protection from harm. Her hypotheses were generally supported, showing that fear and anger can differentially affect information accessibility, desired information-seeking, and policy preference.

More recently, a few researchers have been attempting to develop effective health communication messages based on the appraisal theories. For instance, Han, Moser, and Klein (2006) found that individuals' ambiguous perceptions of cancer prevention PSAs would influence their worry, and perceptions of risk and preventability. Dillard and Nabi (2006) also proposed how to develop effective cancer prevention/detection messages based on appraisal theories and CFM (Cognitive-Functional Model). Shen and Dillard (2007) explored individuals' emotional responses to various health messages in terms of

message framing (advantage frame vs. disadvantage frame) and a dispositional factor such as the BIS/BAS (Behavioral Inhibition/Approach) system.

In sum, the appraisal theories provide a comprehensive theoretical framework as to when a specific emotion arises, how the emotion could possibly influence subsequent cognitive-processing. However, there are some limitations in that appraisal theorists mainly focus on conscious, experienced emotions. Although they claim that the appraisal can be non-conscious as well, most of the measures that they use are verbal self-reports or visual self-reports, and their discussions are limited to explain the emotions that we often experience automatically.

A dimensional model of emotions

Although emotional expression can be highly varied, another line of researchers view its motivational basis as having a much simpler, two-dimensional organization (P. J. Lang, 1995; P. J. Lang, Greenwald, Bradley, & Hamm, 1993; Russell, 1980). This approach is based on the assumption that emotions are driven by two motivational systems in the brain. Dickinson and Dearing (1979) claimed that there are two opponent motivational systems (i.e., aversive and attractive) which modulate individual's responses to new, unconditioned information. Research on natural language categories also suggests that individuals' knowledge about emotion is "hierarchically organized and that the superordinate division is between positivity (i.e., pleasant state) and negativity (i.e., unpleasant state)" (Lang, 1995, p.374). In a similar sense, Osgood and his colleagues (e.g., Osgood, Suci, & Tannenbaum, 1957) showed that emotional descriptors could be distributed along a bipolar dimension of affective *valence* or a dimension of affective *arousal*.

Lang (1995) integrated those lines of literature and proposed that “all emotions can be located in a two-dimensional space, as coordinates of affective valence and arousal” (p.372). Here, valence refers to whether an emotion is positive or negative and to what degree, while arousal refers to the intensity of the emotion. Lang (1995) explicated the concepts of affective valence and arousal in terms of the two motivational systems in the brain: the appetitive vs. aversive systems. Each system is activated by a different but equally wide range of external stimuli, and would drive different action dispositions (i.e., emotions); the former would drive approaching dispositions, and the latter would drive withdrawing action dispositions. Lang (1995) proposed that these two motive systems account for the primacy of the valence dimension (pleasant vs. unpleasant), whereas arousal reflects “variations in the activation of either or both systems” (calm vs. aroused) (p. 374). According to Lang (1995), a given emotional state can be characterized by a point in this two dimensional space (e.g., anger - negative valence and high arousal, calm - positive valence and low arousal). Barrett (1998) noted that valence and arousal are “important dimensions in describing how people label their own subjectively experienced affective states¹” (p. 580). Barrett (1998) also claimed that even some researchers who emphasize basic discrete emotions allowed a role for valence and arousal (e.g. Roseman, Spindel, & Jose, 1990; Smith & Ellsworth, 1985). Kim, Bee, Wagner, and André (2004) also noted that the two dimensions provide “a simplified

¹ “Arousal focus likely involves attention to sensory information from either or both the autonomic and the somatic nervous systems, in addition to a tendency to attribute that information to emotional experience. Although arousal is not a uni-dimensional construct and likely consists of different patterns of activation across different systems (Blascovich,1992), it is currently unclear whether it is necessary to specify which system the information is coming from. As a subjective feeling state, arousal may not be defined as any one physiological signal. In fact, the information that goes into the subjective feeling of arousal could come from any number of bodily sources, and probably comes from different sources for different people. The key to arousal focus is that whether individuals incorporate subjective perceptions of arousal into their emotion language, regardless of where perceptions of arousal originate from” (Barret, 1998, p.580).

representation of the essential properties of emotions” (p.160); they help describe emotional states that cannot be distributed into clear-cut fixed categories, as well as for emotion recognition.

Although there has been much debate between those who advocate a discrete-emotions perspective and those who advocate a dimensional perspective, few empirical studies have actually compared these two views directly, mainly due to the fact that direct comparisons are difficult to conduct (Bachorowski & Owren, 2008). According to Bachorowski and Owren (2008), most studies thus have examined smaller sets of predictions based on one or the other of the two approaches. Meanwhile, Larsen, Berntson, Poehlmann, Ito, and Cacioppo (2008) argued that discrete and dimensional approaches are not incommensurable and that both approaches can be useful. Larsen et al. (2008) reviewed the relative merits of each approach and then claimed that “the psychophysiological substrates of emotion are organized in terms of dimensions, but other findings highlight the utility of postulating the existence of discrete emotions” (p. 181). The present study will follow this view of Larsen et al. (2008) that the discrete and dimensional approaches are not incommensurable. Specifically, this study will first assess the relations between emotions and message framing from the dimensional perspective, and then focus on a discrete emotion (i.e., fear) to examine how the different levels of fear arousal elicited from breast cancer messages will moderate the message framing effects between males and females.

c. Emotions and Message Framing

As stated above, the current study intends to examine the role of emotions in determining individuals' responses to a breast cancer intervention message which is framed either positively or negatively. Specifically, this study will examine how the gain- vs. loss-framed message and gender interplay in eliciting different emotional responses (i.e., valence and arousal) from the recipients, and then how such emotional responses influence the recipients' elaborated processing, attitudes, and possible behavioral intentions.

First, with respect to the relationship between message framing and emotions, Shen and Dillard (2007) claimed that recipients' emotional responses would be varied as a function of message framing. Their reasoning was based on the key proposition of appraisal theories of emotion: "Perceived goal congruence produces positive affects, whereas incongruence yields up negative effects." In this sense, Shen and Dillard (2007) argued that gain-framed messages highlight beneficial outcomes (i.e., emphasizing goal congruence), while loss-framed messages focus on the cost of not being in accordance with the advocacy (i.e., emphasizing goal incongruence). Based on the literature consistent with such logic (e.g., Millar & Millar, 2000; Schneider et al., 2001), Shen and Dillard (2007) posed a hypothesis that gain-framed messages would be directly associated with positively-valenced emotions, whereas loss-framed messages would be directly associated with negatively-valenced emotions. They conducted a series of experiments to test this hypothesis, using health-related PSAs (e.g., a skin cancer message, an obesity-related message, an influenza vaccine message), and the results of the experiments confirmed their expectation. These studies suggest that the frame type in

health messages will influence the emotional valence of individuals' responses to the messages. Thus, based on the previous literature reviewed above, the following hypotheses are advanced:

H11: The frame type in breast cancer messages will influence the emotional valence of participants' response to the messages, such that those exposed to gain-framed messages will show more positive emotions whereas those exposed to loss-framed messages will show more negative emotions.

Gender (involvement level) difference in emotional arousal

High audience involvement has been found to lead to deeper message processing (Petty & Cacioppo, 1986), higher knowledge-attitude-behavior consistency (Chaffee & Roser, 1986), higher cognitive complexity (Rothschild & Houston, 1980), and greater information retention (Burnkrant & Sawyer, 1983). With respect to the effects on emotional arousal, Roger and Thompson (1995) found that involvement level was positively related to the emotional arousal occurring during exposure to the message. That is, people who were already actively involved with related topics tended to respond more emotionally to information on a new topic. In a similar sense, a series of researchers have argued that high-involvement would lead to greater emotional arousal (Heo & Sundar, 2001; Lindquist & Sirgy, 2009; Wingard & Maltzman, 1980). In context of cancer communication, McQueen, Vernon, Meissner, and Rakowski (2008) noted that health communication messages regarding gender-specific cancer may elicit different emotional responses from males vs. females. That is, males and females may respond differently to the same message promoting cancer screening if it is gender-specific cancer. In this study, based on the literature reviewed above, it is assumed that females, more highly-involved in the issue of breast cancer than males, would show an equal or greater

magnitude of emotional arousal in response to breast cancer screening messages as compared to males. Thus, the following hypothesis is proposed:

H12: Participants' gender will influence the magnitude of their emotional arousal in response to breast cancer messages, such that female participants will show an equal or greater level of emotional arousal than male participants.

The effects of emotional responses on message elaboration and memory

Arousal. Numerous studies have shown that emotionally-arousing stimuli tend to increase memory retention by attracting more attention that enhances binding of various features of an event together (Mather, 2007). Such memory-enhancing effect of emotion has been demonstrated in a number of empirical studies using stimuli like words, pictures, narrated slide shows (Bradley, Greenwald, Petry, & Lang, 1992; Christianson, 1992; Hamann, 2001) and autobiographical memory studies (Conway et al., 1994). A series of researchers have provided explanations for the emotional enhancement effect on memory, mostly in terms of the arousal dimension of emotion (Cahill & McGaugh, 1995).

With respect to encoding, Easterbrook (1959) claimed that emotional arousal leads to a narrowing of attention so that the information central to the source of the emotional arousal will be encoded while peripheral details will not (i.e., "*cue-utilization hypothesis*"). In a similar line, several studies have shown that the presentation of emotionally-arousing stimuli results in enhanced memory for central details as compared to neutral stimuli (Fox, Russo, Bowles, & Dutton, 2001; Hulse & Memon, 2006). In sum, as Ochsner (2000) concluded, emotionally-arousing stimuli are more distinctively encoded by increasing attention selectivity and dwell time, leading to more accurate memory of those stimuli.

With respect to processing, many studies have suggested a prioritized processing of emotional information. For instance, when people detect an item in a rapid stream of visual stimuli, they miss subsequent targets in the next 400 to 600 ms interval (i.e., the intentional blink); research (e.g., Anderson, 2005; Keil & Ihssen, 2004) has shown that emotionally-arousing stimuli are more resistant to the intentional blink than neutral stimuli (Mather, 2007). That is, under conditions of limited attention, emotionally-arousing items are more likely to be processed than neutral items.

With respect to memory storage, research has also suggested that emotional arousal increases the likelihood of memory consolidation during the storage stage of memory. The process through which some memories become long-lasting representations is known as long-term consolidation (Frankland & Bontempi, 2005). The hippocampus plays an essential role in both the consolidation and retrieval of episodic memories (Nadel, Samsonovich, Ryan, & Moscovitch, 2000), and many studies have found that emotional arousal triggers stress hormones that modulate memory-consolidation processes (McGaugh, 2000). Another explanation for the relationship between emotional arousal and long-term consolidation is from the post-stimulus elaboration (PSE) hypothesis (Christianson, 1992), that an emotionally arousing experience would cause more effort to be invested in elaboration of the experience. That is, arousing emotional stimuli would be processed at a deeper level than neutral stimuli, by establishing connections between new information and stored information. Such deeper processing will subsequently enhance the memory of the information (Craik & Tulving, 1975).

Valence. As previously reviewed (see chapter 2-1-c), Petty and his colleagues (2003) noted that, when the elaboration is modest, the emotional state itself can

determine the depth of processing. That is, a positive mood tends to promote heuristic processing, whereas a negative mood tends to promote systematic processing. In a similar sense, Forgas (2000) and Bless (2000) also argued that a positive affect generates a top-down, schematic, heuristic processing while a negative affect produces a bottom-up, data-at-hand, systematic processing.

Such literature provides the current study a theoretical guide to understand how individuals' emotional valence states influence how they process the message. Based on previously reviewed literature, this study expects that the gain vs. loss frame of breast cancer messages will influence individuals' emotional states, and those states will, in turn, influence the depth of the cognitive processing of the message. As a series of researchers suggests (e.g., Bless, 2000; Forgas, 2000; Petty et al., 2003), the negative affect would generate a systematic processing while the positive affect promotes a heuristic processing. That is, people who have negative emotions in response to breast cancer messages will have greater message elaboration than those who have positive emotions. Such difference in processing depth will subsequently influence the memory (Craik & Tulving, 1975), such that deeper processing will enhance the memory of the breast cancer message. Therefore, based on the above literature review on the effects of emotional responses (both arousal and valence) on message elaboration and memory, the following hypotheses are advanced:

H13: Participant's emotional responses (both arousal and valence) to breast cancer messages will influence their message elaboration.

H13a: The more participants are emotionally aroused in response to breast cancer messages, the greater they will elaborate the message (arousal).

H13b: Those who have negative emotions in response to breast cancer messages will have greater message elaboration than those who have positive emotions (valence).

H14: Participant's emotional responses (both arousal and valence) to breast cancer messages will influence their memory of the message.

H14a: The more participants are emotionally aroused in response to breast cancer messages, the greater memory of the message they will retain (arousal).

H14b: Those who have negative emotions in response to breast cancer messages will have greater memory of the message (valence).

Fear appeals

Fear appeal has been a pervasive strategy in health communication because fear has been thought to motivate behavioral change by threatening the audience with harmful outcomes from committing an unhealthy behavior (Choi, 2005). From a dimensional model of emotions, fear is defined as a negatively-valenced emotion with a high-level of arousal (Witte, 1998). From a distinct model of emotion, fear has a unique role in motivating people to avert dangerous or threatening events, leading to self-protective behaviors. Fear appeals, defined by vivid, graphic, and gory stimulation messages (Keller, & Block, 1996; Witte & Morrison, 1995), have been widely used in health campaigns. For instance, in the context of anti-smoking PSAs, Biener, McCallum-Keeler, and Nyman (2000) found that fear appeals have been a major part of message content and have been rated higher on perceived effectiveness than neutral or humorous appeals.

Meanwhile, research on the effectiveness of fear appeals has produced somewhat inconsistent findings. In some instances, fear arousal enhanced persuasion (King & Reid, 1990), while in others, fear arousal decreased persuasion (Hovland, Janis, & Kelley, 1953), or resulted in an increase and then a decrease in persuasion (Janis, 1967).

Janis (1968) and McGuire (1968) claimed that moderate levels of fear appeals would produce the tension required for message acceptance and attitude change, while too high or too low levels of fear would result in message rejection. That is, at a low level of fear, people would dismiss the information about the threat, while at a high level of fear, people would reject the message as a defensive reaction to lessen the unpleasant emotional state. More recently, Keller and Block (1996) explained the mechanism behind the persuasiveness of fear appeals in terms of *cognitive elaboration*. That is, a low level of fear would be ineffective since there is insufficient elaboration of the harmful consequences of engaging in the destructive behavior, whereas a high level of fear would be ineffective since too much elaboration on the harmful consequences interferes with processing of the recommended change in behavior.

