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Disentangling the characteristics of narratives comprising evidence: outcomes of osteoporosis narrative evidence for young women

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DISENTANGLING THE CHARACTERISTICS OF NARRATIVES COMPRISING EVIDENCE: OUTCOMES OF OSTEOPOROSIS NARRATIVE EVIDENCE FOR YOUNG WOMEN

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ABSTRACT

Health communication scholars are charged with seeking ways to convey health information in credible and reliable ways for audiences. In the context of osteoporosis, the challenge becomes how to communicate risk and prevention to young women, as prevention behaviors started early in life can help decrease osteoporosis diagnosis later in life. Evidence has been shown to be one message tool that can increase comprehension of information presented and influence outcomes. Previous research has found that statistical evidence to be associated with systematic processing, or careful attention to messages, whereas narrative evidence evokes heuristic processing, or a reliance on heuristics. Yet, the benefits of narratives, and the sharing and telling of experiences has been shown to aid comprehension and behaviors for a variety of health contexts. Specifically, that the emotions conveyed and aroused after reading a narrative can influence understanding, and message effectiveness. Guided by the Heuristic-Systematic Model (HSM), this study examined outcomes associated with the use of different narrative evidence types and expressions of emotion within narrative evidence for arousal of discrete emotions, comprehension, dominant cognitions, heuristic and systematic processing, perceived evidence quality, perceived message effectiveness, behavioral intentions, and the osteoporosis prevention behaviors of calcium and vitamin D consumption. Formative research led to the creation of narrative evidence and selection of positive and negative emotions expressed. A 4x3 between subjects pretest-post-test with follow-up 24-hour dietary recall was used to test the outcomes of the narrative evidence types. Results indicated that both heuristic and systematic processing of narrative evidence does simultaneously occur for osteoporosis content, and positive relationships between comprehension, judgments of evidence quality and perceptions of message effectiveness predict behavioral intentions towards osteoporosis prevention. Specifically, the emotions of fear and hope serve as heuristics for the processing of osteoporosis narrative evidence. No significant differences emerged for narrative evidence type and the behaviors of calcium and vitamin D, however, results imply that different message strategies are needed for these behaviors. Implications of these findings for osteoporosis health messages are discussed.

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> "The only things that stand between a person and what they want in life are the will to try it, and the faith to believe it's possible." -Rich Devos

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CHAPTER ONE

INTRODUCTION

Narrative Evidence for Communication and Health Communication

For communication scholars, evidence is a message feature that can add credibility and legitimacy to messages (Reynolds & Reynolds, 2002). Evidence is defined as, "factual statements originating from a source other than speaker, objects not created by the speaker, and opinions of persons other than the speaker that are offered in support of the speaker's claims" (McCroskey, 1969, p. 171). Broadly, Reinard (1988) referred to two types of evidence in persuasion as testimonial assertions and factual information. Factual information represents reports and statistics, while testimonial assertions illustrate more of a narrative form (Reinard, 1988). Narratives can be defined as "a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed" (Kreuteret al., 2007, p. 222). Importantly, not all stories constitute narrative evidence; evidence is when, "data (facts or opinions) presented as proof for an assertion" (Reynolds & Reynolds, 2002, p .429). While the names are similar, narrative evidence is evidence that can be told in different forms (e.g., pictures, city map), not just a story or experience. Thus, there is a distinction between narrative or story, and narrative evidence. Additionally, there are different types of narratives that can be used as narrative evidence (e.g., firsthand, secondhand, official, invented) (Schank & Berman, 2002) which must be examined in health communication and communication research.

Narrative evidence has appeal for communication research because "people communicate with one another and learn about the world around them largely through

stories" (Kreuter et al., 2007, p. 222). For health communication scholars, narratives can provide a culturally grounded medium for modifying health behavior and a way of knowing about the world (Larkey & Hecht, in press). Firsthand narratives are a way to communicate about complex health issues, propose behavior change or maintenance, and assist individuals in coping with disease (Green, 2006; Kreuter et al., 2007). As a form of evidence, these narratives may also distract from such aims as they often rely on implicit conclusions about these issues and use a nonlinear organizational pattern (Green, 2006). Thus, a firsthand narrative may elicit different persuasive outcomes compared to a narrative told by a health organization, or an official narrative, and differ again from a secondhand narrative among others (Schank & Berman, 2002). Because it is possible for narrative evidence to be more persuasive and aid comprehension compared to statistical evidence (Kopfman, Smith, Hodges & Ah Yun, 1998), a more systematic study of how and when this occurs is needed. Additionally, the affective responses to narratives has drawn much interest in its persuasiveness (Schank & Berman, 2002), especially when considering the emotions experienced with health diagnoses and diseases (Kreuter et al., 2007). Investigation into the use of narrative evidence in health communication messages is warranted to identify characteristics of the use of these messages as a form of evidence, as well as different types of narrative evidence that can be used.

Despite the importance of narratives as a form of evidence, narrative evidence is often poorly defined and operationalized within communication. Reinard (1988) spoke specifically of this problem of operationalization in his overview of evidence in persuasion and the need for more work towards testimonial assertions. Many narratives in communication and health communication research are commonly operationalized as a

story, case history, or personal experience (i.e., illness narrative). The lack of clearly defining a narrative is a problem, as it is unknown if all the characteristics and structure of a narrative are incorporated into developing the evidence. Some narratives are likely told for the benefit of the teller rather than with the intention of influencing the listener, serving a venting function, for example, though the receiver may not distinguish this reality. Other narratives are simply told as educational tools to inform readers about a certain issue. As a result, it is difficult to assert the persuasiveness of narrative evidence when many variations are offered and lack of systematic definitions of narratives and narrative evidence in empirical research.

Heuristic-Systematic Model, Narrative Evidence and Emotion

When considering the persuasiveness of narrative evidence, the Heuristic-Systematic Model (HSM) (Chaiken, Liberman, & Eagly, 1989; Chaiken & Matheswaran, 1994) affords one theoretical framework to guide insights about why some narrative types function as more effective evidence than other narratives. For example, this perspective can help scholars understand if a firsthand vs. secondhand narrative used as narrative evidence may have more persuasive effects for a context, and if these accounts of experiences are more effective compared to an official narrative about a context. Previous research suggests that narrative evidence serves as a heuristic cue, leading to an automatic response which may range from attention to process the content carefully because it is, for example, personally relevant (Claypool, Mackie, Garcia-Marques, McIntosh & Udall, 2004), or process the content superficially because it is not personally relevant (Claypool et al., 2004), or because the experience or attitude referenced in the narrative is not accessible (Martin, Hewstone, Martin, 2007). Some research suggests that

the effects of narrative evidence are partly due to the varied emotive reactions among individuals (Kopfman et al., 1998). For example, feelings of anger have been found to focus participants on content and lead to more systematic processing (Pfau et al., 2001; 2009). Feelings of happiness have been found to be related to more heuristic processing (Pfau et al., 2001; 2009). Without consistent operationalization of narratives and narrative evidence, however, the claims linked to the emotional effects of narratives on message processing cannot be consistently evaluated, and the relationship between emotions and heuristic processing remains unclear. Research is needed to explore relationships of narrative evidence and processing further, and understand the persuasiveness of narrative evidence in health communication. One health context to consider is osteoporosis, a disease that is growing in prevalence among women in the United States.

Osteoporosis Communication

The need to communicate about osteoporosis to young women is clear through the *Surgeon General's Report of 2004: Bone Health and Osteoporosis*. This report demonstrates that bone health is a top public health priority, and osteoporosis is a serious disease affecting Americans, most notably women (Surgeon General, 2004). Furthermore, *Healthy People 2010*, which outlines our nation's health objectives, names reducing the proportion of adults with osteoporosis from 10 percent to 8 percent, and reducing the number of individuals aged 65 years and older hospitalized for vertebral fractures associated with osteoporosis from 17.5 to 14.0 hospitalizations per 10,000 (www.healthypeople.gov, 2008). Thus, osteoporosis presents a major health concern and priority for the nation.

According to the National Osteoporosis Foundation, an estimated 10 million Americans over the age of 50 currently have osteoporosis and almost 80% of the cases are among women (National Osteoporosis Foundation (NOF), 2005). In addition, approximately $18 million is spent each year caring for osteoporosis related fractures (Surgeon General, 2004). Research suggests that the increasing prevalence of osteoporosis-related fractures will lead to more socioeconomic burdens because of the high cost of treating these symptoms (Hien et al., 2005). Nicknamed the "silent disease" osteoporosis is difficult to treat and incurable, but prevention life-style habits (e.g., calcium and vitamin D intake, and weight-bearing exercises) started earlier in life can help decrease chances of being diagnosed (Surgeon General, 2004; Tung & Lee, 2006). It is clear then that communication methods are needed to disseminate the risk of osteoporosis and prevention techniques to lay audiences, especially younger women where health habits can be started early in life and maintained throughout the lifespan. Previous osteoporosis educational efforts have demonstrated positive effects on knowledge and increased attitudes toward prevention habits, yet suffered from methodological flaws, small sample sizes and lack of control of contextual variables (Tung & Lee, 2006), such as resource accessibility and social environment constraints.

Communication about osteoporosis often targets adolescent, middle age or older adults (Surgeon General, 2004). For example, some research among pre-adolescents (ages 8-11) and middle-age women (ages 30-50) suggest that peer involvement, self-efficacy and social support can be important communication predictors of adopting bone healthy behaviors (Ievers-Landis et al., 2003; Turner, Hunt, DiBrezzo, & Jones, 2004). One study of university staff, students, and community members (men and women; mean

age of 35) found age to be correlated with osteoporosis knowledge, but not education level (Ailinger, Braun, Lasus, & Whitt, 2005). Research on older adults in retirement communities (ages 65 and older) suggests that education is related to maintaining bone healthy behaviors (Popa, 2005). A host of variables thus contribute towards osteoporosis prevention efforts and messages towards these audiences.

When examining bone health and osteoporosis communication endeavors among young women between the ages of 18-30, little current literature exists. Both a 1994 and 2001 cross-sectional survey of college-age women revealed that participants had heard of the disease, but believed it to be less serious than other diseases and reported that they were unlikely to be diagnosed with osteoporosis (Kasper et al., 1994; Kasper, Peterson, & Allegrante, 2001). Only the belief of osteoporosis being a highly visible or disfiguring disease prompted some 16-25 year old women to increase their intentions towards preventing the disease (Klohn & Rogers, 1991). Chang (2006) also found that women ages 25-45 found themselves to be at risk for osteoporosis, but that they had less than optimal levels of calcium. Focus groups of 40 young women ages 18-33 revealed that young women find that communication about osteoporosis is not targeted towards them, and they have low motivation to discuss osteoporosis with others (Volkman, in progress). Additionally, focus groups indicated that women do feel threatened by the disease, and express family health history as a worry about susceptibility (Volkman, in progress). Seeing or hearing about a family member with osteoporosis is a memorable message for some young women (Volkman, in progress). This presents a problem, as peak bone mass can be obtained during this time frame (Surgeon General, 2004). Thus, a college-age women represents one of the last opportunities to reach women to help attain peak bone

mass and encourage prevention behaviors that can be sustained throughout the lifespan. It is appropriate then to begin understanding how to engage young women within osteoporosis prevention behaviors.

Overview of Research Study

In light of these findings and previous research on narratives as a form of evidence, it is necessary to understand the implications of using different types of narratives as evidence to derive effective health messages. Specifically, research is needed to comprehend how processing of narrative evidence may differ across these different types, and the role of different emotions expressed in these narrative forms can influence outcomes. Furthermore, it is necessary to further understand how narrative evidence is processed by individuals when accounting for the uniqueness and emotional content of this evidence. In the context of osteoporosis, narrative evidence may be a form of evidence that can motivate young women to attend to, and eventually act upon, bone healthy behaviors and communication about the disease. Narrative evidence of women their own age may provide an identification and important impetus towards these actions. The following dissertation study explores these considerations by examining types of narrative evidence (e.g., firsthand, secondhand, official and attention-control) and types of emotion expressed in narrative evidence (e.g., positive, negative, “no emotion”) towards message processing and the outcomes of behavioral intentions towards bone health healthy behaviors and the behaviors of calcium and vitamin D use.

CHAPTER TWO

LITERATURE REVIEW

Reynolds and Reynolds (2002) echo the assertion that narrative evidence links most closely to testimonials, while factual evidence is associated with statistical evidence, as they propose two types of evidence that communication scholars can use: statistical and narrative evidence. While each type of evidence has been studied for their ability to increase the persuasiveness of a message or enhance processing of a message (Reinard, 1988; Allen & Pries, 1997; Allen et al., 2002), narrative evidence holds much promise for health communication scholars in its ability to communicate to individuals about health, as well as its ability to incorporate the emotive responses that are often connected with the experience of illness. Narrative evidence thus can provide much for scholars in understanding ways to enhance health messages towards specific behaviors and communication about illness. This promise becomes even more important with a disease like osteoporosis where prevention earlier in life can help prevent diagnosis (Surgeon General, 2004). Although this disease affects both men and women, the higher incidence among women has warranted specific strategies to communicate prevention and ways to encourage younger women to adopt bone healthy behaviors (Surgeon General, 2004).

Narrative Evidence in Health Communication

When examining what constitutes narrative evidence, it is sometimes defined in comparison to statistical evidence. For example, scholars identify statistical evidence as "empirically quantified descriptions of events, persona, places, or other phenomena" (Church & Wilbanks, 1986, p. 108), and narrative evidence as represented by a story,

anecdote, case history, or testimonial (Baesler & Burgoon, 1994) often in absence of numbers or quantification. To illustrate the meaning of narrative evidences requires consideration of the full scope and potential of a narrative. Bleakley (2005) writes that "narrative (L. narrare) means to 'to know' and storytelling involves knowledge production and sharing of experience, not simply transparent recounting of events…[and] story brings temporal order to what would otherwise be experienced as a series of chaotic events" (p. 535). Furthermore, Green and Brock (2000) posit that a narrative account "requires a story that raises unanswered questions, presents unresolved conflicts, or depicts not yet completed activity; characters may encounter and then resolve a crisis or crises" (p. 701). For example, culturally grounded narratives used in health promotion can be a way of communicating health content, as well as a form (Larkey & Hecht, in press). We each have a story related to our relationships that shapes who we are and how we communicate, and stories encompass the positive and negative aspects to these relationships (Miller-Day, 2004). Narrative evidence is thus evidence that contains these features and characteristics that envelope narratives overall. To begin an understanding of narrative evidence, scholars need to look towards the structure and specifics related to narratives in general that are needed in narrative evidence for messages.

The Structure of Narratives and Narrative Evidence

In his review of the persuasive effects of evidence, Reinard (1988) offers scholars an overview of the characteristics of evidence. He describes the intrinsic characteristics of evidence entail: (a) credibility of evidence source; (b) quality of evidence; (c) amount of evidence; and (d) novelty and recency (Reinard, 1988). The extrinsic factors that can be related to evidence include: (a) speaker credibility (e.g., source credibility); (b)

message-related influences (e.g., proposition type, message presentation); and (c) audience characteristics (e.g., prior attitude and familiarity and receiver traits) (Reinard, 1988). These descriptors offer a cursory viewpoint into the structure of narrative evidence.

Scholars agree narratives overall need to have at least four components. When using narrative evidence to strategically support a message, scholars should thus follow these components. Fisher's (1987) narrative theory posits two key elements: consistency and fidelity. This is interpreted as "the narrative must be cohesive – free of inconsistencies, realistic and meaningful . . . the narrative also should have fidelity; in other words, it must seem reliable and truthful" (Bylund, 2005, p. 24-25). Ochs and Capps (1996) describe that two other elements needed in a narrative, which are temporality and point of view. "The temporality, or chronology, refers to the means by which the teller can link certain events. This is not to say that narratives are only told in chronological order. Tellers often " 'shift back and forth in times as bits and pieces of the tale and the concerns they manifest come to the fore' " (Ochs & Caps, 1996 p. 24). In other words, temporality refers to the plot of the narrative, and the action that is temporally sequenced (Thorne, Korobov, & Morgan, 2007). Thus, the "beginning, middle and end" of a narrative offers a way to tie together actions and implications in a casual chain (Green, 2006). Ochs and Capps' (1996) reference to point of view in narratives pertains to the perspective of the teller that influences how the narrative is framed, and narratives are intricately linked to the teller's perspective. Such considerations about the structure of narratives are thus required in the use of narrative evidence in health

messages in order to support and differentiate narrative evidence from other forms of evidence.

Types of Narratives that May be Used as Evidence

The commonality of structure within narratives does not imply that all narratives are the same or identical, and that narrative evidence cannot be singular for the purpose of strategic and targeted message design. In the health domain, narratives appears as public service announcements, telenovas (or soap opera dramas), whereas narrative evidence often is presented as personal stories, illness narratives or conversations (Thomas-MacLean, 2004; Green, 2006; Thorne et al., 2007). Sometimes, these are strategically designed and other times with less intention, although effects in both domains may be merged in discussion about narratives and health. Ochs and Capps (1996) write that "personal narratives comprise a range of genres from story, to novel, diaries and letters to memoirs, gossip to legal testimony, boast to eulogy, troubles talk to medical history, joke to satire, bird song to opera, etching to palimpsest, and mime to dance" (p. 19). Narrative evidence can thus be considered a variety of ways.

Although there are various examples of narratives that can be used in narrative evidence, some scholars have categorized narratives into five umbrella types. Bleakley (2005) cautions researchers to not typecast all narratives into many preset categories as it can limit how "specific narratives work for specific social occasions" (p. 536). Additionally, narrative evidence is often a strategic component used to support message persuasiveness (Reynolds & Reynolds, 2002). Schank and Berman's (2002) identification of five types of stories thus seems appropriate for its utility in categorizing some narratives, but enabling researchers to not miss the unique contribution of narratives and

the situation specific occasions that elicit narratives when using narrative evidence in communication.

Five types of stories that can be considered in the design of narrative evidence have been identified by Schank and Berman (2002) include: (a) official; (b) invented; (c) firsthand experiential; (d) secondhand; and (e) culturally common. Official stories are those relayed by organizations where general story is imagined, but without real life complexities, and can be called "stories that people in authority instruct us to tell" (Schank & Berman, 2002, p. 289). In the context of osteoporosis, official stories can be represented by health organizations offering information about the disease, but are devoid of personal experiences associated with the disease. Invented stories are fictional and are created from elements of one's own stories, stories one has heard (Schank & Berman, 2002). Soap operas can be considered a type of invented story. Firsthand stories are those stories experienced personally, and can be altered with each re-telling, whereas second-hand stories are those recalled from memory and told to others about experiences (Schank & Berman, 2002). An illness narrative could be a type of firsthand story, where individuals recount their experience with an illness (Thomas-MacLean, 2004). Culturally common stories are generalized and are known because they are salient in the culture (e.g., Yiddish phrases) (Schank & Berman, 2002). Narrative evidence can thus vary between cultures as cultural norms and subjective norms differ (Hornikx & Hoeken, 2007). From this overview of the types of narratives, narrative evidence is more than stories or anecdotes, and highlights the richness of narratives. Three types of types of narratives, firsthand narratives, secondhand narratives and official narratives, provide great utility in health communication endeavors and should be considered in more detail.

For instance, the illness, firsthand narrative is such a narrative where an individual's firsthand experience is expressed (Sunwolf, Frey & Lesko, 2008). Illness narratives are those experiences of the ill where the " 'need to become storytellers in order to recover the voices that illness and its treatment often take away' " (Frank, 1995, p. xii as cited in Thomas-MacLean, 2004, p. 1647). In this perspective, an illness narrative is a "call for stories" (Sunwolf et al., 2008, p. 37). Secondhand stories, however, can be less imaginative and lack sometimes the personal details as individuals recall story situations (Schank & Berman, 2002). Official stories, on the other hand, are narratives "from organized groups who have something to relay" (Schank & Berman, 2002, p. 289). These narratives can sometimes not include the complexities associated with experiences and may be tell "a version of events that is sanitized" (Schank & Berman, 2002, p. 289). As Bleakey (2005) cautioned, it is important to not typecast narratives too much, as it hinders the situation specific circumstances influencing such narratives. For example, stories told by daughters of their mother's lives can be filled with details or not, dependent upon the relationship between the daughter and mother the story is concerning (Miller-Day, 2004). The same is true with using narrative evidence, as their strategic use demands that we examine them carefully to understand if the individual experience benefits the teller. Yet, these three types of narratives do offer an understanding into the individual differences that influence how a disease is told and the strategic use of narrative evidence. For example, if a person feels victimized by their illness, or challenged by their illness, it may cause a different type of narrative to be told (Ott Anderson & Geist Martin, 2003), or if a person knows a loved one going through an illness, the narrative evidence seen as beneficial may also be different.

Outcomes of narratives are varied (Schank & Berman, 2002; Sunwolf et al., 2008). It is possible that these narratives function as a teaching or learning tool, create reality, store memories, help others envision the future, foster connections to networks (Sunwolf et al., 2008), behavior change and behavior intentions (Larkey & Hecht, in press) and shape relationships (Miller-Day, 2004). Thus, their use as narrative evidence must be carefully considered. For instance, personal experiences of illness can illustrate to others the potential behaviors to prevent risk of disease and illness, as well as increase understanding of the different treatment options available (Sunwolf et al., 2008). In the context of osteoporosis, this is evident among six focus groups of young women ages 18-33 (Volkman, in progress). When asked about what messages may be helpful for them to engage in more osteoporosis behaviors and communication, these women requested knowing about young women their age having osteoporosis (Volkman, in progress). Thus, personal stories could be an effective persuasive tool in osteoporosis prevention communication.

Characteristics of Narratives to Include in Narrative Evidence

Several constructs have emerged as important when considering the persuasive influence of narratives and are considerations for using narrative evidence. Notably, perceived similarity, engagement, identification and interest have surfaced as an equally important constructs. Perceived similarity can be defined as the "receivers' judgments about how similar the narrative source is to them" (Kreuter et al., 2007). Greater levels of perceived similarity are associated with higher levels of attention and persuasiveness of the message (Kreuter et al., 2007). Perceived similarity, however, can be moderated by other characteristics perceived about the source (Kreuter et al., 2007). For instance, if an

African-American woman believes breast cancer is a disease affecting only Caucasian women, autobiographical narrative evidence by another African-American woman may be considered more persuasive (Kreuter et al., 2007). Additionally, engagement is a considered an important mechanism with narrative evidence (Slater & Rouner, 2002). Slater and Rouner (2002) state that engagement with a narrative is a function of the topic relevance to the receiver, and how well the narrative matches the goals and needs of the receiver determines the degree of engagement. In this sense, audiences should feel connected with the narrative evidence based on how it meets their individual needs (Slater & Rouner, 2002). For example, if a narrative by a cancer patient does not meet the goals and needs of a family member of a cancer patient, the family member will have low engagement with the narrative evidence. Furthermore, Larkey and Hecht (in press) propose that engagement can be influenced by the cultural imbeddedness individuals have with the narrative. Both perceived similarity and engagement are considered associated with the amount of interest and identification an individual has with a narrative (Slater & Rouner, 2002), and thus are needed within narrative evidence.

Interest has been defined as, "the extent to which a recipient finds the narrative engrossing" (Stephenson & Palmgreen, 2001, p. 55), and one of the underlying mechanisms of narrative processing. In other words, it is the elements of a story that the audience finds "gripping" (Stephenson & Palmgreen, 2001, p. 55). In comparison, identification is "when a reader or audience member becomes one with the character in a story" (Oatley, 2002). Identification with the characters is encapsulated within high levels of engagement and can be affected by perceived similarity (Slater & Rouner, 2002; Kreuter et al., 2007), and incorporates a higher level of relating to the narrative (Larkey

& Hecht, in press). For example, as individuals are able to identify with the characters in the story it will increase the engagement with the narrative (Slater & Rouner, 2002; Kreuter et al., 2007), and higher perceived similarity can lead to more identification (Kreuter et al., 2007). Furthermore, Green and Brock (2000) identified that transportation "into a narrative world is a distinct mental process, an integrative melding of attention, imagery and feelings" (p. 701). In other words, the individual is "transported" into the world of the narrative, which encompasses more than identification to include cognitive, affective and imagery processes within individuals (Green, 2006). As a result of being transported into a narrative, individuals are "more likely to change their real-world beliefs in response to information, claims, or events in a story" (Green, 2006, p. S165).

Narrative evidence is thus strategic in its use to help promote these perceptions and judgments of identification and interest in the evidence. These different perceptions can influence the appraisal and response to different narrative evidence, and begs researchers to examine these differences when strategically using narrative evidence in message design.

The results of six focus groups conducted with young women ages 18-33 suggest that messages about osteoporosis, such as pamphlets and commercials, are often not perceived to have characters similar to them and consequently messages are ignored (Volkman, in progress). Because these messages are considered to be for older women, and not their age group, younger women do not attend to the messages and subsequently associate the disease as something of concern for older women and not individuals their own age (Volkman, in progress). As a result, they feel that the disease is not pertinent to their lives (Volkman, in progress). When asked about preferred message features, young

women asked for messages about bone health showing young women, and including stories and testimonials of younger women that have the disease (Volkman, in progress). Young women admitted to wanting information about the disease to learn more about risks and prevention (Volkman, in progress), which is analogous to an official story provided from a health organization. However, it is important to note that when asked about what would motivate them towards engaging in bone healthy behaviors, young women preferred the firsthand and secondhand stories (Volkman, in progress). Thus, the benefits of narrative evidence using a firsthand or secondhand story could outweigh the benefits of an official story told by a health organization about the disease.

The importance of understanding the outcomes associated with different types of narrative evidence is coupled with the emotional content within narrative evidence, as well as individual's emotional reactions to narrative content. Pfau et al. (2001; 2009) found that different emotions can influence the processing of messages, but is it also necessary to consider how these emotions are aroused based on the emotions *conveyed* within the narrative evidence.

The Role of Emotion in Narrative Evidence

Emotions serve an important role in understanding the persuasiveness of narrative evidence. Emotion can be defined as "internal mental states representing evaluative reactions to events, agents, or objects that vary in intensity . . . [and] are a psychological construct" (Nabi, 2002, p. 289-290). Emotion consists of five components: "(a) cognitive appraisal or evaluation of a situation, (b) the physiological component of arousal, (c) motor expression, (d) a motivational component (including behavioral intentions or readiness), and (e) a subjective feeling state" (Nabi, 2002, p. 290). Narrative evidence,

especially when using a type of narrative as narrative evidence, can express the experiences of emotion as individuals state their feelings associated with a disease and the experience of the disease. For instance, the topic of cancer is often considered threatening, and it is difficult for emotions to not be aroused intentionally or unintentionally when discussing cancer risk and treatment (Dillard & Nabi, 2006). Oatley (2002) posits that the emotions experienced in a narrative can become the audience member's own emotions. In other words, the different emotions expressed in narrative evidence can influence outcomes. Statistical evidence, however, can not always do this. For example, in the forms of bar charts or pie charts, statistical evidence can not explicitly state an emotion. Thus, the role of emotions could be considered greater within narrative evidence when the form of narrative evidence is a story or experience.

In addition, the role of emotions within narrative evidence needs to be considered in not just what emotions are told, but also what emotions are aroused. In general, messages can arouse emotions. For instance, results from a study analyzing emotional responses to AIDS PSAs generated feelings of fear and decreased happiness (Dillard, Plotnick, Godbold, Freimuth & Edgar, 1996). Thus, it is possible for individuals to feel emotions in response to health diseases. Emotional responses are most evident when considering the content of some narrative evidence in messages involving topics such as susceptibility and vulnerability to illness and disease (Green, 2006), and an individual's expression of feelings and emotions in conjunction with perceptions of risk. Additionally, it is possible for individuals to have more than one emotional response to a message in general, such as fear, anger and surprise (Dillard & Nabi, 2006). As narratives can include "journeys with despair, quests for meaning, personal growth, spiritual

transformation" (Kreuter et al., 2007, p. 228), it is not surprising that various emotions are experienced within narrative evidence. Research is needed to understand how the different emotions expressed within a narrative can influence the outcomes of interest with narrative evidence.

Oatley (2002) posits that identification is intricately linked to the emotional connection that audiences have with stories; as the audience member becomes "one" with the character. Polichak and Gerrig (2002) argue that emotional responses to narratives are due to the participatory response of audience members. They reason that affective responses "encode, on a basic level, how individuals feel about a stimulus, and through that, their assessment of its likely effects on them" (Polichak & Gerrig, 2002, p. 76). Researchers using narrative evidence thus select this form of evidence because of this relationship that audiences feel with narratives in general.

Adding to the persuasiveness of narrative evidence is the theoretical connection to the vividness or imagery discussed within them. Individuals react with emotional responses to the vivid language and imagery evoked in narrative evidence (Baeslar & Burgoon, 1994). Specifically, emotion can be attributed to the images conjured when reading a narrative, and how vivid, or real, the information in the narrative evidence is perceived by the audience. Thus, different emotions expressed can perhaps evoke different images. Imagery concerns the "images that can be recalled, recognized, and responded to" (Green & Brock, 2002), and vivid information is, "(a) emotionally interesting, (b) concrete and imagery provoking, and (c) proximal in a sensory, temporal, or spatial way" (Nisbett & Ross, 1980, p. 45). It is perceived that narrative evidence that

evokes images and have vivid information are considered more persuasive (Baeslar & Burgoon, 1994).

When considering the uptake of health behaviors, and messages that can promote these behaviors, scholars do suggest that positive emotions versus negative emotions expressed can differ on outcomes such as attention to messages and attitudes in response to the message (Petty & Cacioppo, 1986; Cacioppo & Petty, 1989; Pfau et al., 2001). As a result, some scholars suggest understanding different emotional appeals within messages (Pfau et al., 2001). Emotions do vary in response to osteoporosis, bone health and suggested behaviors to prevent the disease. For instance, some young women express hatred towards milk, and perceptions of worry about osteoporosis affecting family members (Volkman, in progress). Others respond that osteoporosis is "pretty bad" and visuals of osteoporosis are "scary," and they are surprised that osteoporosis can affect young women later in life (Volkman, in progress).

In considering the role of emotion and different emotions stated within types of narrative evidence, researchers need to account for the structure of emotion being used. The discrete models approach towards emotion stems from the perspective that emotions are distinct from one another, and "each one is represented by a unique pattern of changes in cognition, the automatic nervous systems, neuroantomical activity, facial expression, and action readiness" (Dillard & Meijnders, 2002, p. 218). The three features of discrete emotions include their function, action tendency and valence (Shen & Dillard, 2007). For understanding communication and narrative evidence, the discrete model approach explains how emotions can have a specific action tendency that aligns with the function of the emotion. While there are many emotions studied, Lazarus (1991) identified several

emotions in relation to the core relational theme, which captures the essence of the emotion and the person-specific environment relationship. Research assessing the effects of discrete emotions in persuasion has supported the negative discrete emotions of anger, fright, guilt/shame, sadness, disgust and envy, with the positive discrete emotions being happiness/joy, pride, relief, hope, and compassion (Nabi, 2002). Lazarus (1991) offers scholars a way to understand how emotions are appraised through the core relational themes that can be evidenced in messages. Scholars agree that when a core relational theme is present, a corresponding emotion will be appraised (Lazarus, 1991; Dillard & Nabi, 2006). See Table 1.1. Research supports that some emotions are studied in conjunction with one another as they offer complementary themes, or can work in opposition of each other. For instance, anger and fear are seen to work in opposition regarding message outcomes (Dillard et al., 1996), yet fear and hope are seen to complement as hope is often experienced with the presence of fear (Lazarus, 2001). In particular, fear is an emotion to be experienced prior to hope (Lazarus, 2001). Thus, it is possible for the discrete emotions to influence the effects of each other.

Table 1.1 *Emotions and Core Relational Themes of Emotion*

Emotion	Core Relational Theme
Anger	A demeaning offense against me and mine.
Anxiety	Facing uncertain, existential threat.
Fright	An immediate, concrete and overwhelming physical danger.
Guilt	Having transgressed a moral imperative.

Table 1.1 continued.

Emotion	Core Relational Theme
Shame	Failing to live up to an ego-ideal.
Sadness	Having experienced irrevocable loss.
Envy	Wanting what someone else has.
Jealousy	Resenting third party for loss or threat to another's affection or favor.
Disgust	Taking in or being too close to an indigestible object or idea.
Happiness	Making reasonable progress toward the realization of a goal.
Pride	Enhancement of one's ego-identity by taking credit for a valued object or achievement, either one's own or that of someone or group with whom we identify.
Relief	A distressing goal incongruent condition that has changed for the better or gone away.
Hope	Fearing the worst but yearning for better, and believing a favorable outcome is possible.
Love	Desiring or participating in affection, usually but not necessarily reciprocated.
Gratitude	Appreciation for an altruistic gift that provides personal benefit.
Compassion	Being moved by another's suffering and wanting to help.

Heuristic-Systematic Model for Processing of Narrative Evidence

When studying narrative evidence, emotion and persuasion, the dual-processing models are often cited in relation to affect's (mood or emotion) influence on processing, and understanding the perceived effectiveness of evidence towards attitude change (Massi Lindsey & Ah Yun, 2003). Specifically, the dual-processing models of Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) and Heuristic-Systematic Model (HSM) (Chaiken et al., 1989; Chaiken & Maheswaran, 1994) are cited frequently. Within health communication regarding health risks and disease, these models help "researchers understand how people come to seek, attend to, and process information about a given risk" (Griffin, Neuwirth, Giese, & Dunwoody, 2002, p. 706).

Both the ELM and HSM offer explanations toward the dual systems of processing persuasive messages, with the ELM focusing on the central or peripheral routes (Petty & Cacioppo, 1986), and the HSM offering the systematic and heuristic routes (Chaiken et al., 1989). According to the ELM, if sufficient levels of motivation and ability are present, central processing occurs where the receiver pays careful attention to the arguments and information; if either of these levels of motivation or ability are not sufficient, then receivers will engage in peripheral processing where heuristic cues to evaluate the persuasiveness (Petty & Cacioppo, 1986).

The empirical problem associated with ELM predictions (Eagly & Chaiken, 1993) has prompted many scholars to utilize the HSM when describing message processing routes. In comparison, the HSM states that "accuracy-motivated individuals may assess message validity through two types of message processing – heuristic and systematic –

which may operate concurrently depending on the receiver's judgment confidence threshold for a particular issue" (Nabi, 1999, p. 294). Systematic processing is more effortful processing, while heuristic processing is based on simple heuristics (Nabi, 1999). HSM further postulates that systematic and heuristic processing can interact under the additive, attenuation and bias hypotheses (Todorov, Chaiken, & Henderson, 2002) where both heuristic and systematic processing can occur simultaneously. In particular, with the additive hypothesis, both systematic and heuristic processing styles contribute to consistent information (Todorov et al., 2002). The attenuation hypothesis, however, states that the processing styles are in opposition, and the "implications derived from systematic processing can overwrite or attenuate the impact of heuristics" (Todorov et al., 2002, p. 199). The bias hypothesis offers that "an ambiguous persuasion message can be interpreted in line with a preceding heuristic cue even if people are sufficiently motivated" (Todorov et al., 2002, p. 200) for systematic processing. Previous research has argued that emotions can support the bias hypothesis as emotions can influence the valence of cognitive responses to a message, and these cognitive responses can influence message outcomes (Dillard et al., 1996). In other words, a message about osteoporosis may involve an emotion such as fear, which will serve as a heuristic cue and prompt several responses, which in turn may cause message acceptance (Dillard et al., 1996). Individuals that are motivated to process systematically may process follow the additive hypothesis and process the message heuristically as well as systematically. Or, if the narrative evidence about osteoporosis is vague, and incorporates emotion as a heuristic cue, the individual may process heuristically, even if they have sufficient motivation (e.g., family history of the disease) to want to pay careful attention to the message.

HSM posits that systematic processing will only occur if the individuals have the cognitive capacity and motivation to do so (Zuckerman & Chaiken, 1998). Cognitive capacity refers to the ability to devote time and resources to judgment tasks, as well as knowledge of the issue (Zuckerman & Chaiken, 1998). It is possible that if individuals have limited knowledge about the issue, they may be less able to understand and systematically process the information (Zuckerman & Chaiken, 1998). Additional work supports how limited knowledge may influence the persuasiveness of evidence. For instance, "studies on prior knowledge and evidence so far suggest that evidence has an effect only on those who have some previous attitudes on (and presumably knowledge of) the persuasive topic" (Reynolds & Reynolds, 2002, p. 432). Heuristic processing requires that heuristics are available, or have been learned and stored in memory, and accessible, or are able to be retrieved for use in a judgment task (Zuckerman & Chaiken, 1998). Such heuristics may include accessible attitudes about the topic at hand, or personal relevance such as family history (Claypool et al., 2004), as well as emotions (Pfau et al., 2001; 2009). Within the context of osteoporosis, a family history of the disease or attitudes about brochures offering information about the disease may serve as heuristics. Focus groups with young women about osteoporosis discovered that young women have a family history of the disease, as well as have negative attitudes about advertisements providing information about the disease (Volkman, in progress). These factors could impact their style of processing narrative evidence about osteoporosis.

Aside from ability, motivation is also necessary for the activation of systematic and heuristic processing. The HSM argues that there are two underlying assumptions of motivations for individuals dealing with sufficient motivation, as well as the qualitatively

different types of motivation such as accuracy, defense and impression (Todorov et al., 2002). The sufficiency principle discusses individuals having the sufficient amount of confidence in processing the information (Griffen et al., 2002; Todorov et al., 2002). These individuals feel motivated to process the information. Researchers posit that constructs of personal relevance of the issue, task importance, need for cognition and accountability are some variables that can foster systematic processing because they increase desired judgmental confidence in systematic processing (Todorov et al., 2002). Furthermore, the model states that those that are sufficiently motivated, but lack the ability to engage in systematic processing, will examine the setting for heuristic cues (Chaiken et al., 1989; Todorov et al., 2002). Within the context of osteoporosis, for individuals want to process osteoporosis content and pay careful attention to it, but perhaps do *not* have a family history of the disease nor previous attitudes about osteoporosis, they will examine the content of the evidence for heuristic cues such as emotion words to guide towards processing.

The second motivation assumption of HSM proposes that accuracy, defense and impression motivations are qualitatively different motivation types (Todorov et al., 2002). Accuracy-motivated processing is "characterized as an open-minded processing in which persuasion information is treated evenhandedly" (Todorov et al., 2002, p. 201). This type of motivation does not exclude biased processing, and individuals can engage in systematic, heuristic or both processing (Todorov et al., 2002). Defense motivation, however, is a more close-minded form of processing where individuals attempt to defend their beliefs that are consistent with their interests (Todorov et al., 2002). This form of motivation can also induce systematic, heuristic or both forms of processing (Todorov et

al., 2002). For processing of osteoporosis narrative evidence, it is possible that individuals process because they identify with the narrative evidence, and subsequently want to maintain their interests. Finally, impression motivation refers to an individual's desire to have "socially acceptable attitudes or attitudes and beliefs that satisfy the person's immediate social goals" (Todorov et al., 2002, p. 203). Individuals with impression-motivation use heuristics carefully (Todorov et al., 2002).

Narrative Evidence and Cognitive Processing

Scholars disagree on the persuasiveness of narrative evidence on outcomes such as attitude, change, message recall, comprehension and processing (Reynolds & Reynolds, 2002). For instance, Baesler and Burgoon (1994) in their study of the evidence's influence on belief change discovered that statistical evidence is more persuasive than narrative evidence. Kopfman et al. (1998) found that statistical evidence about organ donation enhanced systematic and heuristic processing, while narrative evidence of a personal story only enhanced heuristic processing. The study has since been criticized for its methodological flaws (e.g., order effects) (Feeley, Marshall & Reinhart, 2006). Notably, a replication of the messages and procedures of Kopfman et al. (1998), correcting methodological errors, by Feeley et al. (2006) failed to reproduce the findings of the original study.

One of the central arguments towards the persuasiveness of narrative evidence is their focus on "one." Narratives have been credited with provoking more audience interest because the specific case represented in narrative evidence is more concrete and can be judged for its salience (Cox & Cox, 2001). It is argued that audiences read a specific case, and connect it with meaningful associations, thus increasing its

remembrance compared to statistics (Cox & Cox, 2001). The heuristic sample size associated with narrative evidence (a story of one), however, versus the sample size associated with statistical evidence (n of many) may be a limitation of narrative evidence "because a claim based on a large sample should have more of an impact than an identical claim based on a small sample" (Baesler & Burgoon, 1994, p. 584). For instance, Massi Lindsey and Ah Yun (2003) found that those who read statistical evidence all had greater perceptions of the sample size heuristic, verifiability and message credibility compared to narrative evidence. This suggests that education and learning linked to views of Western medicine and science may form the view that statistics are valid more often than narratives.

The claim that statistics are more persuasive than narrative evidence (Allen & Priess, 1997) is not universally supported. A critique holds that statistical evidence provides too many generalizations and thus are not recalled by audiences (Cox & Cox, 2001), and that case studies, or narrative evidence may be more effective because "readers underuse information presented in a statistical or strictly informational format" (Greene & Brinn, 2003, p. 445). In other words, the evidence is not easily comprehended and perceived to be of quality by individuals in these instances (Cox & Cox, 2001). Furthermore, it is possible that "the numerical representation of statistics is encountered less frequently in everyday life than in stories, and since statistics are more difficult to interpret than a story, statistics are expected to be less readable and more complex than stories" (Baesler, 1997, p. 171). In health communication, this debate is critical when providing evidence about health risk information, treatments and diagnoses. For instance, when communicating about the severity of a health issue, it is important to understand if

a statistics (e.g., probabilities or odds) will provide behavior change, or if a personal testimonial (e.g., someone's experience with a disease) is more persuasive.

Some scholars assert that when individuals engage in narratives overall, they are passive audience members, and thus it is possible that the dual-processing models may not be appropriate for understanding narrative processing (Hinyard & Kreuter, 2007). For instance, Hinyard and Kreuter (2007) state that, "HSM assumes that the primary processing goal of message recipients is to assess the validity of the persuasive messages they encounter. [Therefore] HSM is not an appropriate model for examining the persuasiveness of narrative effects" (p. 780) because receiving a narrative is often for enjoyment. This perspective has been advanced when studying narratives in entertainment-education to elicit health behavior change (Green & Brock, 2002; Slater & Rouner, 2002). In this regard, it is possible that these scholars are not referring to narrative evidence. Narrative evidence is used in support of a message, as defined by Reinard (1988) as a form of evidence. Individuals that receive narrative evidence in a message can be aware that such evidence is present to help add credibility and validity to the overall message, and thus judge it (Reinard, 1988). In fact, if narratives are to be employed systematically as a form of narrative evidence, it is likely that they will be processed because they are being read for understanding and coping and as evidence towards explicitly reaching a conclusion.

Narrative Evidence and Emotional Processing

As part of understanding what can trigger processing, emotions serve as a key prompt towards systematic and heuristic processing (Pfau et al., 2001; 2009). When understanding the role of emotion in processing of messages, there are conflicting results

with the HSM on the role of emotion on information processing (Zuckerman & Chaiken, 1998). For example, it is possible for fear to increase or reduce systematic processing in specific cases (Zuckerman & Chaiken, 1998). When examining the literature on some emotions, such as fear, one study suggests that chronic fear (e.g., continually occurring fear) reduces systematic processing (Hale, Lemieux, & Mongeau, 1995), and implies that "chronic fear and message-relevant acute fear may lead to less careful message processing if the need for reassurance is not met or is met by peripheral cues" (Nabi, 1999, p. 300). However, it is possible that motivation and not cognitive ability can mediate processing (Nabi, 1999). It is also possible that trait anxiety can influence processing (Hale et al., 1995), but that "high levels of anxiety not need always deter cognitive activity. Enhanced motivation to process can sometimes compensate for deficits in cognitive capacity induced by high anxiety" (Sengupta, & Johar, 2001, p. 148). When studying fear and fear appeals in messages, it is also possible that these conflicting results are due to sampling error (Boster & Mongeau, 1984). Nabi (2002) offers an explanation for the role of emotions in the Cognitive Function Model. "CFM views emotion as the determining the motivation to process…and focuses on motivation to alleviate aversive relationships with the environment, whereas the ELM and HSM focus primarily on accuracy motivations" (Nabi, 2002, p. 207). It is thus important to consider what motivations and abilities relate to the processing of narrative evidence.

Individual Motivations and Abilities to Process Narrative Evidence

When considering the dual-model processing model of HSM, researchers need to understand the motivation and ability to process messages. Narrative evidence makes explicit the possible tendencies that individuals may display which predispose them to be

influenced by this evidence form. Some individuals have been found to prefer narrative processing more than others, and some have been found to have a higher preference for numerical information than others. Both likely impact an individual's likelihood of processing a narrative heuristically or systematically. In the context of osteoporosis, family history of the disease may also influence processing of osteoporosis messages.

Narrative Tendencies

Newman (2005) provides a perspective stating that individuals may have a preference for receiving narratives based on a fun unification model. The fun unification model is a tool for measuring fun in computer-mediated communication activity (Newman, 2005), where often stories are told. Based on this model, individuals have narrative tendencies, or a "predisposition for creating and finding narrative" (Newman, 2005, p. 3). In measuring narrative tendencies, they represent the fun and entertainment value of narratives (Newman, 2005). These measures are the few that are attempting to understand how individuals may be motivated and able to attend to narratives, and address how some individuals may have a proclivity for telling and attending to narratives. For individuals processing narrative evidence in support of a health message, narratives may not evoke a sense of fun. Often firsthand stories of illness describe painful and emotionally distressing occurrences (Kreuter et al., 2007), and these experiences are used in support of a message about health behaviors. This construct, however, does tap into understanding how some individuals may have a tendency to prefer narratives and subsequently may process narrative evidence differently than other forms of evidence.

Focus groups young women could not recall an osteoporosis narrative, but did remember personal stories of other diseases (Volkman, in progress). For example, some

young women recall the powerfulness and emotions of Katie Couric's telling of her husband's battle with colon cancer or Michael J. Fox's discussion of Parkinson's disease (Volkman, in progress). For these young women, narrative evidence represents a compelling story about a disease, and one that can educate them about prevention (Volkman, in progress). These stories are not sharing narratives as sense of fun, but rather as a way to identify and gain interest in the information being shared.

Preference for Numerical Information

The argument has been made by some researchers (Baesler & Burgoon, 1994) that statistical evidence is more persuasive because of the use of numbers. If this assertion is to be followed, it would be useful for researchers to utilize Viswanathan's (1993) Preference for Numerical Information scale which helps identify those individuals with a proclivity for receiving numerical information. It is possible that "individuals with low preference for numerical information may be less likely to acquire ability that is required in, say, arithmetic or statistics, than are individuals with high preference for numerical information" (Viswananthan, 1993, p. 742). Hornikx and Hoeken (2007) studied preference for numerical information among French and Dutch participant's susceptibility to anecdotal, statistical, causal and expert evidence and found it to not differ between the cultures. While the content of Hornikx and Hoeken (2007) study was not reliant on health information, this individual difference is important when considering types of narrative evidence in health communication. Risk information is often stated when discussing susceptibility to disease and treatment success rates, and "a basic preference for numerical information may influence the likelihood that relevant numerical information is acquired, interpreted, and used in such situations"

(Viswananthan, 1993, p. 742). If individuals score low on this scale, it suggests that narrative evidence may be more appropriate and persuasive for them.

Focus groups about bone health among women 18-33 highlight that stories and testimonials are equally important in messages, as well as statistics (Volkman, in progress). Young women realize that statistics may help them understand the prevalence of the disease, but that knowing a personal story of a young women's journey with osteoporosis can help add relevance of the issue to them (Volkman, in progress).

Family Health History of Disease and Family Discussion

The importance of family communication in health cannot be denied, as countless research has found family communication as a mechanism for adopting health behaviors and discussing health information (Jones, Beach, & Jackson, 2004; Pecchioni, Thompson, & Anderson, 2006; Powell & Segrin, 2004). The importance of family communication is further emphasized as analysis of health message design states that families provide a structure and foundation for children and adolescents across development, as well as being another audience for sending health information (Weintraub Austin, 1995). Additionally, as individuals witness health events among families, engage in family discussions about illnesses and/or perform actions like visiting physicians with other family members, it contributes to one's repertoire of communicative behaviors and skills around health issues (Pecchioni et al., 2006).

Research also proposes that the ability to discuss health becomes a critical skill because learning family health history can help prevent numerous diseases (Guttmacher, Collins, & Carmona, 2004). Medical professionals are being trained to specifically ask patients about their health history (Guttmacher et al., 2004). Consequently, family

disclosure and discussion about health issues can help prevent negative health outcomes and improve communication efforts with physicians (Guttmacher et al., 2004). Additionally, information conveyed by a family member can support information that is communicated by the media about a health issue. Many individuals turn to a form of mass media, such as television, movies, newspapers, magazines, and Internet, to enhance their understanding and knowledge of health issues (Kline, 2003).

Furthermore, family discussions are a way to understand family history of a disease. Focus groups of young women ages 18-33 cite that they know a grandmother with osteoporosis, which prompts their parents to disclose to them about bone health prevention behaviors (Volkman, in progress). Additionally, these same young women have been a part of family rituals involving a prevention behavior of drinking milk partly due to the incidence of the disease in their family (Volkman, in progress). Family health history and family disclosure of osteoporosis is therefore an important characteristic to consider when creating messages for osteoporosis prevention. These women also state that they have seen messages about osteoporosis, such as a doctor's office, but tend to ignore these messages because they do not believe it is relevant to them (Volkman, in progress).

Current Health Behaviors

Both the Surgeon General (2004) and Pennsylvania Osteoporosis Program emphasize the bone healthy behaviors of calcium intake, vitamin D, and weight-bearing exercises (e.g., running) as prevention behaviors for osteoporosis. As part of their efforts to increase osteoporosis prevention behaviors, the Pennsylvania Osteoporosis Program has also focused on the reducing the behaviors of smoking and caffeine (e.g., soda,

coffee, tea) consumption. The program finds it important to understand current health behaviors for women as part of understanding what improvements are needed. Focus groups of women ages 18-33 discussed that many do drink a lot of soda and do take a multivitamin, but drinking milk is not a form of calcium for them.

Outcomes of Processing Narrative Evidence

Within understanding the persuasiveness of evidence, several outcomes of interest are studied (Reinard, 1988; Reynolds & Reynolds, 2002). Most notably, these include emotions, comprehension, perceptions of evidence quality, perceived message effectiveness, behavioral intentions and behavior.

Emotions

Emotions are an important element within narrative evidence, as well as an outcome when considering the persuasiveness of narrative evidence. Literature shows that different emotions can be aroused simultaneously in response messages, and these emotions elicited can vary in response to multiple ways of conveying a topic (Dillard & Peck, 2001; Dillard & Nabi, 2006). For instance, AIDS PSAs share similar content about a health disease, but are told different ways, and these PSAs aroused several emotions to varying levels and degrees which impacted message effectiveness outcomes (Dillard & Peck, 2001). Furthermore, different emotions can trigger the systematic and heuristic processing that can occur (Pfau et al., 2001; 2009). Thus, when considering different types of narratives to use as narrative evidence (e.g., firsthand, secondhand, official), it is necessary to understand what emotions are aroused and how these emotions can influence subsequent processing and other outcomes associated with narrative evidence. Research assessing the effects of discrete emotions in persuasion has supported the negative

discrete emotions of anger, fright, guilt/shame, sadness, disgust and envy, with the positive discrete emotions being happiness/joy, pride, relief, hope, and compassion (Nabi, 2002).

Comprehension

Although Reynolds and Reynolds (2002) do not list comprehension as one of the effects of using evidence, comprehension is an outcome when studying risk communication (Parrott, Silk, Dorgan, Condit, & Harris, 2005). The ability for individuals to understand the information being presented to them is critical towards them enacting certain health behaviors (Parrott et al., 2005). Research on other forms of evidentiary appeals such as verbal or visual forms of communication has found that comprehension levels are higher when using verbal rather than visual evidence (Parrott et al., 2005). Comprehension is thus a concept involving whether an individual's understanding "based on the integration of the ideas with related frameworks of meaning" (Parrott et al., 2005 p. 425). It is also argued that "in order to understand a narrative, and as a part of comprehension, individuals must . . . position themselves within the mental modes of the story" (Busselle & Bilandzic, 2008, p. 272). Thus, comprehension can be considered an outcome of becoming engaged and involved within the narrative.

Within the realm of health communication, comprehension can also encompass Bandura's work from social cognitive theory (1997) which suggests that as a part of an individual's reading of messages is their expectation of the outcome being promoted to be viable. These outcome expectancies can be in the form of personal, social or personal outcomes. Bandura (1997) provides that health behaviors sometimes fail to be achieved

because of a collection of physical, social and personal outcome expectancies, and thus cannot be fully executed. Comprehension is therefore achieved due to an individual's understanding of the various personal, social and physical frameworks that are integrated as part of evidence.

In health communication endeavors, comprehension can also be attributed to an individual understanding the health behaviors being advocated and a belief that these health behaviors will work and are important (Murray-Johnson & Witte, 2003). In other words, response efficacy is when individuals belief that the provided response consistently works (Murray-Johnson & