Published in final edited form as:

Commun Q. 2012 ; 60(1): 1–16. doi:10.1080/01463373.2012.642269.

An Initial Investigation into Naturally Occurring Loss- and Gain-Framed Memorable Breast Cancer Messages

Carolyn LaPlante, Sandi Smith, Michael Kotowski, Samantha Nazione, Cynthia Stohl, Abby Prestin, Jiyeon So, and Robin Nabi

Carolyn Lauckner (B.A., Michigan State University, 2010) is a Doctoral Student in the Department of Telecommunication, Information Studies, and Media at Michigan State University. Sandi Smith (Ph.D., University of Southern California, 1986) is a Professor in the Department of Communication Arts & Sciences and Director of the Health and Risk Communication Center at Michigan State University. Michael Kotowski (Ph.D., Michigan State University, 2007) is an Assistant Professor in the School of Communication Studies at the University of Tennessee. Samantha Nazione (M.A., Michigan State University, 2009) is a Doctoral Student in the Department of Communication at Michigan State University. Cynthia Stohl (Ph.D., Purdue University, 1982) is a Professor in the Department of Communication at the University of California–Santa Barbara. Abby Prestin (Ph.D., University of California–Santa Barbara, 2012) is a Postdoctoral Fellow at the National Institutes of Health–National Cancer Center. Jiyeon So (M.A., Purdue University, 2007) is a Doctoral Student in the Department of Communication at the University of California–Santa Barbara. Robin Nabi (Ph.D., University of Pennsylvania, 1998) is a Professor and Graduate Advisor in the Department of Communication at the University of California–Santa Barbara

Abstract

Memorable message research examines interpersonal messages “...remembered for extremely long periods of time and which people perceive as a major influence on the course of their lives” (Knapp, Stohl, & Reardon, 1981, p. 27). They can also guide actions, such as health behaviors. This exploratory research examined self-reported memorable messages about breast cancer to determine if they were framed, emphasizing either the benefits (gain-framed) or the costs (loss-framed) of a behavior. About one-fourth of the messages were framed, with most being gain-framed. The messages tended to emphasize early detection actions. Study limitations and implications for future research are discussed.

Keywords

Memorable messages; breast cancer; message framing

Cancer is a health issue that cannot be ignored. It affects the lives of millions of people; the American Cancer Society (2010) predicted that in 2010 alone, 1,529,560 new cancer cases would be diagnosed in the United States. Breast cancer is one of the most prevalent types, as it is the second leading cancer diagnosed in women, aside from skin cancer. Also, it is the second leading cause of cancer death in women (American Cancer Society, 2009d).

Due to the salience of breast cancer in our society, messages containing information about the disease are continuously being distributed through various media, interpersonal, and

medical sources. Content analyses of media messages have found that breast cancer is mentioned more than any other type of cancer (Slater, Long, Bettinghaus, Reineke, 2008; Cohen et al., 2006; Hoffman-Goetz & Friedman, 2005; Stryker et al., 2007). There is great potential for these breast cancer messages to make a difference in women's lives, as communication has the power to: increase knowledge and awareness of a health issue; potentially change social norms by influencing perceptions, beliefs, and attitudes; stimulate action; and reinforce attitudes, knowledge, and/or behavior (National Cancer Institute, 2004). In fact, many communication interventions have been correlated with increased use of mammography, clinical breast exams, and breast self-exams, which are measures that can help to detect the disease (e.g., Howze, Broyden, Impara, 1992; Jibaja-Weiss, Volk, Smith, Holcomb, & Kingery, 2005; Strickland et al., 1997; Sun, Zhang, Tsoh, Wong-Kim, & Chow, 2007; Oliver-Vazquez, Sanchez-Ayendez, Suarez-Perez, Velez-Almodovar, & Arroyo-Calderon, 2002).

This study focuses on “memorable messages” within the domain of breast cancer. These are interpersonal messages that are “remembered for extremely long periods of time and which people perceive as a major influence on the course of their lives” (Knapp, Stohl, & Reardon, 1981, p. 27). Such messages could have an important impact on health behaviors, as they have been shown to prescribe rules for behavior (Knapp, Stohl, & Reardon, 1981), guide one's self-assessment of behavior (Smith & Ellis, 2001; Smith, Ellis, & Yoo, 2001; Ellis & Smith, 2004), and prompt behavior change (Holladay, 2002).

Another important feature of messages is the way in which they are framed. Research on message framing, emphasizing either the benefits (gain-framed) or the costs (loss-framed) of a behavior, has focused on people's interpretations of and reactions to different kinds of framing. Many studies have examined the differential effects of gain- and loss-framed messages on disease prevention and detection behaviors, finding that the framing of a message may have an effect on its ability to encourage such health behaviors (for a discussion, see Rothman, Bartels, Wlaschin, & Salovey, 2006). Therefore, research that investigates the relationship among the effects of memorable messages and particular frames has great potential for health communication research within the realm of breast cancer.

Breast Cancer

It is estimated that every woman has a 1 in 8 chance of developing breast cancer at some point in their lifetime (American Cancer Society, Inc., 2009d). The National Cancer Institute (2010a) estimates that 207,090 women will be diagnosed with and 39,840 women will die of breast cancer in 2010. The median age for breast cancer diagnosis is 61 and most diagnoses occur in women between 55 and 64 years old (National Cancer Institute, 2010a).

It is important to distinguish between breast cancer prevention and breast cancer detection behaviors, which are both discussed throughout this paper. The definition used here for prevention behaviors refers to acts that reduce a woman's risk of getting breast cancer. The American Cancer Society (2009b) lists the following as behaviors that may reduce breast cancer risk: limiting alcohol use, exercising regularly, maintaining a healthy body weight, choosing to breast feed for at least several months, avoiding post-menopausal hormone therapy, and avoiding chemicals with estrogen-like properties. Conversely, breast cancer detection behaviors are acts that help to find existing cancer within the breasts. The following are listed by the American Cancer Society (2009a) as potential methods to detect breast cancer: mammograms, clinical breast exams, breast self-exams, and magnetic resonance imaging (MRI). Breast self-exams are no longer explicitly recommended by the National Cancer Institute (2007), but are listed as an optional method of supplementing

breast cancer screening, which is also how they are described by the American Cancer Society (2009a) and the Centers for Disease Control and Prevention (2009).

Memorable Messages

Virtually all of the research on memorable messages has at its core the previously provided definition given by Knapp et al. (1981)—that they are messages that are remembered for a long time and significantly impact the receiver's life. In her discussion of memorable messages, Stohl (1986) adds: “The only necessary and sufficient condition that distinguishes a memorable message from the thousands of others we receive each day is the retrospective judgment by the individual that the message was/is significant and can be precisely recalled” (p. 234). Studies have also shown that people are confident in their ability to precisely recall memorable messages (Barge & Schlueter, 2004; Holladay, 2002; Stohl, 1986), and the original study found that participants were able to report the same message five months after initial data collection (Knapp, Stohl, & Reardon, 1981).

Research has demonstrated that memorable messages are usually conveyed in private settings (Barge & Schlueter, 2004; Holladay, 2002; Knapp, Stohl, & Reardon, 1981), are serious in nature (Ford & Ellis, 1998; Knapp, Stohl, & Reardon, 1981), are more often positive than negative (Knapp, Stohl, & Reardon, 1981; Stohl, 1986), are perceived to have senders with benevolent motives (Holladay, 2002; Knapp, Stohl, & Reardon, 1981), and can guide sense-making (Holladay, 2002; Stohl, 1986).

Memorable message research has also shown that they are prevalent across a variety of topics and populations, such as those demonstrated in final conversations about religious faith with the surviving loved ones of the deceased (Keeley, 2004) and aging messages among individuals at all stages of life (Holladay, 2002). There have also been studies that have examined memorable messages about breast cancer. Smith, Atkin, Skubisz, Munday, and Stohl (2009) found that women who are the most likely to recall memorable breast cancer messages have had personal experience *and* close friends or relatives who have had experience with breast cancer. Other research by Smith et al. (2009) has found that memorable breast cancer message topics include early detection, awareness, treatment, and prevention of breast cancer, and the most common sources of these messages are the media, friends, family, and medical professionals. They also examined the impact of different sources of messages on prevention or detection behaviors, and found that medical professionals were substantially more likely to influence breast cancer detection than breast cancer prevention behaviors. However, research has yet to examine the framing of breast cancer memorable messages and its impact on their behavioral effects.

Message Framing

Message framing refers to emphasizing either the benefits (gain-framed) or the costs (loss-framed) of a behavior. Various researchers (Dillard & Marshall, 2003; Rothman & Salovey, 1997; Wilson, Purdon, & Wallston, 1988) have concluded that each kind of framed message can take two forms—the outcome of the behavior can be described as desirable or undesirable, and the outcome can be described as being either attained (acquired, achieved, made more likely) or avoided (averted, not realized, made less likely)—leading to four possible framing scenarios. In their meta-analysis of framing studies, O’Keefe and Jensen (2006) supplemented this disambiguation by also considering the *kernel states* of framed messages. In their words, “The kernel state is the basic, root state mentioned in the message’s description of the consequence” (p. 7). This approach was used because there are many instances in which it may not be clear what form the message is taking. For example, consider the message “If you eat healthily and exercise, you will reduce the risk of breast cancer.” Here, the message could be interpreted as saying that complying with the behavior

will make a positive outcome more likely (reducing risk of breast cancer), or it could be seen as making an undesirable outcome (breast cancer) less likely. Examining the kernel state of a message, in this case “breast cancer,” makes it clearer what the form of the message is; in this case, an undesirable kernel state is avoided/made less likely. Together, these methods of conceptualizing framed messages can be placed into a 2×2 array, shown in Figure 1, which expresses the four different scenarios in terms of the kernel states in messages.

Message framing research has yielded findings revealing that individuals are more likely to prefer a message about a behavior perceived as “risky” if it is loss-framed (Tversky & Kahneman, 1981). These results have led scholars to hypothesize that disease detection behaviors, which are considered risky due to the possibility of finding a disease, will be more likely to be influenced by loss-framed messages; in turn, disease prevention behaviors, which are less risky, are predicted to be more likely to be influenced by gain-framed messages (For a discussion, see Rothman, Bartels, Wlaschin, & Salovey, 2006; Salovey, Schneider, Apanovitch, 2002).

Numerous studies have tested this hypothesis, leading to inconclusive results. Some studies have found that loss-framed messages were more effective for encouraging mammography use (Banks et al., 1995; Schneider et al., 2001), breast self-exams (Meyerowitz & Chaiken, 1987), Pap test utilization (Rivers, Salovey, Pizarro, Pizarro, & Schneider, 2005) and HIV screening (Kalichman & Coley, 1995). Other research has found that gain-framed messages were more effective at encouraging prevention behaviors like using sunscreen (Detweiler et al., 1999), using infant car seats (Christophersen & Gyulay, 1981), exercising (McCall & Ginis, 2007) and using condoms (Linville, Fischer, & Fischhoff, 1993).

Three meta-analyses have yielded results that are only weakly supportive of the detection/prevention hypothesis (O’Keefe & Jensen, 2006; O’Keefe & Jensen, 2007; O’Keefe & Jensen, 2009). The meta-analyses examining prevention behaviors found that gain-framed messages were significantly more likely to be more persuasive than loss-framed messages (O’Keefe & Jensen, 2006; O’Keefe & Jensen, 2007). However, the 2007 analysis attributed this almost completely to dental hygiene behaviors, and did not find any differences in persuasiveness for other preventive behaviors. One analysis testing messages in relation to detection behaviors did not find any difference in the persuasiveness of gain- and loss-framed messages (O’Keefe & Jensen, 2006), and another found that loss-framed messages were significantly more persuasive for breast cancer detection behaviors, although the effect was small (O’Keefe & Jensen, 2009).

Research Questions

Research has yet to investigate the intersection of framing and naturally occurring memorable messages. Additionally, to the best of the knowledge of the authors, this is the first study to examine a set of naturally occurring messages and to determine their frames, as opposed to performing the usual practice of manipulating frames of the messages experimentally. Thus, not only is this work innovative in nature, but it also brings together two realms of study within communication and message design research.

To examine the framing of naturally occurring breast cancer memorable messages reported by women, this study used the same classification of message framing as used by O’Keefe and Jensen in their meta-analyses (2006 (2007)). Thus, our research questions address the frequencies of framed messages in general and of each of the four framing possibilities:

RQ1. What percentage of messages are either gain- or loss-framed?

RQ2. What percentage of messages are gain-framed due to an undesirable kernel state that is avoided?

RQ3. What percentage of messages are gain-framed due to a desirable kernel state that is attained?

RQ4. What percentage of messages are loss-framed due to an undesirable kernel state that is attained?

RQ5. What percentage of messages are loss-framed due to a desirable kernel state that is avoided?

Method

Participants

Participants were recruited from breast cancer awareness organizations, advocacy groups, a large Midwestern university, and a medium-sized Western university in the United States. Many participants were made aware of the survey through a snowball sampling process. Some participants were also recruited with the incentive to receive class credit or extra credit by participating or having an older female relative or friend participate in the survey. In sum, 472 respondents completed the survey. Exclusionary criteria required that participants were female. Participants ranged from 18 to 85 years old ($M = 38.22$, $SD = 15.98$), and women who reported a memorable message ($M = 42.3$, $SD = 15.1$) tended to be older than those who did not ($M = 33.4$, $SD = 15.6$). Caucasians composed the majority of the sample (81%). African Americans (2%), Hispanics (3%), Asian Americans (6%), Native Americans (1%), Pacific Islanders (1%), those identifying themselves as “other” (3%), and those choosing not to respond (3%) composed the remainder of the sample. When participants were asked about their highest level of education, 13% reported a high school degree or less, 43% of participants completed some college, technical school, or earned an associates degree, 25% earned a bachelor's degree, 16% had graduate schooling, and 4% chose not to respond.

Instrumentation and Procedure

This project was carried out as part of the NIEHS/NCI Breast Cancer and the Environment Research Centers, four centers with transdisciplinary research collaborations integrated across biologic, epidemiologic, and community outreach projects. Participants completed a web-based survey questionnaire that took approximately 45 minutes to complete. The survey went through pre-testing with eligible participants in order to clarify questions. The beginning of the survey gave the definition of a memorable message and asked participants if they could recall a memorable message about breast cancer. If the participant did have a memorable message, they were asked to report it ($n = 246$, 52.1%). Then, a series of open-ended questions were asked about their personal experience with breast cancer, as well as the characteristics of and responses to their memorable message.

Framing of Messages

Two independent coders coded 10% of the reported memorable messages to determine if and how they were framed and to establish reliability. Training involved a reading an overview of the memorable message and framing literature, coding example messages for practice, and a discussion of potential problems they might encounter during the process. Coders first examined the messages to see if they contained a kernel state, defined as “the basic, root state mentioned in the message's description of the consequence” (O’Keefe & Jensen, 2006). According to this definition, there can be no kernel state if it is not a *consequence* of an action. Thus, messages that did not have kernel states were those that did not discuss both an action to be performed or avoided and the consequence of a particular action. An example of a message without a kernel state is “The pink ribbon for breast cancer awareness”: no action is discussed, so there is no kernel state to be coded. Additionally, the

presence or absence of a kernel state determined if the message was framed, as framed messages must have both an action and a consequence. If the message did have a kernel state, it was coded as framed, while if it did not have a kernel state, it was coded as unframed. Reliability of coding kernel states was high ($\kappa = 0.92$, Scott's $\pi = 0.92$).

Next, the coders determined whether the kernel states of the framed messages were desirable or undesirable, which was also done with high reliability ($\kappa = 0.94$, Scott's $\pi = 0.94$). Afterward, coders examined the entire message to see if the kernel state was avoided or attained. If the kernel state was acquired, achieved, made more likely, or made less threatening, it was coded as attained. If the kernel state was averted, not realized, made less likely, or made less threatening, it was coded as avoided. The concept of being made more/less threatening was added to O'Keefe and Jensen's (2006) framework for the purposes of this study to account for cases unique to cancer. For example, this applied to messages in which an individual discussed an action that would help with detection of cancer, as detection alone does not necessarily "avoid" the threat of cancer, but it does lessen the threat that it presents. Whether or not the kernel state was avoided/attained was coded highly reliably ($\kappa = 0.94$, Scott's $\pi = 0.94$). Based on their responses concerning the kernel states, the coders then determined if the message was gain or loss-framed. If the kernel state was desirable/attained or undesirable/avoided, it was coded as gain-framed. If it was desirable/avoided or undesirable/attained, it was coded as loss-framed. This was also done reliably ($\kappa = 0.88$, Scott's $\pi = 0.88$). After reliability coding was completed, differences were discussed and reconciled between the two coders, and one continued on to code the rest of the data set.

Results

Research question one asked what percentage of messages were either gain- or loss-framed. Of reported memorable messages, a total of 23% ($n=57$) were framed.

Characteristics of Gain-Framed Messages

RQ2 was posed to determine what percentage of messages were gain-framed due to an undesirable kernel state that was avoided. Of framed messages, 28% ($n = 16$) were framed as undesirable/avoided. One example of an undesirable/avoided message is the following, which someone said to a respondent: "To prevent breast cancer, give yourself weekly breast exams in the shower." Here, the undesirable outcome of "breast cancer" is avoided/made less threatening by giving yourself breast exams. RQ3 asked what percentage were gain-framed due to a desirable kernel state that was attained. An example of a desirable/attained message is "Early detection saves lives," where "life" is the desirable kernel state that is attained by early detection. Such messages accounted for 47% ($n=27$) of framed messages. Summed together, both of those percentages show that 75% ($n = 43$) of all framed messages were gain-framed.

Actions or causes described—The gain-framed messages contained a variety of advocated actions relating to breast cancer. The most common by far was detection, including instances where messages discussed breast-self exams, mammograms, getting check-ups, and finding cancer early. An example of such a message is "Breast cancer is detectable, do self-exams." Another common action described by gain-framed messages related to treatment, such as getting discovered lumps examined, or having a mastectomy, as in the following message: "Losing my breast was a very small price to pay for being able to live another 26 years and finish raising my daughter, and enjoy my grandchildren." Another action described involved aiding in breast cancer research, as in "We have come very far in the research of breast cancer, and with the help of people like you we will hopefully find a cure as soon as possible."

Consequences expressed—There were also a variety of positive consequences reported within the gain-framed messages, which reflect their kernel states. A common gain was making breast cancer less threatening, often through detection, such as described in this message: “Breast cancer is curable if discovered on time.” Another common positive consequence was life, or avoiding death, as in “A mammogram saved my life.” A subset of these messages describing life as a consequence referred to the ability to spend more time with loved ones: “Get your mammogram every year. You have two beautiful young girls to watch grow up and someday grandkids to enjoy. Don't cheat yourself or them out of the experience.” Another gain described within messages referred to more options for or more successful breast cancer treatment, such as in “A mammogram caught a lump and cancer treatment was successful because it was caught early.”

Characteristics of Loss-Framed Messages

Research question four was asked to determine what percentage of messages were loss-framed due to an undesirable kernel state that was attained. An example of such a message is “Smoking increases the chances of breast cancer,” with “breast cancer” being the undesirable state that is attained/made more likely by smoking. Undesirable/attained messages accounted for 19% ($n = 11$) of all framed messages. RQ5 asked what percentage of messages were loss-framed due to a desirable kernel state that was avoided. An example of desirable/avoided message is “If I do not have the mass taken care of now, I may not be able to enjoy my grandchildren,” where “enjoy my grandchildren” is the desirable state that is avoided/made less likely by not having a mass taken care of. Messages with a desirable kernel state that was avoided equaled 5% ($n = 3$) of framed messages. Thus, 25% ($n = 14$) of all the framed messages were loss-framed.

Actions or causes described—Many of the loss-framed messages referred to modifiable risk factors for breast cancer, or factors relating to prevention of the disease. These messages discussed alcohol, smoking, drugs, diet, bra use, obesity, and abortion. Examples include “Alcohol and drug abuse during your teenage years increases your chances of getting breast cancer” and “The women who wear a bra more than 12 hours a day had more risk of breast cancer than those who wore a bra less than 12 hours.” Another cause described in the messages was inherent risk factors, such as family history, as in “Women who experienced menstruation at a young age (10-13?) and who have had a family history of breast cancer are at the highest risk of developing breast cancer.” Other messages referred to neglecting detection or treatment of breast cancer, such as “If I hadn't done a self examination I wouldn't have felt a tiny lump.”

Consequences expressed—In almost all of the loss-framed messages, the consequence described was breast cancer, which was made more likely or more threatening. Examples include “There is a link between abortion and breast cancer in later years,” as well as many of the previously listed messages. Other mentioned consequences were losing time with family, as in the message “If I do not have the mass taken care of now, I may not be able to enjoy my grandchildren,” or no longer being able to enjoy favorite foods after undergoing chemotherapy: “Never eat your favorite foods while going through chemo. Once you are done with treatment, the smell and taste will take you back to when you were enduring treatment and you will never like those foods again.”

Discussion

This research was innovative as, to our knowledge, no other studies have taken a set of reported messages and examined them in terms of framing. Previous studies experimentally *created* either gain- or loss-framed messages, presented them to participants, and then

analyzed the results. One important finding of this research was that there were more than three times as many gain-framed messages reported than loss-framed messages. Because the framing of self-reported messages has not been studied previously, it is difficult to ascertain why this is the case. However, it could be related to the fact that gain-framed messages are by nature positive, and past research has found that reported memorable messages tend to be more often positive than negative (Knapp, Stohl, & Reardon, 1981; Stohl, 1986). Perhaps loss-framed messages, because they are potentially frightening, are less likely to be recalled by recipients in order to avoid feeling negative emotions. This is a significant finding for health educators because it suggests that, when advocating a health behavior, positive, gain-framed messages are more likely to be remembered over time. However, it could also be the case that gain-framed messages are simply more often delivered to individuals, especially in a delicate subject area such as breast cancer. It is likely that senders of messages have a desire to be supportive and encouraging to those receiving the messages, suggesting that the pool of all breast cancer memorable messages conveyed may be more populated with gain-framed messages in general. Clearly, more investigation is needed into if and why certain types of framed messages are more likely to become memorable.

Overall, the percentage of framed messages from the sample of all memorable messages was relatively low (57/253). Examples of unframed messages included statements about breast cancer awareness, such as “Over 40,000 women a year die from breast cancer”; prescriptive statements without mention of consequences, such as “It is important to get a mammogram”; and statements relating to an individual's own experiences related to breast cancer, such as “I will help you get through this diagnosis.” There are many potential reasons as to why there were few framed messages. Perhaps it was due to the method of data collection; maybe if individuals were given specific prompts, such as requests for messages about detection behaviors, they would have recalled more framed messages about the disease. Conversely, the absence of framing may also provide insight into the way individuals communicate about cancer; communicators may not make definitive action/consequence statements because the research on the disease changes so often. It is also possible that many framed messages that are communicated are too complicated to remember. For example, the message “Women who have had not had children, or who had their first child after age 30, have a slightly higher risk of breast cancer” (American Cancer Society, 2010) is neither very definitive nor simple, but would be considered framed in this research. Because there is still a significant amount of uncertainty regarding factors related to prevention and detection of the disease, it may be difficult to craft simple and memorable framed messages.

An examination into the types of actions/causes and consequences described within the memorable messages also offers interesting insight. The most common action described in gain-framed messages concerned early detection, and breast self-exams were mentioned surprisingly often. This reflects a persisting belief in their usefulness, despite the fact that they are increasingly less recommended by health agencies. There were multiple reports of variants of the messages “Early detection saves lives,” as well as “Early detection is the best protection.” This implies that these messages may be pervasive, which is encouraging for health educators because they are simple to remember and true. However, there is also potential for fatigue if women hear the same message too many times, meaning it could lose its persuasiveness. This implies that it may be time for health educators and communicators to consider crafting similar but differently worded messages. The actions and causes described in the loss-framed messages were related mostly to risk factors, with most of them concerning those you can modify, which shows that some women are aware that they can take steps to prevent breast cancer. This is also encouraging, because with the heavy emphasis on early detection, breast cancer prevention information is often neglected in the health sphere (Atkin, Smith, Ferguson, & McFeters, 2008).

It is no surprise that most of the consequences described in both gain- and loss-framed messages concerned making breast cancer more or less threatening. Messages that were more specific showed that women recognize the value of detecting breast cancer. Their messages also reflect the belief that breast cancer does not have to be the defining factor of their lives; they emphasized simply living through the disease and spending time with loved ones. Overall, the consequences described show that women recall messages pertaining to the whole spectrum of the breast cancer experience, including preventing the disease, detecting it, treating it, and living through it.

One concerning aspect of this research is that some of the cause/effect relationships reported within these framed messages do not reflect the widely-held opinions of health practitioners. For example, one message says “There is a link between abortion and breast cancer in later years,” despite the fact that the National Cancer Institute has determined that the two are not related (National Cancer Institute, 2010b). Other messages said that bra-wearing is related to breast cancer risk, which is widely accepted as false and was based on an e-mail chain letter (American Cancer Society, 2010). It is worrisome that such messages are retained by these women over time, and suggests that efforts to debunk breast cancer myths may be beneficial.

This study has illustrated that framing is present in a set of self-reported messages and that individuals find certain framed messages important enough to remember over time, which is a significant finding for both the memorable message and message framing literature. A future direction for this research would be to examine the differential effects of gain- and loss-framed messages on breast cancer prevention and detection behaviors. The sample size for this research was too small to perform such an analysis, but further examination is warranted due to past framing studies that have examined behavioral outcomes. Future research could more thoroughly test the long-term effects of framed messages (either experimentally created or reported by participants) to see if they affect behaviors in different ways. This potential for long-term influence is important in the realm of disease prevention and detection, because most behaviors advocated in these messages are behaviors that should be continued for a long period of time. Additionally, the research using the “kernel states” conceptualization is sparse, as it was first introduced by O’Keefe and Jensen in their 2006 meta-analysis. In all of their studies, they found that the phrasing of kernel states (whether they were desirable/undesirable or avoided/attained) did not have a significant effect on how persuasive the messages were (2006; 2007; 2009). It would be useful for future research to further test this conceptualization to see if there are indeed differential effects in terms of the way the framed message is presented. Additionally, future research could prompt respondents with various kernel states to see if they can provide related memorable messages. This would provide a broader spectrum of memorable messages for analysis, and would represent a new step in the memorable message literature.

Additionally, future research could examine other characteristics of breast cancer memorable messages, aside from their framing. As in the vein of previous memorable message research (e.g. Dallimore, 2003), breast cancer memorable messages could be examined to see if personal characteristics, such as age, ethnicity, or religious affiliation have an effect on the content of messages received. Such results could aid health educators in properly targeting messages toward specific audiences while aiming for memorability. Messages could also be coded in terms of the types of appeals made, such as fear appeals, appeals to authority, or emotional appeals. An examination of the effects on prevention and detection behaviors of the different types of appeals could be helpful for message developers that are looking to encourage a specific behavior. Overall, the approach of thoroughly examining the characteristics of breast cancer messages that women see as memorable

provides a promising method of formative research for anyone seeking to create a communication campaign about breast cancer awareness, prevention, or detection.

Limitations

Generalizations from these results must be made with caution due to the small sample size. The analysis of the data in this study was limited, due to the fact that relatively few of the memorable messages reported had any framing (22.5%, 57/253). Most of these messages were gain-framed, which left very few loss-framed messages to analyze (n=14). However, they do raise interesting questions about the memorability of gain- and loss-framed messages. Though it was critical to examine the framing of self-reported messages, it did limit the sample size. Thus, future research in this area should control framing in experimental messages and subsequently test for its effects.

Additionally, because of the potential weaknesses of long-term memory, the messages reported by respondents may not match the exact message they were given. However, the authors agree on this point with Holladay (2002), who wrote, "From a practical standpoint, verbatim recall of messages may not be important. Rather, what is important is what receivers believe they recall. Their recollections signal what is important to them about the message" (p. 694). Other limitations are that this study used snowball sampling, and respondents were mainly Caucasian females with a bachelor's degree or higher level of education. The sample does include diverse population characteristics, but because it is restricted in terms of education, the results may not be generalizeable to less educated members of the general population.

Conclusion

Although this study had a small sample size to work with, the results show that the intersection of framing and memorable messages is worthy of examination. The main finding of this study is that framing is present within self-reported messages, and that gain-framed messages are much more common than loss-framed messages. If researchers can discern that framing a message in a certain way makes it more likely to be remembered, then that would be valuable information, as memorable messages have been shown to guide behaviors. Additionally, this study represents a significant step in the message framing literature and presents many possibilities for future research, which could address how memorable the framing of a message is over time, the long-term effects of message framing on behaviors, and the natural occurrence of framing in interpersonal communication, among other topics.

A look into the actions and consequences described shows an emphasis on early detection and that most concern making breast cancer more or less threatening, providing insight into the types of messages that become memorable for women. Additionally, this research furthered the use of the kernel states conceptualization and provides opportunities for future research, as additional study using this framework could illuminate more information about effectively using framing in messages. This, in turn, could aid campaign creators, medical professionals, the media, and interpersonal sources in presenting breast cancer prevention and detection messages to others in the most persuasive way possible.

Acknowledgments

This publication was made possible by the Breast Cancer and the Environment Research Centers Grant No. U01 ES=CA 012771 from the National Institute of Environmental Health Sciences (NIEHS), the National Cancer Institute (NCI), the National Institutes of Health (NIH), and the Department of Health & Human Services. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIEHS, NCI, or NIH.

References

- American Cancer Society, Inc. Breast cancer facts & figures 2007-2008. 2007. Retrieved from <http://www.cancer.org/downloads/STT/BCFF-Final.pdf>
- American Cancer Society, Inc. Can breast cancer be found early?. 2009a. Retrieved from http://www.cancer.org/docroot/CRI/content/CRI_2_4_3X_Can_breast_cancer_be_found_early_5.asp?nav=cri
- American Cancer Society, Inc. Can breast cancer be prevented?. 2009b. Retrieved from http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Can_breast_cancer_be_prevented_5.asp?sitearea=
- American Cancer Society, Inc. Cancer Facts & Figures 2010. 2010. Retrieved from <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-026238.pdf>
- American Cancer Society, Inc. What are the key statistics for breast cancer?. 2009d. Retrieved from http://www.cancer.org/docroot/CRI/content/CRI_2_4_1X_What_are_the_key_statistics_for_breast_cancer_5.asp?sitearea=
- American Cancer Society, Inc. Bras and breast cancer. 2010. Retrieved from http://www.cancer.org/docroot/med/content/med_6_1x_underwire_bras.asp
- Atkin CK, Smith SW, Ferguson V, McFeters C. A comprehensive analysis of breast cancer news coverage in leading media outlets. *Journal of Health Communication*. 2008; 13:3–17.10.1080/10810730701806912 [PubMed: 18307133]
- Babrow A. Review of Final conversations: Survivors' memorable messages concerning religious faith and spirituality. *Health Communication*. 2009; 24:377–378.10.1080/10410230902889506
- Bandura, A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall; 1986.
- Banks SM, Salovey P, Greener S, Rothman AJ, Moyer A, Beauvais J, et al. The effects of message framing on mammography utilization. *Health Psychology*. 1995; 14:178–184.10.1037/0278-6133.14.2.178 [PubMed: 7789354]
- Barge JK, Schlueter DW. Memorable messages and newcomer socialization. *Western Journal of Communication*. 2004; 68:233–256.10.1080/10570310409374800
- Centers for Disease Control and Prevention. Screening for Breast Cancer. 2009. Retrieved from http://www.cdc.gov/cancer/breast/basic_info/screening.htm
- Christophersen ER, Gyulay JE. Parental compliance with car seat usage: A positive approach with long-term follow-up. *Journal of Pediatric Psychology*. 1981; 6:301–312.10.1093/jpepsy/6.3.301 [PubMed: 7288536]
- Dallimore EJ. Memorable messages as discursive formations: The gendered socialization of new university faculty. *Women's Studies in Communication*. 2003; 26:214–265.10.1080/07491409.2003.10162460
- Detweiler JB, Bedell BT, Salovey P, Pronin E, Rothman AJ. Message framing and sunscreen use: Gain-framed messages motivate beach-goers. *Health Psychology*. 1999; 18:189–196.10.1037/0278-6133.18.2.189 [PubMed: 10194055]
- Dillard, JP.; Marshall, LJ. Persuasion as a social skill. In: Greene, JO.; Burleson, BR., editors. *Handbook of communication and social interaction skills*. Mahwah, NJ: Lawrence Erlbaum; 2003. p. 479-513.
- Ellis JB, Smith SW. Memorable messages as guides to self-assessment of behavior: A replication and extension diary study. *Communication Monographs*. 2004; 71:97–119.10.1080/03634520410001691456
- Ford LA, Ellis BH. A preliminary analysis of memorable support and nonsupport messages received by nurses in acute care settings. *Health Communication*. 1998; 10:37–63.10.1207/s15327027hc1001_3 [PubMed: 16370989]
- Heisler JM, Ellis JB. Motherhood and the construction of “Mommy Identity”: Messages about motherhood and face negotiation. *Communication Quarterly*. 2008; 56:445–467.10.1080/01463370802448246

- Holladay SJ. "Have fun while you can," "You're only as old as you feel," and "Don't ever get old!" An examination of memorable messages about aging. *Journal of Communication*. 2002; 52:681–697.10.1111/j.1460-2466.2002.tb02568.x
- Jibaja-Weiss ML, Volk RJ, Smith QW, Holcomb JD, Kingery P. Differential effects of messages for breast and cervical cancer screening. *Journal of Health Care for the Poor and Underserved*. 2005; 16:42–52.10.1353/hpu.2005.0018 [PubMed: 15741708]
- Kalichman SC, Coley B. Context framing to enhance HIV-antibody-testing messages targeted to African American women. *Health Psychology*. 1995; 14:247–254.10.1037/0278-6133.14.3.247 [PubMed: 7641666]
- Kahneman D, Tversky A. Prospect Theory: An analysis of decision under risk. *Econometrica*. 1979; 47:263–291.
- Kassing JW, Pappas ME. "Champions are built in the off season": An exploration of high school coaches' memorable messages. *Human Communication*. 2007; 10:537–546.
- Knapp ML, Stohl C, Reardon KK. "Memorable" messages. *Journal of Communication*. 1981; 31:27–41.10.1111/j.1460-2466.1981.tb00448.x
- Linville, PW.; Fischer, GW.; Fischhoff, B. AIDS risk perceptions and decision biases. In: Pryor, JB.; Reeder, GD., editors. *The social psychology of HIV infection*. Hillsdale, NJ: Erlbaum; 1993. p. 5-38.
- McCall LA, Ginis KAM. The effects of message framing on exercise adherence and health beliefs among patients in a cardiac rehabilitation program. *Journal of Applied Biobehavioral Research*. 2004; 9:122–135.10.1111/j.1751-9861.2004.tb00096.x
- McGuire, WJ. Input and output variables currently promising for constructing persuasive communication. In: Rice, R.; Atkin, CK., editors. *Public Communication Campaigns*. Thousand Oaks, CA: Sage; 2000. p. 22-48.
- Meyerowitz BE, Chaiken S. The effect of message framing on breast self-examination attitudes, intentions, and behavior. *Journal of Personality and Social Psychology*. 1987; 52:500–510.10.1037/0022-3514.52.3.500 [PubMed: 3572721]
- National Cancer Institute. *Making Health Communication Programs Work: A Planner's Guide*. Washington, DC: National Institutes of Health; 2004.
- National Cancer Institute. What you need to know about breast cancer. 2007. Retrieved from <http://www.cancer.gov/cancertopics/wyntk/breast/page5>
- National Cancer Institute. SEER stat fact sheets: Cancer of the breast. 2010a. Retrieved from <http://seer.cancer.gov/statfacts/html/breast.html>
- National Cancer Institute. Summary report: Early reproductive events and breast cancer workshop. 2010b. Retrieved from <http://www.cancer.gov/cancertopics/ere-workshop-report>
- O'Keefe DJ, Jensen JD. The advantages of compliance or the disadvantages of noncompliance? A meta-analytic review of the relative persuasive effectiveness of gain-framed and loss-framed messages. *Communication Yearbook*. 2006; 30:1–43.
- O'Keefe DJ, Jensen JD. The relative persuasiveness of gain-framed and loss-framed messages for encouraging disease prevention behaviors: A meta-analytic review. *Journal of Health Communication*. 2007; 12:623–644.10.1080/10810730701615198 [PubMed: 17934940]
- O'Keefe DJ, Jensen JD. The relative persuasiveness of gain-framed and loss-framed messages for encouraging disease detection behaviors: A meta-analytic review. *Journal of Communication*. 2009; 59:296–316.10.1111/j.1460-2466.2009.01417.x
- Oliver-Vazquez M, Sanchez-Ayendez M, Suarez-Perez E, Velez-Almodovar H, Arroyo-Calderon Y. Breast cancer health promotion model for older Puerto Rican women: Results of a pilot programme. *Health Promotion International*. 2002; 17:3–11.10.1093/heapro/17.1.3 [PubMed: 11847133]
- Pribble JM, Goldstien KM, Fowler EF, Greenberg MJ, Noel SK, Howell JD. Medical news for the public to use? What's on local TV news. *American Journal of Managed Care*. 2006; 12:170–176. [PubMed: 16524349]
- Rivers SE, Pizarro DA, Pizarro J, Schneider TR, Salovey P. Message framing and Pap test utilization among women attending a community health clinic. *Journal of Health Psychology*. 2005; 10:65–77.10.1177/1359105305048556 [PubMed: 15576501]

- Rothman AJ, Salovey P. Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin*. 1997; 121:3–19.10.1037/0033-2909.121.1.3 [PubMed: 9000890]
- Rothman AJ, Bartels RD, Wlaschin J, Salovey P. The strategic use of gain- and loss-framed messages to promote healthy behavior: How theory can inform practice. *Journal of Communication*. 2006; 56:S202–S221.10.1111/j.1460-2466.2006.00290.x
- Salovey, P.; Schneider, TR.; Apanovitch, AM. Message framing in the prevention and early detection of illness. In: Dillard, JP.; Pfau, M., editors. *Persuasion Handbook: Developments in Theory and Practice*. Thousand Oaks, CA: Sage; 2002. p. 391-406.
- Schneider TR, Salovey P, Apanovitch AM, Pizarro J, McCarthy D, Zullo J, Rothman AJ. The effects of message framing and ethnic targeting on mammography use among low-income women. *Health Psychology*. 2001; 20:256–266.10.1037/0278-6133.20.4.256 [PubMed: 11515737]
- Smith SW, Atkin C, Skubisz CM, Munday S, Stohl C. The impact of personal and/or close relationship experience on memorable messages about breast cancer and the perceived speech acts of the sender. *Journal of Cancer Education*. 2009; 24:129–134.10.1080/08858190902854681 [PubMed: 19431030]
- Smith SW, Ellis JB. Memorable Messages as Guides to Self-Assessment of Behavior: An Initial Investigation. *Communication Monographs*. 2001; 68:154–168.10.1080/03637750128058
- Smith SW, Ellis JB, Yoo H. Memorable messages as guides to self-assessment of behavior: The role of instrumental values. *Communication Monographs*. 2001; 68:325–339.10.1080/03637750128072
- Smith SW, Munday S, LaPlante C, Kotowski MR, Atkin C, Skubisz CM, Stohl C. Topics and sources of memorable breast cancer messages and their impact on prevention and detection behaviors. *Journal of Health Communication*. 2009; 14:293–307.10.1080/10810730902805903 [PubMed: 19440911]
- Stohl C. The role of memorable messages in the process of organizational socialization. *Communication Quarterly*. 1986; 34:231–249.10.1080/01463378609369638
- Strickland CJ, Feigl P, Upchurch C, King DK, Pierce HI, Grevstad PK, et al. Improving breast self-examination compliance: A Southwest Oncology Group randomized trial of three interventions. *Preventive Medicine*. 1997; 26:320–332.10.1006/pmed.1997.0147 [PubMed: 9144756]
- Sun A, Zhang J, Tsoh J, Wong-Kim E, Chow E. The effectiveness in utilizing Chinese media to promote breast health among Chinese women. *Journal of Health Communication*. 2007; 11:157–171.10.1080/10810730601150106 [PubMed: 17365357]
- Tversky A, Kahneman D. The framing of decisions and the psychology of choice. *Science*. 1981; 211:453–458. [PubMed: 7455683]
- Wilson DK, Purdon SE, Wallston KA. Compliance to health recommendations: A theoretical overview of message framing. *Health Education Research: Theory and Practice*. 1988; 3:161–171.10.1093/her/3.2.161

	Undesirable kernel state	Desirable kernel state
Avoided kernel state	Gain-framed	Loss-framed
Attained kernel state	Loss-framed	Gain-framed

Figure 1. 2×2 array describing kernel state types and framing