In a similar sense, the Extended Parallel Process Model (EPPM), previously reviewed in Chapter 2 (see 2-1-a), may be understood in terms of the capacity of cognitive elaboration that Keller and Block (1996) argued for. The EPPM (K. Witte, 1992) posits that, after exposure to a threat appeal message, an individual first evaluates the perceived threat of the problem. If the perceived threat is low, they would not be motivated to further process the message (i.e., insufficient elaboration of the message). Meanwhile, if the perceived threat is moderate or high, the individuals would move to the next step of evaluating the perceived efficacy; if the perceived efficacy is not high enough, they would avoid or deny the message in order to control the high arousal of fear (i.e., too much elaboration on the harmful consequences rather than possible solutions). Only when the perceived efficacy is high enough to decrease the level of fear, individuals process the recommendation part of the message. That is, the level of perceived efficacy

may function as to moderate the level of fear that individuals experience from the threat appeal, which may in turn influence the level of elaboration on the recommended change in behavior. In sum, in conditions of low fear, there may be little motivation to elaborate either on the problem or on the solution. On the other hand, a high level of fear may motivate subjects to excessively elaborate on the problems and ignore the solution (Keller & Block, 1996).

Admittedly, determining the optimal level of fear does not have a clear-cut answer, and has received attention from many researchers with mixed findings regarding the optimal level of fear arousal that will persuade a target audience. For instance, some researchers found the effectiveness of high fear appeals in persuading people to stop smoking (Leventhal & Niles, 1964, Leventhal et al., 1967), enroll for group health insurance (Burnett & Oliver, 1979), and have favorable attitudes toward AIDS interventions (Witte, 1994). In contrast, another line of studies found the effectiveness of low fear appeals in persuading people to have favorable attitudes towards condom use and monogamy (e.g., Witte & Morrison, 1995), while other researchers found that moderate fear was most persuasive (e.g., Janis & Feshbach).

Recently, Dickinson and Holmes (2008) argued that such mixed findings were due to the differences in context of the studies, types of stimulus materials used, different conceptualization regarding the fear level, and most importantly, the *different target audiences*. Based on such mixed findings, Dickinson and Holmes claimed that early research which posited that threats that arouse moderate levels of fear should be considered as the optimal level of threat have been proved *wrong*. They then argued for the need for segment-specific research into fear appeals, claiming that “one particular

appeal cannot be considered as most effective for a whole audience” (p.258). That is, some people would respond better to high levels of fear appeals being used in health messages, whereas some people would respond more to lower levels of fear appeals in the messages. Such arguments for fear appeal research in the audience specific context provide helpful insights for the current study, which intends to examine how different audience groups (males vs. females) respond to the same health message. That is, as Dickinson and Holmes (2008) claimed, males and females may respond differently to high vs. low levels of fear aroused from breast cancer intervention messages.

Such expectation can be supported by Keller and Block’s (1996) arguments reviewed above. Based on the assumption that self-reference (vs. other-reference) would increase elaboration of anti-smoking health messages, Keller and Block (1996) conducted an experiment to examine how self-reference (vs. others- reference) moderates the persuasiveness of high vs. low fear appeals. As a result, for the self-referencing group, high fear arousal increased the level of problem elaboration to the extent of which the recipients would engage in defensive tendencies, whereas low fear arousal increased persuasion by reducing the level of excessive problem elaboration as well as reducing the need to avoid the message. On the other hand, for the other-referencing group, low fear arousal interferes with persuasion because of insufficient motivation to elaborate on the messages, whereas high fear arousal increased persuasion by increasing processing of the message problems and solution.

In the current study, as hypothesized in H1 and H2, recipients’ gender will influence their message involvement and elaboration on breast cancer interventions, such that female recipients will be more highly involved in and have greater elaboration of the

messages as compared to male recipients. Based on Keller and Block's (1996) study, it is expected that for female recipients, high fear arousal may interfere with persuasion by leading them to elaborate on the problem too much and become engaged in defensive tendencies such as avoidance or denial; low fear arousal would be more effective to motivate female recipients to process the problem and the recommendation part both. On the other hand, low fear arousal may not be enough to increase the amount of problem elaboration. For male recipients, high fear arousal would be more effective to motivate them to elaborate on the messages – but not as severe as for female recipients who are highly involved in that issue. That is, there will be an interaction effect between gender and the level of fear (high vs. low), such that low fear appeals will be more effective for females, whereas high fear appeals will be more effective for males.

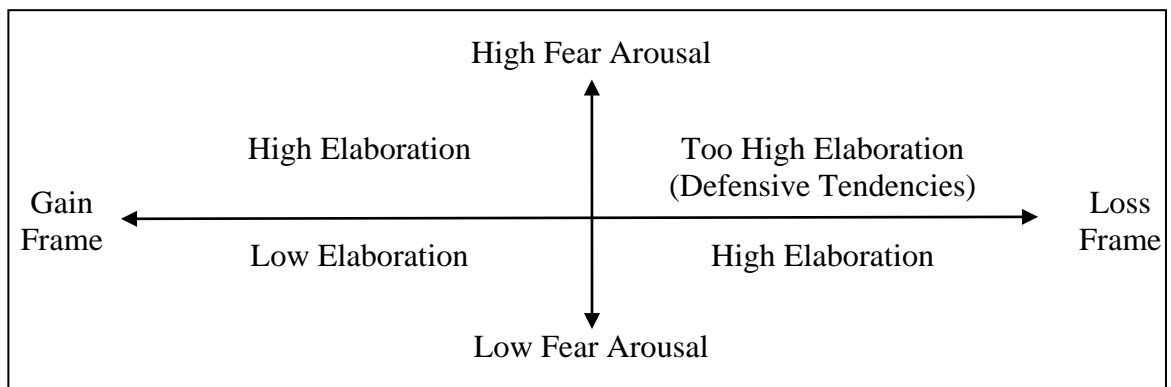
Meanwhile, as hypothesized in H3, recipients' gender will interact with frame type in increasing message elaboration, such that females will have greater message elaboration when the breast cancer message is negatively-framed (i.e., loss frame) than when the message is positively-framed (H3a); male participants will have greater message elaboration when the breast cancer message is positively-framed (i.e., gain frame) than when the message is negatively-framed (H3b).

In addition to these two interaction effects between gender and frame type and between gender and fear level, there has been research on the relationship between frame type and emotional states. For instance, Keller et al. (2003) found that participants in a negative state became more anxious in response to a loss-framed message and were more persuaded by the benefits in the gain-framed message. That is, the main effects of higher

persuasion for loss-frame messages among highly-involved people would depend on the positive emotional state of participants (Keller et al., 2003).

Therefore, based previous studies on the relationship among frame type, fear arousal, and involvement level (as marked by gender in this study), the following combinations are advanced (see Figure 7 & Figure 8). First, for female participants, the combination of loss-frame and high fear arousal will lead participants to elaborate on the problems too deeply and become engaged in defensive tendencies such as avoidance or denial (Keller & block, 1996). The combination of a loss-frame and low fear arousal will lead them to elaborate on the messages, but not as severely as the combination of a loss frame and high fear arousal (Keller et al., 2003). The combination of gain-frame and low fear arousal will only lead them to elaborate messages in a low chance. The combination of gain-frame and high fear arousal lacks prior literature to guide expectations. High fear arousal may trigger the female participants' defensive tendencies (too high elaboration), but gain-frame may function as interventions to reduce the level of elaboration and enhance persuasion (high elaboration).

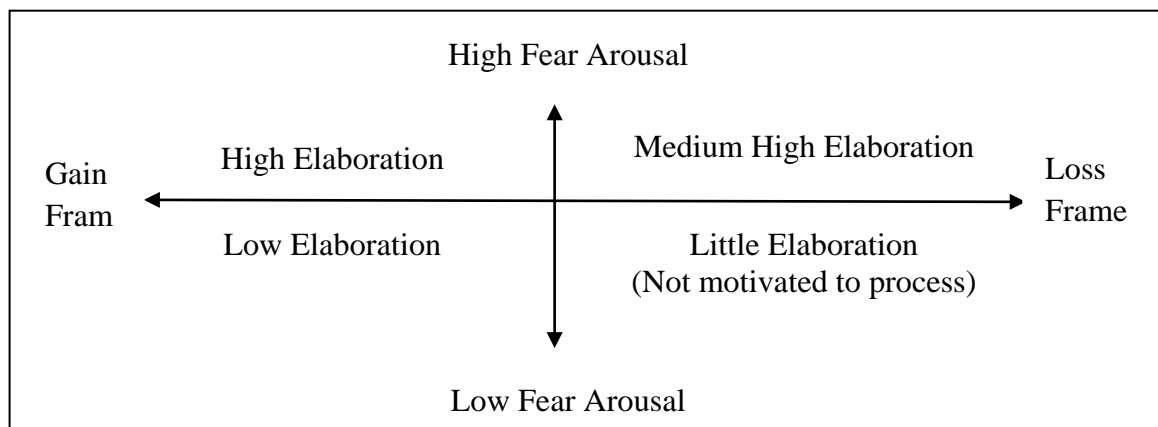
Figure7. Frame Types, Fear Levels, and Message Elaboration (for Females)



Next, for male participants, the combination of loss-frame and high fear arousal will lead participants to elaborate on the problems, but not as severely as for female

participants (Keller & Block, 1996). The combination of loss-frame and low fear arousal will not provide motivation to elaborate the messages, producing very few problem and solution thoughts (Meyers-Levy & Maheswaran, 2004). The combination of gain-frame and low fear arousal will lead participants to elaborate messages in a low chance. The combination of gain-frame and high fear arousal will lead participants to elaborate deeply, but not enough to engage them in defensive tendencies (Keller & Block, 1996).

Figure8. Frame Types, Fear Levels, and Message Elaboration (for Males)



The present study intends to further understand the role of fear in increasing persuasiveness of BCS messages across gender and frame type. By dividing data into two groups via a median split on the fear arousal and analyzing for each group (low fear vs. high fear), this study will examine how the level of fear arousal influences the relationship of gender and frame type. Therefore, based on the aforementioned combinations of frame type and fear levels for females vs. males (Figure 7 & 8), the following hypotheses and a research question are suggested:

H15: Participants' gender (male vs. female) and frame type (gain vs. loss) will interact with the level of fear arousal (high vs. low) to increase supportive thoughts about breast cancer screening.

H15a: Female participants who watched loss-framed breast cancer messages will have more supportive thoughts about screening when their fear arousal is low vs. high.

H15b: Female participants who watched loss-framed breast cancer messages will have more defensive thoughts about screening when their fear arousal is high vs. low.

H15c: Male participants who watched loss-frame breast cancer messages will have more supportive thoughts about screening when their fear arousal is high vs. low.

H15d: Male participants who watched gain-framed breast cancer messages will have more supportive thoughts when their fear arousal is high vs. low.

RQ1: Will female participants who watched gain-framed breast cancer messages have more supportive thoughts when their fear arousal is high vs. low?

As proposed through H4 to H6, participants' supportive thoughts about breast cancer screening (BCS) triggered by the breast cancer message will influence their memory of the message and attitude toward and behavioral intentions regarding BCS positively. In sum, it is expected that participants' gender and frame type will interact with the level of fear arousal in increasing the overall persuasiveness of the breast cancer message. Therefore, the following hypotheses are also proposed:

H16: Participants' gender and frame type will interact with the level of fear arousal to increase the persuasiveness of the breast cancer intervention messages.

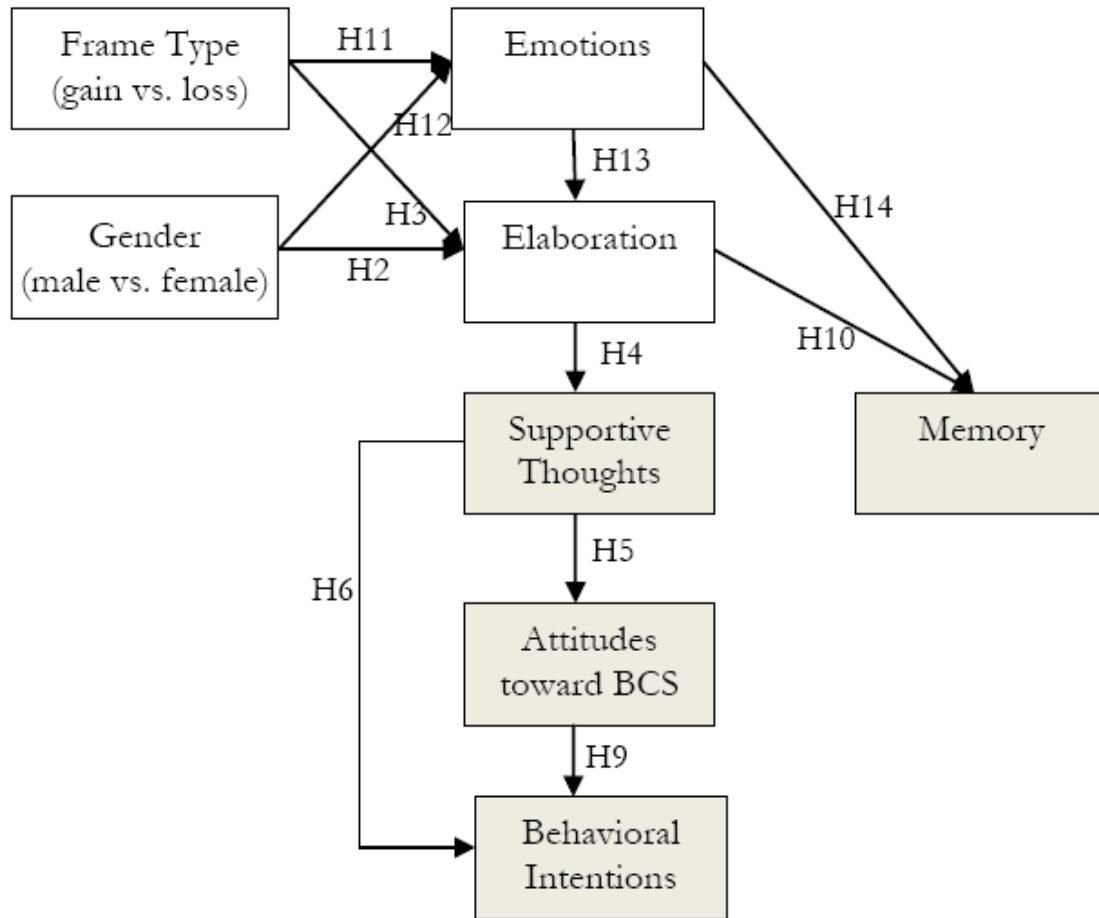
H16a: For female participants, loss-framed breast cancer messages will be more effective when fear arousal is low than when fear arousal is high.

H16b: For male participants, loss-frame breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.

H16c: For male participants, gain-framed breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.

RQ2: For female participants, will gain-framed breast cancer messages be more effective when fear arousal is high than when fear arousal is low?

Figure9. Conceptual Framework for Present Study



Note1: Grayed boxes refer to dependent variables.

Note2: H7 tests for a 2-way interaction between gender and frame type on attitudes toward BCS; H8 for a 2-way interaction between gender and frame type on behavioral intentions; H15 for a 3-way interaction among gender, frame type, and fear arousal on supportive thoughts; H16 for a 3-way interaction among gender, frame type, and fear arousal on other three DVs.

CHAPTER THREE

METHOD

3-1. Design

This study employed a 2 (gender: female vs. male) x 2 (frame type: gain vs. loss) between-subjects experimental design, in which frame type was manipulated to produce two different versions of stimuli. The dependent variables were participants' elaboration depth, emotional responses, memory of Breast Cancer Screening (BCS) messages, supportive thoughts about BCS, and attitudes toward and behavioral intentions regarding BCS.

This study had more than 50 items to be rated by participants when two factors were executed as between-subject factors. If one factor is executed as a within-subject factor, the items that participants have to rate would be more than 100 items, possibly causing time-related errors like fatigue or practice. Considering participants can easily guess the manipulated factor unless each condition involves multiple messages, the number of items rated would be even more. Additionally, one of the main dependent variables of this study is participants' behavioral intentions regarding BCS. If frame type is executed as a within-subject factor, participants will be asked as to their behavioral intentions regarding the same issue repeatedly, causing other errors like carry-over effect or sensitization. Therefore, this study adopted a 2x2 between-subject design, based on the assumption that random assignment controls the individual differences which could possibly affect the dependent variables.

Each participant watched a breast cancer screening message, composed of three video clips in which breast cancer survivors recommend BCS (Breast Cancer Screening). In order to test H11 and H15 regarding the effects of gender and frame type on memory, it was necessary to add factual information into the main stimulus materials. Therefore, a factual information part containing details about BCS (e.g., three types of BCS) and the intervention center (e.g., the website address of *American Cancer Society*) was developed and added to the stimuli for each condition. The factual information part was identical in the gain vs. loss frame conditions.

The sample size was calculated using G Power 3.1 software based on the following conditions: F tests (ANOVA: Fixed effects, special, main effects and interactions), effect size $f = .30$, type I error probability = .05, Power (1-type II error probability) = .8, Numerator $df = 7$, number of groups = 8. As a result, the required total sample size was 126. Thus, this study recruited 128 participants in total, and randomly assigned 32 participants to one of the four groups.

3-2. Stimuli

Two video presentations about breast cancer screening (BCS) were created. The thrust of the presentations was to persuade individuals of the importance of early detection through routine BCS. The 3-minute videos contained a brief introduction, interview clips with breast cancer survivors, and a factual information part regarding BCS.

In order to create systematic message variance between levels of treatments, multiple interview clips were selected. A pool of BCS advocacy video clips were constructed from the database of NCI-sponsored project, *The Story Telling Project*. *The Story Telling Project* staff recorded the personal testimonials of fifty African American

female breast cancer survivors, and then categorized all of the interviews, unitizing each feature of the interviews into distinct video clips, and coding each clip according to several topic and story attribute variables. The current study is based on that database of interviews. The goal of this study is to generate knowledge of the impact of cancer survivor testimonials in recommending BCS-related behaviors to viewers. Previous research has shown that messages incorporating testimonials from breast cancer survivors are most effective in changing attitudes toward breast cancer prevention (G. M. Leshner et al., 2008). Specifically, this study examined the combined impact of a specific message attribute (i.e., loss- vs. gain-frame) and an individual factor (i.e., gender).

Possible messages for the current study were identified with the help of prior coding by researchers at Missouri School of Journalism. The researchers (G. M. Leshner, Bolls, P. D., Moore, J. J., Peters, S. , Kononova, A. , Bailey, R. L., Gardner, E. and Wise, K., 2008) identified 60 possible messages from the NCI database of *The Story Telling Project*, and then pretested the messages with a group of students (N = 20) to gather data for statistical comparisons ensuring proper message categorization. From the pool of pretested interview clips, six were identified for use, three for loss-framed and three for gain-framed condition. All video clips, ranged from 22 to 68 seconds, were non-narrative interviews of individual women, shot by a single camera in medium close-up with no cuts, edits, or camera movement.

In this study, gain frame was defined as emphasizing the advantages/benefits of engaging in BCS (e.g., Breast Self Examination (BSE), mammogram, or clinical examination), while loss frame was defined as emphasizing the disadvantages/costs of not engaging in BCS. Both the loss-framed and gain-framed presentations were

approximately 3-minutes long and addressed such issues as the detection procedure, the importance of early detection, facts about breast cancer screening (BCS), and the importance of regular BCS. Table1 lists some exemplary gain- vs. loss-frame statements from the interview clips of each condition.

Table1. Comparison of Sample Gain- vs. Loss-Framed Statements

Gain-framed	Loss-framed
<p>- “It’s important to go because I truly believe, if they can catch it in the beginning, the rest of the process will be so simple and easy for you. It won’t be life-threatening. And if you get the annual mammogram, I think it will make a difference between life and death.”</p>	<p>- “If you don’t (have a mammogram), then the (survival) chances are not that great.... (A mammogram) hurts, but don’t listen to a lot of people saying ‘well, it hurt.’ Yes, it hurts. But cancer hurts worse.” (nn-u3)</p> <p>- “If they don’t want to know that they don’t have cancer, and they do develop cancer.”</p>

3.3. Participants

A total of 128 adults over age 30 were recruited to participate in this study. All participants were of African descent (African Americans) and had not been previously diagnosed with breast cancer. Among the participants, females (N = 64) and males (N = 64) were equally recruited.

Participants were recruited from a predominately African American graduate student group and an African American undergraduate student group at a large Mid-Western university; predominately African American churches in Columbia, MO; Missouri branch of NAACP (National Association for the Advancement of Colored

People); a local health fair and barber shops at Columbia, MO. The researcher left flyers with leaders of organizations, and posted solicitation for the study in church bulletins, as well as online communities for African American professionals. Additionally, an African American student from Atlanta, GA was hired to recruit prospective participants from African American communities.

The convenience sample of participants was told that they would be participating in a study investigating African Americans' responses to breast cancer interventions. They were informed that they would receive \$20 after completion of the online study for their time. Two individuals would have the possibility of receiving a \$70 or \$100 gift certificate from Walmart. The recruitment began once it was approved by the campus Institutional Review Board at University of Missouri-Columbia.

A summary of demographics and descriptive statistic is given at Table 2. Participants' age ranged from 30 to 65. The mean was 45.85 (SD = 10.10). The mean age of female participants was 43.78 (SD = 9.78), and the mean of male participants was 47.92 (SD = 10.07). The majority of participants (89.8%) had at least some college school education; 39.1% had graduated from college, and 36.2% had advanced degrees (M.A., Ph.D., M.D., J.D., etc.). These statistics suggest a well-educated sample. As for household income, the majority of participants (64.8%) made \$50,000 and above.

Table2. Descriptive Statistics of Sample Demographics

Demographics	N	Percentage
Marital Status		
Single/Never married	32	25
Married	74	57.8
Separated	5	3.9
Divorced	14	10.9
Widowed	3	2.3
Total	128	100

Education		
High school/GED	13	10.2
Some college	18	14.1
2-year college degree	6	4.7
4-year college degree	44	34.4
MA	36	28.1
Ph.D.	7	5.5
Professional degrees	4	3.1
Total	128	100
Income		
Less than \$10,000	1	.8
\$10,000-\$19,999	8	6.3
\$20,000-\$29,999	10	8.0
\$30,000-\$39,999	18	14.4
\$40,000-\$49,999	8	6.4
\$50,000-\$59,999	13	10.4
\$60,000-\$69,999	9	7.2
\$70,000-\$79,999	12	9.6
\$80,000-\$89,999	7	5.6
\$90,000-\$99,999	3	2.4
\$100,000-\$\$150,000	24	19.2
More than \$150,000	12	9.6
Unanswered	3	.8
Total	128	100

3.4. Procedure

The individuals who had agreed to participate in the study received an email from the researcher. The email included one of two different URL links, which was randomly assigned to each participant. The email recipients were asked to participate in this study within a week, by clicking on the URL link.

Once clicking on the link in the email, the participants were asked to read a written consent form describing the study briefly. After the participants agreed to the consent form by clicking on the button, they were asked to answer a few pre-exposure questions (e.g., their involvement level in the issue of breast cancer), and then watched a three-minute long BCS intervention video. After watching the video, the participants

answered a questionnaire about the video they just watched. At the end of the questionnaire, the participants were asked to provide their postal addresses to receive their reward by mail.

3.5. Measurement

Participants' issue involvement and personal background regarding breast cancer were measured *before* they were exposed to the video clip.

Issue Involvement

The definition of issue involvement in this study was based on personal relevance. That is, issue involvement refers to perceived importance of the breast cancer issue here. Since Zaichkowsky's (1986, 1994) definition of involvement focuses on personal relevance, this study measured the issue involvement variable, based on Zaichkowsky's (1994) involvement scale. Participants' involvement level in the issue of breast cancer was measured by a 7-point Likert-type scale, ranging from 1 ("*Not at all*") to 7 ("*Very much*"), with six items: important, relevant, interesting, means a lot to me, valuable and involving. Three items from Zaichkowsky's (1994) involvement inventory were dropped in this study considering this study's topic, breast cancer: exciting, fascinating, and appealing. The six-item index was reliable ($\alpha = .89$).

Personal Background

Participants' personal background regarding breast cancer was controlled in this study. The basic assumption of this study was that males and females would have different involvement levels in the issue of breast cancer. However, if a male participant has a family member diagnosed with breast cancer, his involvement level would be higher than other males who do not have such background. Therefore, individuals' personal

background regarding breast cancer was asked before they watch the stimuli, using the question of whether someone close to them has been affected by breast cancer.

Perceived Vulnerability

In this study, perceived vulnerability was defined as the belief that one and her/his close others are vulnerable and likely to be affected by breast cancer. Based on Witte et al. (1992), perceived vulnerability was measured by asking participants to indicate the level of their agreement with four statements on a 7-point Likert scale: “I am at risk for breast cancer,” “It is possible that I will develop breast cancer,” “It is possible that my close women (e.g., family, partner, friends) will develop breast cancer,” and “My close women (e.g., family, partner, friends) are at risk for breast cancer.” The four-item index was reliable ($\alpha = .84$).

Next, once participants watched a video clip, they were asked to answer a subsequent questionnaire designed to measure a series of dependent variables as follows.

Dimensional Emotions (Valence/Arousal)

Self-reported valence and arousal were measured using the Self-Assessment Mannequin (SAM). SAM is a pictorial scale designed to assess emotional response along three dimensions: valence, arousal, and dominance (Lang, Greenwald, Bradley, & Hamm, 1993). For this study, only the valence and arousal dimensions were measured, since the approach used here conceptualizes emotional experience as having two commonly derived dimensions: valence and arousal (Fridja, 1986; Greenwald, Cook, & P. Lang, 1989; Mehrabian & Russell, 1974). A. Lang and Newhagen (1996) argued that prior literature on emotional media messages (e.g., A. Lang, Dhillon, & Dong, 1995b) had shown that the processing of messages is mediated by the valence and arousal of the messages, while little was known about the effects of dominance dimension on media message processing. This study measured valence and arousal on 5-point scales by asking

participants to rate “How did you feel emotionally when you viewed the video?” in terms of emotional valence –2 (negative) to +2 (positive) and arousal –2 (low arousal) to +2 (high arousal). The mid-point of each scale was coded as zero without wording (Sato & Yoshikawa, 2007).

Distinct Emotions

Based on the previous work of Dillard and colleagues (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Smith & Dillard, 1997), this study developed a 23-item emotion measure for the purpose of this particular research. The emotion scale used a 7-point scale ranging from 1 (“*Not at all*”) to 7 (“*Very much*”) for each item: afraid, scared, fearful, angry, irritated, annoyed, aggravated, sad, dreary, dismal, surprised, startled, disgusted, sickened, revolted, agitated, happy, cheerful, content, puzzled, confused, bewildered, and empathy.

Message Elaboration

Message elaboration is defined as the degree of mental effort used to process a given message (Priester & Petty, 2003). Some studies have used a thought listing for measuring individuals’ elaboration degrees (e.g., Priester & Petty, 2003), while others have used a Likert-type scale measurement to maintain a coherent measurement process (e.g., Eveland, 2001; Eveland, Shah & Kwak, 2003; Chow & Luk, 2006). This study used both of these two methods. That is, participants were first asked to indicate their elaboration degree on a 7-point Likert-type scale (Chow & Luk, 2006; Lumpkins, 2007). This scale was composed of three items: “*The amount of attention I paid to the video was*”, “*The extent to which I thought about the content of the video was*”, and “*The extent to which I concentrated on its contents was.*” This index was reliable ($\alpha = .89$). Next, participants

were also asked to list the thoughts that they had experienced while watching the video. Their responses in this thought-listing task were then coded as supportive thoughts (i.e., message favorable), neutral thoughts (i.e., message neutral), irrelevant thoughts (i.e., message irrelevant), or refutative thoughts (i.e., message unfavorable) (Cameron, Jacks J.Z., & M.E., 2002).

Attitude toward BCS

Participants' attitudes toward breast cancer screening (BCS) were measured based on MacKenzie and Lutz's (1989) scale, which is composed of three bipolar items: good-bad, favorable-unfavorable, and pleasant-unpleasant. Each item was measured on a 7-point scale ($\alpha = .76$).

Defensive Avoidance

Defensive avoidance is defined as a motivated resistance to the BCS messages (Witte, 1992). Participants' defensive avoidance was measured based on the scale from Witte and Morrison (2000). Participants responded to the following item in three ways, "*When I was watching the interview clips of breast cancer survivors, my instinct was to:*" (a) "*Want to think about breast cancer*" – "*Not want to think about breast cancer*", (b) "*Want to protect my close women from breast cancer*" – "*Not want to protect my close women from breast cancer*", and (c) "*Want to protect myself from breast cancer*" – "*Not want to protect myself from breast cancer*" ($\alpha = .67$).

Behavioral Intentions regarding BCS

Participants' behavioral intentions regarding BCS were measured with three categories: the intention to obtain BCS, the intentions to recommend BCS to close women, and the intentions to act regarding BCS campaign. The first dimension was asked to female

participants only, while the other two dimensions were asked to male and females both. Male and female participants were both asked to indicate the level of their agreement with six statements on a 7-point Likert scale: “*I would recommend women in my life (e.g., family, partners, friends, etc) to get regular breast cancer screening,*” “*I would encourage women in my life to think about breast cancer screening,*” and “*I would suggest women in my life to visit a doctor to discuss breast cancer screening*” (three items for Intentions to Recommend, $\alpha = .87$). “*I would participate in breast cancer screening campaigns if I have the opportunity in the future,*” “*I would suggest that my friends support breast cancer screening campaigns if they have the opportunity in the future,*” and “*I would seek out additional information about breast cancer screening*” (three items for Intentions to Act, $\alpha = .80$).

Memory

First, a visual recognition test was conducted using a picture recognition task (Macmillan & Creelman, 1991). Each participant was exposed to a total of 10 pictures, and was asked to indicate whether they recognize a picture from the video they just watched (i.e., choosing between “*Yes*” or “*No*”). Three pictures came from the video segments that participants were exposed to, and the rest came from other interview clips that were not included in the stimuli. Recognition was assessed using signal detection scores calculated as $A' = .5 + [(y-x)(1+y-x)]/[4y(1-x)]$, where x is the probability of a false alarm (incorrect acceptance of a foil claim), and y is the probability of a hit (correct acceptance of a true claim)² (Grier 1971). These scores measure the discrimination ability uncontaminated by

² $A' = 0.5 + ((\text{HitRates} - \text{FalseAlarmRates}) * (1 + \text{HitRates} - \text{FalseAlarmRates})) / (4 * \text{HitRates} * (1 - \text{FalseAlarmRates}))$

the response tendency of participants and they are the recommended measures of ad recognition (Putrevu, 2008; Singh & Churchill, 1986).

Next, a content recognition test was conducted by asking participants to answer five multiple questions about the content of the video clip (e.g., “*Please select how many types of Breast Cancer Screening methods were mentioned in the video you just watched.*”). Each item added one point to the content recognition scores. Finally, a free recall test was conducted by asking participants to write as much as they can remember about the content of the interviews and the factual information part (Bolls, Lang, Potter, 2001; Choi, 2005). Free recall score was computed by counting each word that was shown or mentioned in the video segments or the recommendation. Each item added one point to the free recall test scores.

CHAPTER FOUR

RESULTS

4-1. Manipulation check

The validity of the independent variable manipulation was checked by independent t-tests. The manipulation of the frame type (gain vs. loss) was assessed by asking participants to rate the emphasis of the video clip with two items on a 7-point scale. The item [A] ranged from the “*Costs of failing to obtain breast cancer screening*” (-3) to the “*Benefits of obtaining breast cancer screening*” (+3). The item [B] ranged from the “*Negative outcomes of not obtaining breast cancer screening*” (-3) to the “*Positive outcomes of obtaining breast cancer screening*” (+3). The mid-point of each scale was coded as zero without wording. T-test analyses revealed that there was a significant difference between the gain vs. loss groups. For the item [A], gain group ($M = 2.68, SD = .94$) vs. loss group ($M = .45, SD = 2.53$), $Mdiff = 2.23, t(126) = 6.60, p = .000$. For the item [B], gain group ($M = 2.53, SD = 1.16$) vs. loss group ($M = -1.00, SD = 2.36$), $Mdiff = 3.53, t(126) = 10.72, p = .000$. Therefore, the manipulation for the frame type (gain vs. loss) was successful.

4-2. Preliminary Analyses

Emotion Measures

As addressed earlier, the participants’ emotional responses to the video were measured using the Self-Assessment Mannequin (SAM), as well as a series of discrete emotional items drawn from the previous work of Dillard and his colleagues (1996; 1997). Factor analysis was conducted to reduce the data and find the minimum number of factors that

account for observed discrete emotions. A principal components analysis was conducted utilizing a varimax rotation. The analysis produced a five-component solution, which was evaluated with the eigenvalue and variance. The five components and their corresponding items were as follows: Irritation accounted for 42.11% of the total variance (irritated, annoyed, aggravated, revolted, disgusted, angry, agitated, $\alpha = .95$), Fear for 11.94% (fearful, scared, afraid, $\alpha = .96$), Confusion for 6.57% (confused, puzzled, bewildered, $\alpha = .92$), Happiness for 4.99% (happy, cheerful, content, $\alpha = .88$), and Empathy for 4.37% (empathy).

Assumptions Check

A series of ANOVAs and regression analyses were conducted to test the hypotheses and research questions. All analyses were conducted using SPSS for Windows, Base 15.0 and SPSS Windows, Base 13.0 Grad Pack (SPSS, 2006; SPSS, 2004). Prior to hypotheses testing, the data were screened by examining missing values, outliers, homoscedasticity, and normality. First, it was found that the data included less than 5 percent of the missing cases, and therefore Listwise default was used. Second, the Explore statistics were used to identify outliers for the dependent variables across the groups. Since most cases had zero or only a small number of outliers, the researcher replaced the outliers with accepted minimum or maximum values. Third, the Levine's tests of homogeneity were conducted to check the homogeneity of the error variance of the dependent variables across the groups, when ANOVAs were conducted for testing each hypothesis. Finally, normality assumption was checked by examining skewness and kurtosis along with histograms and Kolmogorov-Smirnov tests of normality for the dependent variables across the groups. Typically, skewness and kurtosis values should lie between +1 and -1. Results suggested

that the distribution of a few dependent variables (e.g., elaboration level, number of supportive thoughts, attitudes toward BCS, and defensive avoidance) were negatively skewed, indicating the scores bunched up on the high end of the scale. To address the skewed distribution, a square root function transformation was conducted for each variable. The square root function transformation reduces the skewness by compressing the negative and positive tails of the distribution (Nolan & Heinzin, 2008).

Control

As noted in the methods, participants' personal experience regarding breast cancer was measured to be controlled when assessing the effects of the frame types and gender on responses to breast cancer screening messages. Participants were asked to identify whether someone close to them has been affected by breast cancer or not. Since this possible covariate was a categorical variable, it was added as another fixed factor along with the independent variables in a series of ANOVAs, which were used to test hypotheses (H1, H2, H3, H7, H8, H11, H16, and H17). Because the current study was not interested in the possible interactions between this control variable and two independent variables, the researcher selected a custom model and only included a main effect term of the control variable for the following analyses used for testing the hypotheses.

4-3. Tests of the Hypotheses

H1: Participant's gender will influence his or her involvement in the issue of breast cancer, such that female participants will be more highly-involved in the breast cancer issue than male participants will.

In testing H1, ANOVA was used with gender as an IV and breast cancer issue involvement as a DV. The analyses indicated that gender had no main effect on involvement levels in the breast cancer issue, suggesting the ceiling effect. There was no

significant effect of gender on issue involvement even after controlling for participants' personal background regarding breast cancer. That is, there was no significant difference between male ($M = 5.96, SD = 1.22$) and female participants ($M = 6.08, SD = 1.00$) in their involvement levels in the breast cancer issue, $F(1,125) = .157, p = .69$. Therefore, H1 was not supported.

Notably, however, the following post hoc analyses revealed that there was a significant difference between male ($M = 3.52, SD = 1.36$) and female participants ($M = 4.28, SD = 1.67$) in their perceived vulnerability about breast cancer. $F(1,125) = 7.28, p = .008, \eta^2 = .055$. That is, female participants were more likely to believe that they and their close women were vulnerable and likely to be affected by breast cancer, as compared to male participants.

H2: Participant's gender will influence his or her message elaboration in breast cancer intervention messages, such that female participants will have greater message elaboration than male participants.

H2 expected that female participants would have greater message elaboration than male participations. The ANOVA analyses showed that there was a significant difference between men and women in their message elaboration as measured by the thought-listing task. That is, female participants ($M = 2.47, SD = 1.34$) listed more thoughts related to the breast cancer screening video right after watching the video than did male participants ($M = 1.60, SD = .78$). $F(1,123) = 6.89, p = .010, \eta^2 = .053$.

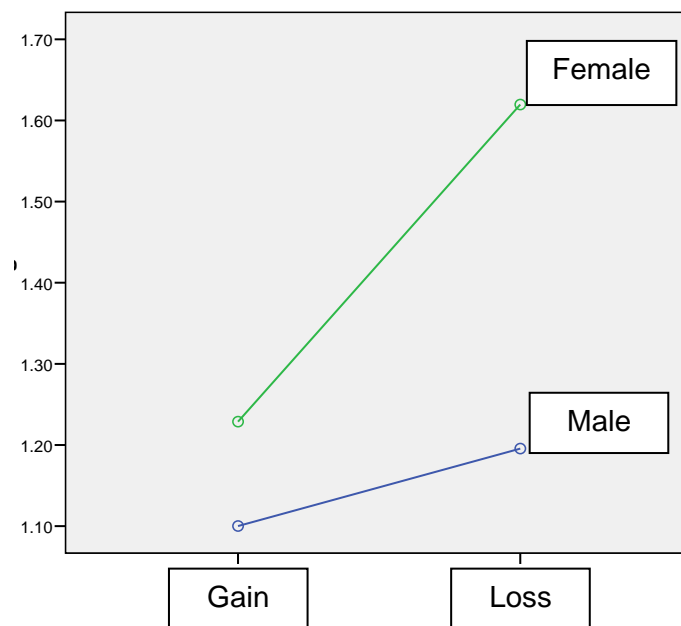
H3: Participant's gender will interact with the type of frame in breast cancer intervention messages to increase message elaboration.

H3a: Female participants will have greater elaboration for the loss-framed message than the gain-framed message.

H3b: Male participants will have greater elaboration for the gain-framed message than the loss-framed message.

H3 expected the interaction between gender and frame type in increasing message elaboration. The ANOVA analyses showed that there was a significant interaction between gender and frame type on message elaboration, supporting H3. $F(2, 123) = 3.672, p = .028, \eta^2 = .056$ (see Figure 10). In order to examine the interaction more closely, the *Bonferroni* pair-wise comparisons tests were conducted. The results indicated that, among the female participants, there was a significant mean difference between the gain-framed group and the loss-framed group in their elaboration levels. That is, women in the loss-framed group ($M = 1.22, SD = .10$) were more likely to have higher elaborations, as compared women in the gain-framed group ($M = 1.62, SD = .10$), supporting H3a. ($Mdiff = .391, SE = .148, p = .009$). In contrast, among male participants, there was no significant mean difference between the gain-framed group vs. the loss-framed group, failing to support H3b ($Mdiff = .095, SE = .148, p = .519$).

Figure 10. Interaction between Gender and Frame Type on Elaboration Level



H4: Participants' breast cancer message elaboration will increase their supportive thoughts about breast cancer screening.

In testing H4, a regression analysis was conducted with elaboration as an independent variable and the number of supportive thoughts as a dependent variable. The result showed that participants' elaboration ($M = 6.13$, $SD = .98$) significantly increased their supportive thoughts regarding breast cancer screening ($M = .96$, $SD = .86$). $R^2 = 2.63$, $F(1,126) = 44.92$, $p = .000$, $\beta = .515$, $t = 6.702$ (sig. = .000).

H5: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their attitude toward BCS positively.

In testing H5, a regression analysis was conducted with the number of supportive thoughts as an independent variable and attitudes toward breast cancer screening as a dependent variable. The result showed that there was no significant influence of supportive thoughts on attitudes toward breast cancer screening ($M = 6.33$, $SD = 1.02$). Thus, H5 was not supported. $R^2 = .004$, $F(1,126) = .528$, $p = .469$, $\beta = -.065$, $t = -.727$ (sig. = .469).

H6: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their behavioral intentions regarding BCS positively.

In testing H6, a regression analysis was conducted with the number of supportive thoughts as an independent variable and behavioral intentions as a dependent variable. There were three types of behavioral intentions: intentions to obtain BCS (females only), intentions to recommend, and intentions to act. The result showed that there was no significant influence of supportive thoughts on intentions to obtain BCS ($M = 6.60$, $SD = .65$) ($R^2 = .024$, $F(1,62) = 1.53$, $p = .221$, $\beta = .161$, $t = 1.24$ (sig. = .221)) or intentions to

recommend ($M = 6.74$, $SD = .56$) ($R^2 = .001$, $F(1,126) = .118$, $p = .732$, $\beta = .029$, $t = .343$ (sig. = .732)), suggesting the ceiling effects. On the other hand, there was a significant positive influence of supportive thoughts on intentions to act. That is, the more supportive thoughts about BCS participants had, the more likely they intended to act regarding BCS (e.g., participating in breast cancer screening campaigns in future) ($M = 5.66$, $SD = 1.42$). $R^2 = .035$, $F(1,126) = 4.53$, $p = .035$, $\beta = .448$, $t = 2.128$ (sig. = .035). Therefore, H6 was partially supported.

H7: Participant's gender will interact with the type of frame in breast cancer messages to increase their attitudes toward breast cancer screening (BCS) positively.

H7a: Male participants will have more favorable attitudes toward BCS when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H7b: Female participants will have more favorable attitudes toward BCS when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

In testing H7, ANOVA was run with gender and frame type as independent variables and attitudes toward BCS as a dependent variable. The analyses showed that there was no significant interaction between gender and frame type on attitudes toward BCS, failing to support H7 ($F(1, 123) = 2.172$, $p = .143$, $\eta^2 = .017$). Notably, however, the following analyses revealed that there was a significant interaction between gender and frame type on participants' supportive thoughts about BCS ($F(1, 123) = 5.547$, $p = .020$, $\eta^2 = .043$). The *Bonferroni* pair-wise comparisons tests indicated that there was a significant mean difference between men and women in responding to loss-framed messages. That is, in response to loss-framed messages, women ($M = 1.38$, $SD = .132$)

listed more supportive thoughts about BCS than men did ($M = .91, SD = .132$) ($M_{diff} = .469, SE = .187, p = .013$). It was also found that women listed more supportive thoughts about BCS when exposed to loss-framed messages ($M = 1.38, SD = .132$) vs. gain-framed messages ($M = .688, SD = .132$) ($M_{diff} = .688, SE = .187, p = .000$).

H8: Participant's gender will interact with the frame type in breast cancer messages to increase their behavioral intentions regarding breast cancer screening.

H8a: Male participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H8b: Female participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

In testing H8, ANOVA was used with gender and frame type as independent variables and behavioral intentions regarding BCS as dependent variables. The analyses showed that there was no significant interaction between gender and frame type on behavioral intentions regarding BCS (for intentions to recommend, $F(1, 124) = .160, p = .690, \eta^2 = .001$; for intentions to act, $F(1, 124) = .725, p = .396, \eta^2 = .006$). Thus, H8 was not supported.

H9: Participants' attitudes toward breast cancer screening will influence their behavioral intentions regarding breast cancer screening.

In testing H9, a series of regressions were conducted concerning attitudes toward BCS using the three types of behavioral intentions as dependent variables. The result showed that there was a significant influence of attitudes toward BCS on the intentions to recommend BCS ($R^2 = .14, F(1,126) = 19.92, p = .000, \beta = .369, t = 4.46$ (sig. = .010)), and the intentions to obtain BCS (for female participants) ($R^2 = .085, F(1,62) = 5.77, p$

$=.019, \beta = .292, t = 2.40$ (sig. = .019)). There was a positive influence of attitudes toward BCS on the intentions to act regarding BCS, but the relation fell short of the $p < .05$ significance level ($R^2 = .018, F(1,126) = 2.25, p = .136, \beta = .132, t = 1.50$ (sig. = .136)). Therefore, H9 was partially supported.

On the other hand, there was significant positive influence of supportive thoughts on intentions to act. That is, the more supportive thoughts about BCS participants had, the more likely they intended to act regarding BCS (e.g., participating in breast cancer screening campaigns in future). $R^2 = .035, F(1,126) = 4.53, p = .035, \beta = .448, t = 2.128$ (sig. = .035).

H10: Participant's gender will interact with the frame type in breast cancer messages to increase their memory of breast cancer message.

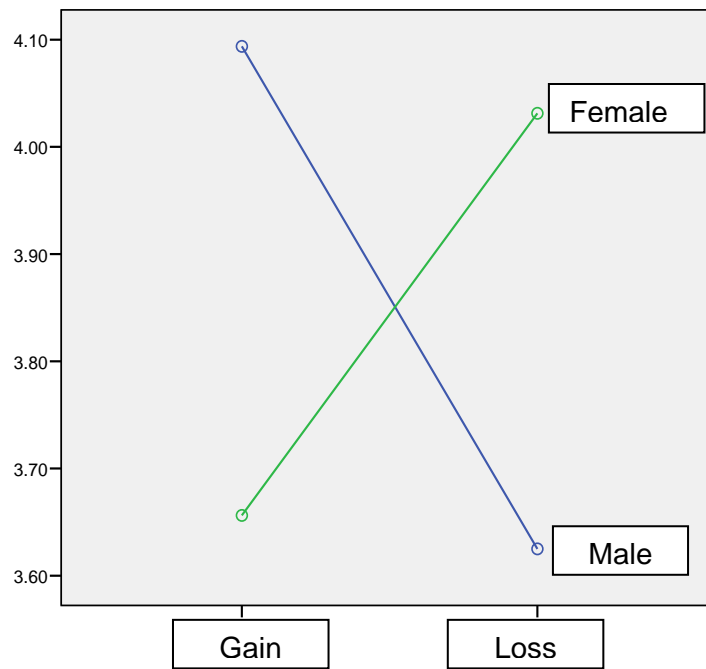
H10a: Male participants will have greater memory of the breast cancer message when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).

H10b: Female participants will have greater memory of the breast cancer message when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).

In testing H10, a series of ANOVAs were conducted with gender and frame type as independent variables and three types of memory measures as dependent variables. First, the analyses showed that there was an interaction between gender and frame type on visual recognition scores (i.e., A prime) in a borderline significance ($F(1, 119) = 2.92, p = .090, \eta^2 = .024$). The *Bonferroni* pair-wise comparisons tests indicated that there was a mean difference between men and women in responding to loss-framed messages. That is, in response to loss-framed messages, women ($M = .96, SD = .011$) ($M = 88.72, SD = 15.01$) as in percentage accuracy scores) tended to have higher visual recognition

scores than men did ($M = .93, SD = .011$) ($M = 85.07, SD = 19.62$ as in percentage accuracy scores) in a borderline significance ($Mdiff = .027, SE = .016, p = .084$). Next, the ANOVA analysis showed that there was an interaction between gender and frame type on content recognition scores ($F(1, 124) = 6.07, p = .015, \eta^2 = .047$) (see Figure 11).

Figure 11. Interaction between Gender and Frame Type on Content Recognition Scores



The *Bonferroni* pair-wise comparisons tests indicated that men had greater content recognition scores when the breast cancer message was gain-framed ($M = 4.09, SD = .171$) than when the message was loss-framed ($M = 3.63, SD = .171$), supporting H10a ($Mdiff = .469, SE = .242, p = .055$). In contrast, women had greater content recognition scores for a loss-framed message ($M = 4.03, SD = .171$) than for a gain-framed message ($M = 3.66, SD = .171$), although the mean difference fell short of significance at $p < .05$ ($Mdiff = .375, SE = .242, p = .124$). Finally, the analysis showed

that there was no significant interaction between gender and frame type on free recall scores. Therefore, H10 was partially supported.

H11: The frame type in breast cancer messages will influence the emotional valence of participants' response to the messages, such that those exposed to gain-framed messages will show more positive emotions whereas those exposed to loss-framed messages will show more negative emotions.

In testing H11, one-way ANOVA was used with frame type as an independent variable and SAM valence score as a dependent variable. The analysis showed that there was a significant main effect of frame on emotional valence ($F(1, 126) = 7.73, p = .006, \eta^2 = .058$). That is, participants exposed to gain-framed message showed more positive emotional valence ($M = .23, SD = .92$) than those exposed to loss-framed message, whereas those exposed to loss-framed message ($M = -.20, SD = .85$) showed more negative emotional valence. Therefore, H11 was supported.

H12: Participants' gender will influence the magnitude of their emotional arousal in response to breast cancer messages, such that female participants will show an equal or greater level of emotional arousal than male participants.

In testing H12, one-way ANOVA was used with frame type as an independent variable and SAM arousal score as a dependent variable. Participants' background regarding breast cancer was controlled. The analysis showed that there was no significant difference between men ($M = 1.89, SD = 1.06$) and women ($M = 1.97, SD = 1.14$) on emotional arousal ($F(1, 125) = .09, p = .764, \eta^2 = .001$). Therefore, H12 was not supported.

H13: Participant's emotional responses to breast cancer messages will influence their message elaboration.

H13a: The more participants are emotionally aroused in response to breast cancer messages, the greater they will elaborate the message (arousal).

H13b: Those who have negative emotions in response to breast cancer messages will have greater message elaboration than those who have positive emotions (valence).

In testing H13, a regression was conducted with emotional valence and arousal as independent variables and message elaboration as a dependent variable. The result showed that there was no significant influence of emotional responses on message elaboration, $R^2 = .003$, $F(2,125) = .171$, $p = .843$ (for valence, $\beta = .053$, $t = .58$ (sig. = .56); for arousal, $\beta = .012$, $t = .14$ (sig. = .892). Therefore, H13 was not supported.

H14: Participant's emotional responses to breast cancer messages will influence their memory of the message.

H14a: The more participants are emotionally aroused in response to breast cancer messages, the greater memory of the message they will retain (arousal).

H14b: Those who have negative emotions in response to breast cancer messages will have greater memory of the message (valence).

In testing H14, a series of regressions were conducted with emotional valence and arousal as independent variables and three types of memory measures as dependent variables. The result showed that there was no significant influence of emotional responses on memory. For visual recognition scores, $R^2 = .027$, $F(2,120) = 1.64$, $p = .199$ (for valence, $\beta = .094$, $t = 1.03$ (sig. = .305); for arousal, $\beta = -.118$, $t = -.130$ (sig. = .197). For content recognition scores, $R^2 = .010$, $F(2,125) = .612$, $p = .544$ (for valence, $\beta = -.099$, $t = -1.09$ (sig. = .280); for arousal, $\beta = -.001$, $t = -.011$ (sig. = .991). For free recall scores, $R^2 = .003$, $F(2,125) = .190$, $p = .827$ (for valence, $\beta = .010$, $t = .110$ (sig. = .913); for arousal, $\beta = -.052$, $t = -.571$ (sig. = .569). Therefore, H14 was not supported³.

³ Post hoc analyses were conducted to explore the possible effects of emotional valence and arousal on other dependent variables than memory. A series of regressions were conducted with emotional valence

However, the post hoc analyses revealed that the distinct emotions found in the preliminary analysis influenced participants' memory and behavioral intentions. A series of regression analyses found that confusion tended to decrease participants' visual recognition ($R^2 = .048$, $F(1,121) = 4.60$, $p = 0.034$, $\beta = -.191$, $t = -2.14$ ($p = .034$)); fear tended to increase participants' defensive avoidance ($R^2 = .093$, $F(1,125) = 12.78$, $p = 0.000$, $\beta = .305$, $t = 3.58$ ($p = .000$)) and their intentions to act regarding BCS campaigns ($R^2 = .044$, $F(1,123) = 6.76$, $p = 0.010$, $\beta = -.228$, $t = -2.60$ ($p = .010$)). Also, irritation tended to decrease participants' intentions to recommend BCS to close women ($R^2 = .048$, $F(1,123) = 6.23$, $p = 0.014$, $\beta = -.220$, $t = -2.50$ ($p = .014$)).

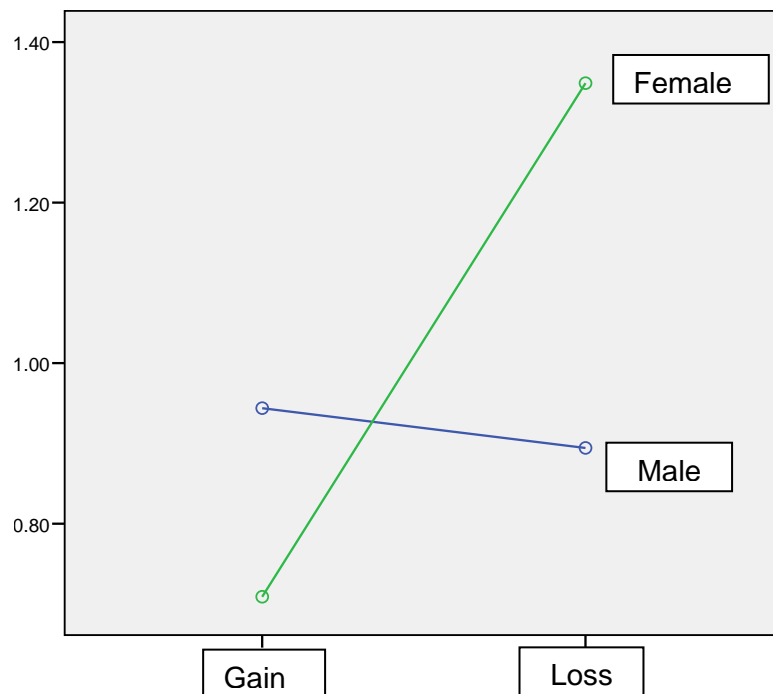
H15: Participants' gender (male vs. female) and frame type (gain vs. loss) will interact with the level of fear arousal (high vs. low) to increase supportive thoughts about breast cancer screening.

H15 expected a three-way interaction among gender, frame type, and fear level (high fear vs. low fear) in increasing supportive thoughts about BCS. The study also controlled for whether participants had any close others affected by breast cancer. The three-way ANOVA results failed to find the significant three-way interaction that H15 proposed. Interestingly, however, there were significant main effects of the frame type and fear level, as well as an interaction between gender and frame type on supportive thoughts about BCS. That is, those who watched loss-framed messages ($M = 1.12$, $SE = .102$) were more likely to have supportive thoughts about BCS, as compared to those who

and arousal as independent variables and supportive thoughts about BCS, attitudes toward and behavioral intentions regarding BCS as dependent variables. The results showed that there was no significant influence of emotional responses on those dependent variables: supportive thoughts about BCS ($R^2 = .007$, $F(2,125) = .46$, $p = .63$ (for valence, $\beta = .05$, $t = .55$ (sig. = .58); for arousal, $\beta = .08$, $t = .88$ (sig. = .38)), attitudes toward BCS ($R^2 = .011$, $F(2,125) = 6.78$, $p = .51$, (for valence, $\beta = -.05$, $t = -.55$ (sig. = .58); for arousal, $\beta = -.10$, $t = -1.11$ (sig. = .27)), intentions to recommend BCS ($R^2 = .02$, $F(2,125) = .98$, $p = .38$, (for valence, $\beta = .07$, $t = .72$ (sig. = .47); for arousal, $\beta = .12$, $t = 1.32$ (sig. = .19)), intentions to act ($R^2 = .015$, $F(2,125) = .92$, $p = .40$ (for valence, $\beta = -.01$, $t = -.14$ (sig. = .89); for arousal, $\beta = .12$, $t = 1.30$ (sig. = .20)), and intentions to obtain BCS ($R^2 = .038$, $F(2,61) = 1.20$, $p = .31$ (for valence, $\beta = .12$, $t = .98$ (sig. = .33); for arousal, $\beta = .16$, $t = 1.27$ (sig. = .21))).

watched gain-framed messages ($M = .83$, $SE = .103$), $F(1,118) = 4.41$, $p = .038$, $\eta^2_t = .036$. Also, those who expressed high fear after watching the BCS messages ($M = 1.12$, $SE = .102$) were more likely to have supportive thoughts about BCS, as compared to those who expressed low fear after watching the BCS messages ($M = .826$, $SE = .103$), $F(1,118) = 6.52$, $p = .012$, $\eta^2_t = .052$. Additionally, there was the significant interaction effect between gender and frame type, $F(1,118) = 6.01$, $p = .016$, $\eta^2_t = .048$. The mean pattern was similar with the pattern found in the analysis for H7 above. That is, women listed more supportive thoughts about BCS after watching loss-framed BCS messages ($M = 1.38$, $SE = .751$), as compared to gain-framed BCS messages ($M = .688$, $SE = .780$). On the other hand, for men, there was no significant mean difference between loss-framed message and gain-framed message in increasing supportive thoughts about BCS (see Figure12).

Figure12. Interaction between Gender and Frame on Supportive Thoughts about BCS



In order to examine the data more closely and test H15a-H15d and RQ1, the follow up analyses were conducted after splitting the data by gender.

H15a: Female participants who watch loss-framed breast cancer messages will have more supportive thoughts about screening when their fear arousal is low vs. high.

RQ1: Will female participants who watch gain-framed breast cancer messages have more supportive thoughts when their fear arousal is high vs. low?

First, in terms of the female participants (H15a and RQ1), ANOVA was conducted with frame and fear level as independent variables and supportive thoughts as a dependent variable. Personal background regarding BCS was controlled. The results revealed the significant main effects of frame type ($F(1,59) = 11.051, p = .002, \eta^2 = .158$) and fear level ($F(1,59) = 5.232, p = .026, \eta^2 = .081$) in increasing supportive thoughts about BCS. For female participants, the loss frame was more effective than the gain frame, regardless of the level of fear. Also, high fear was more effective than low fear, regardless of the frame type. That is, women who watched loss-framed messages had more supportive thoughts when their fear arousal was high ($M = 1.52, SE = .172$) vs. low ($M = 1.15, SE = .208$), as opposed to H15a. Therefore, H15a was not supported. As for RQ1, it was found that women who watched gain-framed messages had more supportive thoughts when their fear arousal was high ($M = .933, SE = .193$) vs. low ($M = .471, SE = .181$).

H15b: Female participants who watch loss-framed breast cancer messages will have more defensive thoughts about screening when their fear arousal is high vs. low.

In testing H15b, ANOVA was conducted with frame and fear level as independent variables and defensive avoidance as a dependent variable. The results

revealed that there was a significant main effect of fear level on women's defensive avoidance ($F(1,59) = 5.96, p = .018, \eta^2 = .092$). However, the *Bonferroni* pair-wise comparisons tests indicated that there was no significant mean difference between high vs. low fear arousal for those who watched loss-framed messages ($M_{diff} = .163, SE = .169, p = .338$). Thus, H15b was not supported.

H15c: Male participants who watch loss-frame breast cancer messages will have more supportive thoughts about screening when their fear arousal is high vs. low.

H15d: Male participants who watch gain-framed breast cancer messages will have more supportive thoughts when their fear arousal is high vs. low.

Next, in terms of the male participants (H15c and H15d), ANOVA was conducted with frame and fear level as independent variables and supportive thoughts as a dependent variable. Personal experience regarding BCS was also controlled. Results revealed no significant main effects or an interaction effect (for the main effect of frame type, $F(1,59) = .421, p = .519, \eta^2 = .007$; for the main effect of fear level, $F(1,59) = 2.33, p = .132, \eta^2 = .038$; for the interaction effect, $F(1,59) = .033, p = .857, \eta^2 = .001$).

Therefore, H15c and H15d were not supported.

H16: Participants' gender and frame type will interact with the level of fear arousal to increase the persuasiveness of the breast cancer intervention messages.

H16 expected a three-way interaction among gender, frame type, and fear level (high fear vs. low fear) in increasing the persuasiveness of the BCS messages. A series of three-way ANOVAs were conducted with memory, attitudes, and behavioral intentions as dependent variables⁴. The results did not find a significant three-way interaction in the

⁴ Post hoc analyses investigated the 3-way interaction among gender, frame type, and fear arousal, after splitting the continuous fear arousal variable into three groups instead of a median split. The 3-way ANOVA showed similar results with those of prior analyses, which used a dichotomized fear arousal

dependent variables, thus, it failed to support H16. However, the following analyses found that there was significant interaction between gender and frame on content recognition scores, and the interaction between gender and fear level on attitudes toward BCS. That is, men had higher content recognition scores after exposed to gain-framed messages vs. loss-framed messages, whereas women had higher content recognition scores after exposed to loss-framed messages vs. gain-framed messages ($F(1,118) = 4.68, p = .033, \eta^2 = .038$). Also, men had more favorable attitudes toward BCS when they felt the greater fear vs. lower fear, whereas there was no significant difference between high fear vs. low fear for women ($F(1,119) = 7.41, p = .007, \eta^2 = .059$).

Next, in order to examine the data more closely and test H16a-H16c and RQ2, the follow up analyses were conducted after splitting the data by gender.

H16a: For female participants, loss-framed breast cancer messages will be more effective when fear arousal is low than when fear arousal is high.

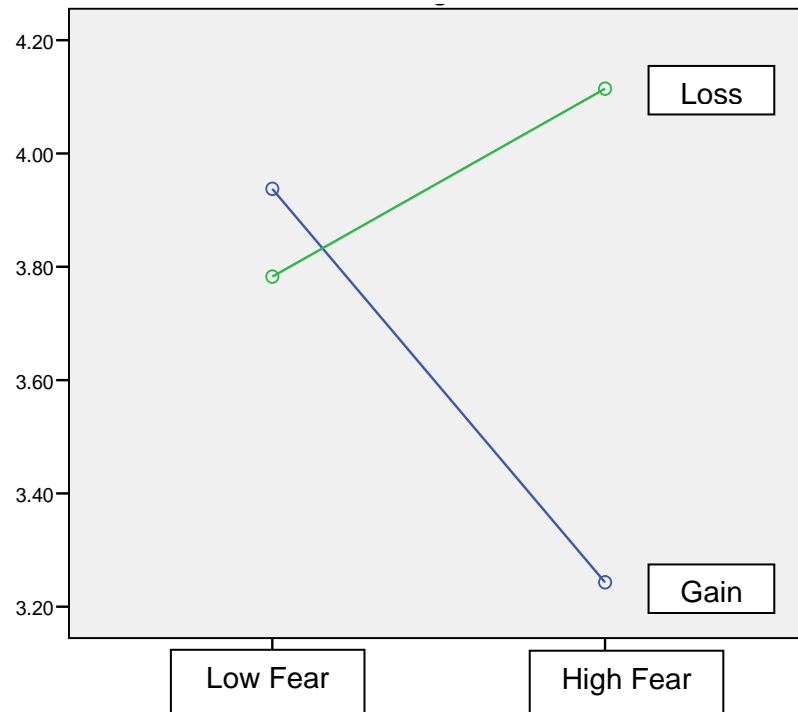
RQ2: For female participants, will gain-framed breast cancer messages be more effective when fear arousal is high than when fear arousal is low?

For female participants (H16a and RQ1), ANOVAs were conducted with frame and fear level as independent variables and three types of memory measures, attitudes, and behavioral intentions as dependent variables. Personal background regarding BCS was controlled. First, the results revealed the significant interaction between frame type and fear level on women's content recognition scores. However, for women who watched loss-framed messages, there was no significant mean difference between high vs. low fear arousal. Rather, the *Bonferroni* pair-wise comparisons test indicated that loss-framed

variable. That is, there were no significant 3-way interactions among gender, frame type, and fear arousal on supportive thoughts about BCS ($F(2,101) = 2.12, p = .125$), attitudes toward BCS ($F(2,100) = .54, p = .587$), intentions to recommend ($F(2,100) = .18, p = .839$), and intentions to act ($F(2,100) = .40, p = .674$).

message was more effective in increasing women's memory when their fear arousal was high vs. low ($M = 1.15$, $SE = .208$), ($M_{diff} = .891$, $SE = .343$, $p = .012$), as opposite to H16a (see Figure 13).

Figure13. Interaction between Frame Type and Fear Level on Content Recognition Scores (Females)



As for RQ2, it was found that gain-framed message was more effective in increasing women's memory when their fear arousal is low ($M = 4.00$, $SE = .241$) vs. high ($M = 3.27$, $SE = .256$), ($M_{diff} = .733$, $SE = .352$, $p = .041$). Additional ANOVAs were conducted other memory measures, attitudes and behavioral intentions as dependent variables, but there were no significant main effects of or interaction effects between frame and fear level for female participants. Therefore, H16a was not supported.

H16b: For male participants, loss-frame breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.

H16c: For male participants, gain-framed breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.

For male participants (H16b and H16c), ANOVAs were conducted with frame and fear level as independent variables and three types of memory measures, attitudes, and behavioral intentions as dependent variables. Personal background regarding BCS was controlled. First, the results revealed the significant main effects of high fear on men's attitudes toward BCS and behavioral intentions. That is, men had more favorable attitudes when their fear arousal was high ($M = 1.31, SE = .049$) vs. low ($M = 1.12, SE = .045$) ($F(1,58) = 7.99, p = .006, \eta^2 = .121$). Similarly, men's intents to act regarding BCS campaigns were also higher when their fear arousal was high ($M = 5.98, SE = .293$) vs. low ($M = 4.92, SE = .266$) ($F(1,58) = 7.38, p = .009, \eta^2 = .113$). Also, men had higher intent to recommend BCS to their close women when their fear arousal was high ($M = 6.93, SE = .077$) vs. low ($M = 6.71, SE = .085$) in a borderline significance ($F(1,58) = 3.77, p = .057, \eta^2 = .061$). Therefore, H16b and H16c were supported.

Interestingly, the following analyses revealed the significant effects of gain frame on men's behavioral intentions, which the prior analysis for H8 failed to find. That is, when controlled for fear level, men had higher behavioral intentions to act regarding BCS campaigns after watching gain-framed message ($M = 5.89, SE = .309$) vs. loss-framed message ($M = 5.00, SE = .279$) ($Mdiff = .883, SE = .416, p = .039, \eta^2 = .076$). Also, it was found that there was a significant interaction between frame type and fear level on men's attitudes toward BCS ($F(1,55) = 5.53, p = .022, \eta^2 = .091$). That is, men who watched gain-framed messages and had high fear arousal tended to have the most

favorable attitudes toward BCS than other three groups (i.e., [gain + low fear], [loss + high fear], and [loss + low fear]) (see Figure14).

Figure14. Interaction between Frame Type and Fear Level on Attitudes toward BCS (Males)

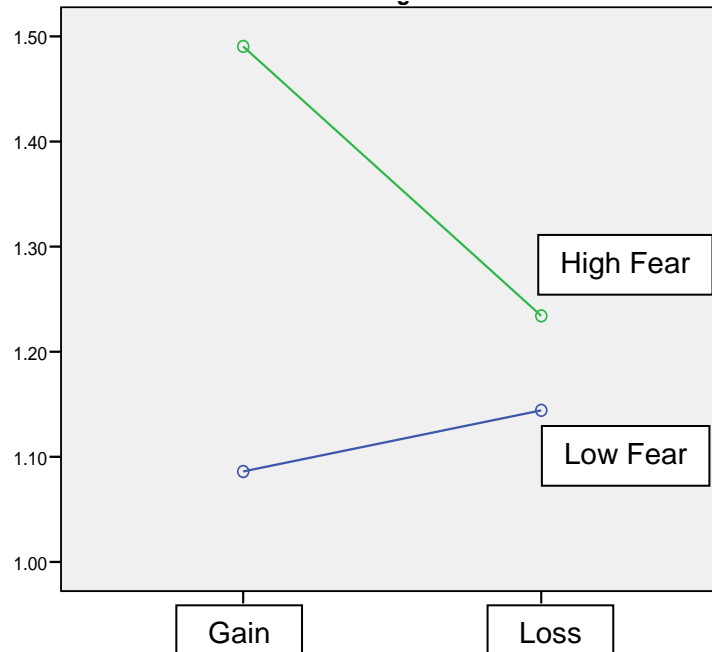


Table3. Summary of Results

Measured Effects	Hypotheses/RQs	Results	Post Hoc Findings
Main effect of gender on BC issue involvement	H1: Participant's gender will influence his or her involvement in the issue of breast cancer, such that female participants will be more highly-involved in the breast cancer issue than male participants will.	NS	-The main effect of gender on perceived vulnerability
Main effect of gender on elaboration in BCS message	H2: Participant's gender will influence his or her message elaboration in breast cancer intervention messages, such that female participants will have greater message elaboration than male participants will.	S	
Two-way interaction between gender and frame type on elaboration	H3: Participant's gender will interact with the type of frame in breast cancer intervention messages to increase message elaboration.	S	

in BCS message	<p>H3a: Female participants will have greater elaboration for the loss-framed message than the gain-framed message.</p> <p>H3b: Male participants will have greater elaboration for the gain-framed message than the loss-framed message.</p>	S	
<p>Effects of elaboration on supportive thoughts about BCS</p> <p>Effects of supportive thoughts on attitudes toward BCS</p> <p>Effects of supportive thoughts on behavioral intentions</p>	<p>H4: Participants' breast cancer message elaboration will increase their supportive thoughts about breast cancer screening.</p> <p>H5: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their attitude toward BCS positively.</p> <p>H6: Participants' supportive thoughts about breast cancer screening (BCS), triggered by the breast cancer message, will influence their behavioral intentions regarding BCS positively.</p>	S NS S	
Two-way interaction between gender and frame type on attitudes toward BCS	<p>H7: Participant's gender will interact with the type of frame in breast cancer messages to increase their attitudes toward breast cancer screening (BCS) positively.</p> <p>H7a: Male participants will have more favorable attitudes toward BCS when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).</p> <p>H7b: Female participants will have more favorable attitudes toward BCS when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).</p>	NS NS NS	-The interaction between gender and frame type on supportive thoughts about BCS
Two-way interaction between gender and frame type on behavioral intentions	<p>H8: Participant's gender will interact with the frame type in breast cancer messages to increase their behavioral intentions regarding breast cancer screening.</p> <p>H8a: Male participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is positively-framed (gain-framed message)</p>	NS NS	

	<p>than when the message is negatively-framed (loss-framed message).</p> <p>H8b: Female participants will have greater behavioral intentions regarding breast cancer screening when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).</p>	NS	
Effects of attitudes toward BCs on behavioral intentions	H9: Participants' attitudes toward breast cancer screening will influence their behavioral intentions regarding breast cancer screening.	S	
Two-way interaction between gender and frame type on memory	<p>H10: Participant's gender will interact with frame type in breast cancer messages to increase their memory of breast cancer message.</p> <p>H10a: Male participants will have greater memory of the breast cancer message when the breast cancer message is positively-framed (gain-framed message) than when the message is negatively-framed (loss-framed message).</p> <p>H10b: Female participants will have greater memory of the breast cancer message when the breast cancer message is negatively-framed (loss-framed message) than when the message is positively-framed (gain-framed message).</p>	S S NS	
Effects of frame type on emotional valence	H11: The frame type in breast cancer messages will influence the emotional valence of participants' response to the messages, such that those exposed to gain-framed messages will show more positive emotions whereas those exposed to loss-framed messages will show more negative emotions.	S	
Effects of gender on emotional arousal	H12: Participants' gender will influence the magnitude of their emotional arousal in response to breast cancer messages, such that female participants will show an equal or greater level of emotional arousal than male participants.	NS	

	RQ1: Will female participants who watch gain-framed breast cancer messages have more supportive thoughts when their fear arousal is high vs. low?	Yes	
Three-way interaction between gender, frame type, and fear level on memory, attitudes, and behavioral intentions.	<p>H16: Participants' gender and frame type will interact with the level of fear arousal to increase the persuasiveness of the breast cancer intervention messages.</p> <p>H16a: For female participants, loss-framed breast cancer messages will be more effective when fear arousal is low than when fear arousal is high.</p> <p>H16b: For male participants, loss-frame breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.</p> <p>H16c: For male participants, gain-framed breast cancer messages will be more effective when fear arousal is high than when fear arousal is low.</p> <p>RQ2: For female participants, will gain-framed breast cancer messages be more effective when fear arousal is high than when fear arousal is low?</p>	<p>NS</p> <p>NS</p> <p>S</p> <p>S</p> <p>No</p>	

CHAPTER FIVE

DISCUSSION

5-1. Summary of Findings

The present study examined the effects of message framing (gain vs. loss) in the context of breast cancer screening (BCS) messages. Specifically, this study tested how the framing effects would be moderated by the gender of the message recipients. The key expectation was that loss frame would be more effective for women while gain frame would be more effective for men, based on prior literature on framing and issue involvement. Results found that there was no significant difference between male vs. female participants in their self-report responses about breast cancer issue involvement. Nevertheless, the results did reveal that men and women processed the breast cancer messages with a different elaboration depth. This study then examined how such gender differences in elaboration depth would lead men and women to perceive gain vs. loss frames in BCS messages differently. The results found significant interactions between gender and frame type in the persuasiveness of BCS messages. That is, compared to the gain frame, *loss frame was more effective for women* in increasing their message elaboration and supportive thoughts about BCS. On the other hand, when compared to loss frame, *gain frame was more effective for men* in increasing their memory of the BCS messages, their favorable attitudes toward BCS, and their behavioral intentions.⁵ These findings were consistent with prior framing literature (i.e., loss framing would be more

⁵ The main effects of gain frame for men's attitudes toward BCS and behavioral intentions were found in the post hoc analyses after the fear level was controlled for testing H16 (see p. 101-102 for details).

effective in promoting a *detection* behavior because people tend to be risk-seeking when a problem is framed as a loss), as well as this study's expectation that such framing effects would be evident for systematic processors only. This study expected that the framing effects would not occur for heuristic processors, who might not pay much attention to the framing cues. Rather, it was expected that men would tend to base their judgments on superficial aspects of the BCS message, and approach what is positive. The results supported this expectation. That is, gain framing was found to be more effective in increasing men's memory, favorable attitudes and behavioral intentions regarding BCS. Additionally, this study examined the role of emotions in people's responses to gain- vs. loss-framed BCS messages. First, the results revealed that the gain- vs. loss-framed message elicited different emotional valence responses. That is, participants exposed to gain-framed messages experienced more positive emotions; whereas those exposed to loss-framed messages experienced more negative emotions. Although this study failed to find evidence to suggest the idea that participants' dimensional emotions (i.e., valence and arousal) affect their message elaboration and memory, the follow-up analysis revealed that five factors of distinct emotions (irritation, fear, confusion, happiness, and empathy) did emerge from participants' responses to the BCS message. Post hoc analyses revealed that some distinct emotions influenced participants' memory, as well as behavioral intentions. For example, confusion tended to decrease participants' recognition scores. Irritation tended to decrease participants' intentions to recommend BCS to women they are close to. Finally, fear tended to increase participants' defensive avoidance but, at the same time, increase the intentions to act regarding BCS campaigns. As demonstrated in this study, the role of fear in persuasion has produced mixed findings in prior literature.

The present study further examined the role of fear in increasing persuasiveness of BCS messages across gender and frame type.

Specifically, by dividing the data into high fear vs. low fear groups via a median split, this study assessed the possible three-way interactions among gender, frame type, and fear level. Although results did not reveal the three-way interactions among these three factors, the follow-up analyses revealed some interesting main effects as well as interaction effects among the factors. First, results from the female participants revealed the significant main effects of loss frame and high fear in increasing supportive thoughts about BCS. That is, women in the [loss frame + high fear] group had more supportive thoughts about BCS than did those in the other three groups. Results also revealed a significant interaction between frame type and fear level on women's memory. That is, the loss frame was more effective in increasing women's memory when the women's fear arousal was high vs. low; whereas the gain frame was the least effective in increasing women's memory when the women's fear arousal was high. Next, the results of the male participants revealed significant main effects of high fear arousal on men's attitudes toward BCS and behavioral intentions. That is, men had more favorable attitudes toward BCS and related behavioral intentions when their fear arousal was high vs. low. This study also found a significant interaction between frame type and fear level on men's attitudes toward BCS. That is, men in the [gain frame + high fear] group had more favorable attitudes toward BCS than the other three groups.

5-2. Theoretical Implications

From a theoretical point of view, the current study validated and advanced the gain vs. loss framing literature in the context of breast cancer interventions. Prior framing studies

have suggested that loss-framing would be more effective in breast cancer screening (BCS) messages than gain-framing because BCS is a detection behavior, not a prevention behavior. The question of the present study, however, was whether loss-framing for BCS messages would actually influence male audiences, too. The key expectation of this study was that loss frame would be more effective for women while gain frame might be more effective for men. This expectation was based on Maheswaran and Meyers-Levy's (1990) arguments that loss framing would be more effective than gain framing only for highly involved individuals. The results supported this expectation. That is, the advantage of loss-framing was clearly found for women, but not for men. As for men, the present study intended to shed some light in one of the most controversial areas in framing research. As discussed in the literature review, there have been the apparent conflicts between the two lines of research regarding the relationship between framing and involvement. One line of researchers (e.g., Rothman et al., 2006) argued that loss framing would work better for promoting detection behaviors and gain framing for promoting prevention behaviors. They contended that these framing effects would simply *not* occur for those whose involvement levels were low (i.e., null effect). On the other hand, another line of researchers (e.g., Maheswaran & Meyers-Levy, 1990; 2004) argued that, regardless of the type of behaviors promoted, loss-framing would be more effective for systematic processors, whereas gain-framing would be more effective for heuristic processors. The findings of the current study supported the latter. That is, this study found that gain framing produced a limited but significant advantage for men, whose elaboration level was lower than women's. Gain framing tended to increase men's memory, favorable attitudes toward BCS, and behavioral intentions regarding BCS, as

compared to loss framing. This finding adds empirical evidence to the controversial area in the framing literature.

Meanwhile, it should be noted that the advantage of gain framing for men was not found for every dependent variable. There was a null effect in increasing men's supportive thoughts about BCS. Also, the impact of gain framing in increasing men's attitudes toward BCS and behavioral intentions were found only after the fear level was controlled. Such mixed findings suggest that the advantage of gain framing for heuristic processors may not be as strong as the advantage of loss framing for systematic processors. That is, for heuristic processors, gain framing may be only one of the peripheral cues that influence their message processing. Besides framing, there could be many other message/situational factors that influence the message effects for heuristic processors. This could explain why the impact of gain framing for men was revealed only after their fear was controlled. Such possible, but limited impacts of gain framing may be the reason why the conflicting arguments and mixed evidence have existed between the two lines of framing research. The findings of the present study may provide a preliminary milestone to build a bridge between those two conflicting literatures. Future research should explore other various factors that possibly moderate the advantage of gain framing for heuristic processors. Also, examining the advantage of gain vs. loss framing for systematic processors in promoting *preventions* behaviors (as compared to *detection* behaviors assessed in the present study) would be another next step needed to untangle the conflicting framing literature.

The present study also extended the framing literature by examining the role of emotions in framing effects for health communication messages. Specifically, this study

examined the interplay of message framing and emotions based on two theoretical frameworks of emotions. First, from the dimensional approach to emotions, this study found that the different frame (gain vs. loss) influenced people's emotional valence in response to the messages. That is, people exposed to gain-framed message experienced more positive emotional valence than those exposed to loss-framed messages, whereas those exposed to loss-framed messages experienced more negative emotional valence, as predicted in H11. However, this study did not find a significant impact from dimensional emotions on elaborated processing and memory. Although the emotion literature suggests that negative affect would generate systematic processing while a positive affect would promote heuristic processing, such effects of emotional valence were not revealed in this study. One possible explanation would be that the effects of emotional valence might not be as strong as the impact of loss vs. gain framing in determining people's information processing route. It should be noted that prior literature suggested that emotional valence would affect cognitive processing when the elaboration level is *modest*. In this study, the effects of framing might increase the elaboration level high enough to override the possible effects of emotional valence. For instance, positive affects elicited from gain framing could have promoted heuristic processing for men and women both. However, for male participants, the advantage of gain framing for men might override this tendency, and thus promoted systematic processing instead and increased memory. That is, the effects of emotional valence on cognitive processing might have been counterbalanced by participants' gender difference in responding to the gain vs. loss frame. Another possible explanation would be that the emotional valence elicited by gain vs. loss framing in this study might not have enough variance to determine heuristic vs.

systematic processing. Most of the prior literature either manipulated the emotional valence of messages or selected the messages specifically based on the emotional tones in order to investigate how the positive vs. negative emotion influences cognitive processing. Finally, it should be also noted that many of the prior literature focused on the role of incidental emotions in promoting different information processing routes, while the current study assessed the message-related emotions (i.e., emotions elicited by the media message). Future researchers may need to examine the effects of incidental emotions (e.g., by inducing positive vs. negative affective states *before* exposing participants to message stimuli) on people's responses to gain vs. loss framing. It would be interesting to explore the interplay between the incidental emotions vs. message-related emotions induced by manipulation stimuli, and assess how such possible interactions would influence the effects of gain vs. loss framing.

Notably, this study also did not find a significant arousal impact on cognitive processing. This was inconsistent with prior literature, which found that high arousal tended to increase elaboration levels and thus memory. This might be due to the fact that participants' emotional arousal was not induced high enough to influence their cognitive processing in this study. The relatively low mean values of emotional arousal give weight to this presumption ($M = 1.92$ on a 5-point scale, $SD = 1.09$). This might be because the visual/auditory structures of the BCS messages used in this study were relatively simple. Researchers have found that the structural complexity of media messages increases the amount of arousal experienced by viewers, as well as memory (Potter, 2006). The videos used in this study contained static medium shots of interview clips (i.e., a talking head) without any changes in visual/auditory structure significant enough to trigger an orienting

response or increase arousal. Future studies may need to investigate the role of structural complexity of health messages (visual and auditory features both) in increasing people's emotional arousal, elaboration levels, and memory in response to gain- vs. loss-framed health messages.

Next, from the distinct approach to emotions, this study found that five distinct emotional factors emerged in response to BCS messages. It was also found that some of the distinct emotions were significantly related to participants' subsequent responses to the BCS messages. For instance, confusion tended to decrease memory; irritation decreased participants' intentions to recommend BCS to close women; and fear tended to increase participants' defensive avoidance and also their intentions to act regarding BCS campaigns. Such findings about the impact of distinct emotions answered Dillard and his colleagues (2000; 2006; 2007), who suggested that health communication research could move forward by considering specific emotions as one of the key tools to achieve persuasive goals. Future research should further investigate the role of specific emotions, which could possibly affect the public's memory, attitudes, and behavioral intentions in response to health communication messages. Also, although it was beyond the scope of this study to further discuss the possible relations between various distinct emotions and framing effects, such an endeavor should be undertaken to obtain a fuller understanding of the framing effects.

The present study specifically examined the role of fear arousal in influencing the interaction between gender and frame type. The author's expectation was that the combination of [loss frame and low fear arousal] would be most effective for female recipients because [loss frame and high fear arousal] might interfere with persuasion by

leading women to elaborate on the problem too much and become engaged in defensive tendencies such as avoidance. Although results showed that high fear arousal tended to increase defensive avoidance, high fear arousal was still more effective than low fear arousal for women and men both (H15 not supported). That is, the combination of [loss frame and high fear arousal] was generally most effective for female participants. One possibility for this result is that the fear arousal might not have been high enough to interfere with persuasion in this study. The current study measured the fear arousal as individual differences rather than manipulating it as an experimental factor, which could have induced high vs. low fear more effectively. Another possibility is that the sample (N = 128) was not big enough to capture the three-way interactions among gender, frame type, and fear arousal. Bigger sample size (e.g., N = 240) may increase the power to find significant three-way interactions. Future studies may need to employ fear appeal as a manipulated factor and assess its role in influencing gain vs. loss framing using a bigger sample size. Additionally, it should be noted that high fear arousal tended to increase defensive avoidance and, at the same time, increase the message persuasiveness for men and women both. Such findings suggest that fear arousal may function as a double-edged sword, as consistent with previous literature that produced mixed findings regarding the optimal level of fear arousal. Further exploration of the optimal level of fear arousal for different audiences might be warranted in health communication. Finally, the present study found that people's elaboration levels in BCS messages did influence their supportive thoughts about BCS (H4), which in turn increased their behavioral intention regarding BCS (H6) under the dual processing framework. This study also found that systematic processors vs. heuristic processors (i.e., women vs. men as demonstrated H2)

perceived the loss vs. gain framing differently. Although this study failed to reveal the significant impact of emotional valence on message elaboration depth, the post hoc regression analysis showed that the fear arousal tended to increase the message elaboration positively ($R^2 = .070$, $F(1,126) = 9.50$, $p = .033$, $\beta = .265$, $t = 3.08$ (sig. = .033). This result is consistent with Tiedens and Linton's (2001) finding that low-certainty emotions (e.g., fear) resulted in systematic processing, while high-certainty emotions led to heuristic processing. Future research may need to further investigate the impacts of specific emotions on health messages elaboration by integrating the emotion literature and dual processing framework in health communications.

5-3. Practical Implications

The current study provided a few practical implications for practitioners who attempt to develop effective health communication messages. First of all, this study showed a great potential for male publics in promoting breast cancer awareness, prevention and treatment for women they are close to. Most breast cancer research and campaigns have typically involved middle-aged female participants only. However, in the current study, the majority of male participants indicated that the breast cancer issue was important for them ($M = 6.25$ in the 7-point scale, $SD = 1.12$) and, after watching the BCS promotion video, the majority of them indicated fairly high intentions to recommend BCS to the women in their lives ($M = 6.82$ in the 7-point scale, $SD = .40$). This finding validates Sporer's (2007) argument that the breast cancer campaign should involve both women and men to educate them to encourage their close women to obtain regular breast cancer screening. Practitioners should therefore consider the important role that men play in improving the breast cancer intervention rate among women.

Next, this study of the gender difference in processing gain- vs. loss-framed health messages demonstrated that health communication practitioners should strategically use gain vs. loss framing to achieve their communication goals. Practitioners need to develop message framing in accordance with their target publics, considering the disease characteristics and the public sectors' involvement levels in that disease issue. Specifically, in the context of breast cancer screening campaigns, practitioners may need to utilize loss framing for the female audience, while using gain framing for the male audience (H3 & H10).

The present study also offers practical implications regarding the role of fear arousal. The study found that high fear arousal generally increased the persuasiveness for both men and women. In terms of the male participants, high fear arousal generally increased men's attitudes toward BCS and related behavioral intentions regardless of the combined frame type. On the other hand, for female participants, the advantage of fear arousal was found contingent on the combined frame type. For instance, when increasing women's memory of the BCS messages, the most effective combination was [loss frame + high fear arousal], while the least effective combination was [gain frame + high fear] rather than [gain frame + low fear]. This result suggests that, when it comes to the female audience, high fear appeals may backfire if it is used along with gain-framed BCS messages. Such a finding may be related to the current finding that high fear arousal tended to increase defensive avoidance for women but not for men. Practitioners therefore should make use of the advantage of fear appeals, but utilize it cautiously by considering that fear arousal might function as a double-edged sword especially for systematic processors.

Additionally, the current study unexpectedly revealed another key moderating factor for framing effects: whether an individual has a close relationship with someone affected by a certain health problem. Among the 128 participants of this study, about 65 percent answered that they had close relationships with women affected by breast cancer. The post hoc analyses found such a background led the individuals to get more involved in the breast cancer issue ($F(1, 120) = 4.18, p = .042, \eta^2 = .033$), and process the BCS message with deeper elaboration ($F(1, 124) = 3.91, p = .050, \eta^2 = .032$). There were also significant interactions between those with such a background and the frame type. For instance, loss framing was more likely effective for those with close relationships with women affected by breast cancer when it came to increasing their supportive thoughts about BCS, as compared to gain framing. Gain framing was more likely to be effective for those without such a background ($F(1, 124) = 4.01, p = .047, \eta^2 = .031$), as consistent with the prior framing literature. The current study did not further discuss the role of personal background in influencing the message framing effects. Nevertheless, it still offers some practical implications that practitioners may need considering people who have close relationships with women affected by breast cancer as a key audience for breast cancer intervention campaigns. People with such a background were highly involved in the breast cancer issue and paid more attention to the BCS messages. Practitioners also need to consider that, in order to persuade those individuals to actively participate in BCS campaigns, loss framing would be more effective than gain framing.

Finally, it is noteworthy that this study used the video format for the BCS messages, and exposed this video to participants via the Internet. Descriptive statistical analysis showed that a large percentage of the sample had supportive thoughts about and

behavioral intentions regarding BCS after watching the video online, suggesting that the Internet would be an effective channel to disseminate health intervention videos quickly and widely. A body of research in the field of health communication (e.g., Bernhardt, Lariscy, Parrott, Silk, & Felter, 2002) also suggests the role of new communication technology in distributing information to promote health behaviors. Therefore, in an attempt to distribute video messages regarding various health issues, practitioners can use effective message factors such as framing and fear appeals in accordance to the characteristics of the target publics, and directly communicate with these key publics via organizational Web sites, major blogs and chat forums, viral marketing through e-mail distribution, health-related online communities, social-networking sites, and Web casting.

5-4. Limitations and Future Study

Sample and Data

This study was not without its failings. First, the convenience sample was limited in the sense that it had the potential to recruit male participants who were already highly involved with the breast cancer issue. For instance, since African American participants were told that they would be participating in a study investigating African Americans' responses to breast cancer interventions, individuals who were already interested in breast cancer issues might have been more likely to agree to participate in the study. This might cause some sampling bias. This assumption is based on the fact that among the 128 participants of this study, about 65 percent had close relationships with women affected by breast cancer. That is, individuals who had families or friends affected by breast cancer might be more conscious about the issue and therefore more willing to participate in the study. This biased sample produced some unexpected but interesting findings such

as the interaction between such a background and the frame type (i.e., loss framing was more effective for those who were more personally involved in the breast cancer issue). Consequently, the sample was limited when it came down to testing the main assumption of this study: Men would be less involved in the breast cancer issue than women. This may explain why this study failed to reveal the significant mean difference between men and women in their issue involvement levels in the breast cancer issue (H1 not supported), and why the study ended up with some ceiling effects when measuring participants' attitudes toward BCS. In order to investigate the relation between framing type and issue involvement, future studies may need to adopt random sampling of the population to eliminate this sampling issue.

Second, in relation to the point above, the data failed to support the primary assumption of this study: Men and women would have different involvement levels in the breast cancer issues (H1). One possibility for this might be related to the sampling bias. Another possibility could be the demand characteristics. The participants knew that the study would be about breast cancer intervention, and thus, when they were asked initially if the breast cancer issue was important to them, they might have felt that they were expected to be interested in the issue. One other possibility is that the issue involvement should have been conceptualized and measured as a multi-dimensional concept. In fact, Marshall, Reinhart, Freely, Tutzauer, and Anker (2008) recently argued that, in the context of health communication, issue involvement should be conceptualized as a three-dimensional construct: value-, outcome-, and impression-relevant involvement. Value-relevant involvement is "the psychological state that is created by the activation of attitudes that are linked to important values" (Johnson & Eagly, 1989, p.291);

impression-relevant involvement is the “concern with holding an opinion that is socially acceptable” (p.291); outcome-relevant involvement is “the relevance of an issue to their currently important goals or outcomes” (p.292). (For more detailed review, see Marshall et al., 2008). Marshall et al. (2008) measured these three dimensions of involvement across six health behaviors, and found evidence of the 3-factor structure conceptualized by Johnson and Eagly (1989) and measured by Cho and Boster (2005). Future research on framing and involvement in health communication may need to employ this multi-dimensional perspective to issue involvement rather than using Zaichkowsky’s (1994) uni-dimensional scale. It would be worthy to examine which of these sub-dimension(s) of involvement would be related to men vs. women’s response to breast cancer interventions, and how the involvement would moderate the effects of gain vs. loss framing.

Additionally, it is noteworthy that, although this study failed to find the gender difference in the issue involvement about breast cancer, it revealed the significant difference between men and women in their perceived vulnerability about breast cancer. That is, female participants were more likely to believe that they and their close women were vulnerable and likely to be affected by breast cancer, as compared to male participants. Possibly, such gender difference in perceived vulnerability might have caused men and women to process the BCS messages with a different elaboration depth. Future study may need to further investigate the role of perceived vulnerability regarding a health problem in influencing people’s elaboration depth to process the related health messages.

Third, the findings of the current study suggest that fear arousal may increase the persuasiveness of health messages, but at the same time, may interfere with the

persuasion by increasing the defensive avoidance tendency. However, this study failed to find the optimal level of fear arousal. As mentioned earlier, this might be due to the fact that fear was not manipulated, and therefore was not effective to create enough variance in fear arousal levels. Future studies may need to employ fear appeal as a manipulated factor and investigate the optimal level of fear arousal when developing loss-framed health messages for highly involved individuals.

Fourth, in this study, people's pre-attitudes toward BCS and pre-behavioral intentions regarding BCS were not checked. It would be better to have such pre-measures in future studies because such measures would provide some indicators to reveal how participants' attitudes and behavioral intentions actually change after the message exposure. Future research may need to use a pre-post experimental design to examine participants' pre-attitude to health messages and post-attitude to health-messages from their experience of gain vs. loss framing.

Fifth, this study employed three types of memory measures in examining the effects of gender and frame type on participants' memory: visual recognition, content recognition, and free recall. Interestingly, each of these three memory measures produced different results. Results showed a significant interaction between gender and frame type on content recognition scores, but not on visual recognition scores and free recall scores. First, the conflicting result between visual vs. content recognition scores might be due to the fact that visual information was easier to process than auditory information, as evidenced in prior literature (e.g., Grimes, 1991; Basil, 1994, Lang, 1995). For instance, Lang, Potter, and Bolls (1999) tested the hypothesis that people encode visual information automatically, while having to rely on the controlled allocation of cognitive

resources to encode the auditory information; their findings showed that visual recognition was not affected by the increased resource requirements, but verbal recognition declined. In the current study, visual recognition was not affected by the interaction between gender and frame type, suggesting that the visual information was encoded automatically, resulting in ceiling effects in which scores are predominantly high. The relatively high percentage accuracy scores of visual recognition give weight to this presumption (for women, $M = 88.72(\%)$, $SD = 15.01$; for men, $M = 85.07(\%)$, $SD = 19.62$). Next, the analysis also showed no significant interaction effect between gender and frame type on free recall scores. This conflicting result between content recognition and free recall scores may be interpreted from the limited-capacity framework (Lang, 2000), which treats recognition, cued recall, and free recall as indicators of encoding, storage and retrieval respectively. According to the limited-capacity framework, these processes of encoding, storage and retrieval occur simultaneously, and all make processing requirements on the viewer's limited available resources (Lang, 2000). In this sense, if cognitive resources are automatically allocated to encoding, there may not be enough resources remaining for storing the information, which would in turn decrease the retrieval of the information. In this study, it is possible that the BCS messages might require much of the participants' resources by triggering an automatic allocation of resources toward encoding the messages, and thus lead them not to be able to recall much of what was presented. This presumption, however, needs further investigation beyond the scope of this study. The current study did not measure participants' cued recall scores, which could have shed light on whether the storage and retrieval function actually suffered as a result of high encoding demand. Additionally, the findings with free recall

in this study should be interpreted with the caveat that free recall might be a less rigorous measure of memory than recognition or cued recall since it simply asked for memorability of BCS messages rather than specific details included in those messages. Future research may need to adopt all the indicators of encoding, storage, and retrieval when further investigating the effects of gain vs. loss framing on memory in the health communication context.

Sixth, another area for future study is to further investigate the validity of elaboration measures. The current study used two types of measures: thought-listing and a Likert-type scale. The results revealed a significant mean difference between men and women in the elaboration as measured with the thought-listing task, but not in the elaboration as measured by a Likert-type scale composed of three items (e.g., “*The amount of attention I paid to the video was:*” on 7-point scale ranging from 1 on “*Very little*” to 7 on “*Very much*”). The reason for these conflicting results between the two types of measurements is not yet clear. One possibility is that the Likert-type scale might have created some demand characteristics for the participants; people might have felt that they were supposed to answer they paid a good deal of attention to the socially desirable message even if they actually did not. The high mean score of the elaboration scale ($M = 6.13$, $SD = .98$) gives some weight to this presumption. Such a finding suggests that the traditional thought-listing technique may be more valid than a close-ended scale when measuring the elaboration depth for pro-social messages such as health interventions. Another possibility is that the three-item scale might not be comprehensive enough to capture the variance among the individuals’ elaboration depth. Although closed-ended processing measures have become an accepted method for assessing processing

constructs (Nabi, 2007), the most representative scale has not been established yet. Rather, Wolski and Nabi's (2000) 14-item scale may better serve for future studies that attempt to measure elaboration depth with a close-ended scale. Wolski and Nabi's (2000) scale was designed to assess ability, motivation, and overall depth of information processing, and this multi-dimensional scale may better serve to measure people's cognitive processing.

In a similar sense, this study also found the conflicting results between a self-report scale and a thought listing task for attitudes toward BCS. That is, results revealed the significant mean difference between men and women in supportive thoughts as measured with the thought-listing task, but not in attitudes toward BCS as measured by a bi-polar scale composed of three items (e.g., "*Favorable*" – "*Unfavorable*" on a 7-point scale). Admittedly, for measuring attitudes toward socially desirable behaviors, self-report scales and thought listing tasks may both produce demand characteristics that cause participants to suppress negative views. However, Watt, Maio, Rees, and Hewstone (2007) argue that thought-listing measures are relatively better than close-ended self-report scales at reducing such pressure. The different results from these two measures in the current study add more weight to Watt and her colleagues' (2007) argument. All in all, future research may need to consider this methodological issue regarding open-ended vs. close-ended measures, and further examine the validity of these measures in the field of health communication.

Analysis

Due to experimental practicalities, the relations among dependent variables were not taken into account in the present study. It is beyond the scope of this study to further

discuss the causal/meditational relations among all dependent variables, let alone other key variables (e.g., efficacy perceptions, risk perceptions, etc) from the integrated framework of health message processing, proposed at Figure 6. Nevertheless, such an endeavor should be undertaken to obtain a fuller understanding into the framing effects in the context of health communication. Future research should validate the conceptual framework by testing the causal relations among the key outcome variables, using meditational analysis or structural equation modeling. Structural equation modeling will be especially valuable when it comes to enabling future researchers to test the framework overall, assess the complicated relations among variables such as mediated moderations, and compare the degree of message effects between multiple groups.

External Validity

This study examined African American adults' responses to the BCS messages featured by African American breast cancer survivors. This study was conducted based on the essential proposition that for basic human information processes, the effects of independent variables are universal. The current study addressed a fundamental communication question, and the dependant variables (e.g., elaboration depth, emotional response, attitudes toward and behavioral intentions regarding BCS) were likely to be universal factors that permit generalizations to the general population. In this sense, this study constitutes an important preliminary step in furthering the fundamental knowledge of the role of framing that plays in influencing people's responses to health messages. The findings from the current study should serve as a foundation or pioneering effort to be tested with other types of participants (e.g., different ethnic groups, cultures, age groups, etc.).

Lastly, it should also be acknowledged that this study employed only breast cancer screening messages, limiting the generalizability of its findings to many other health problems and issues. More health communication contexts involving various health issues should be further examined to extend our findings about framing and gender/involvement to the diverse health communication contexts. Also, this study employed the BCS messages sponsored by a nonprofit organization (i.e., American Cancer Society). Future research may need to adopt other types of organizations as possible sponsors. For example, government-related organizations such as CDC, corporate organizations sponsoring a BCS campaign as its CSR (corporate social responsibility) efforts, or religious organizations such as local churches which are well-known as an integral part of the lifestyle of many African Americans. Different types of sponsoring organizations may influence the recipients' credibility perception and elaboration depth, which may, in turn, affect their responses to gain vs. loss framing.

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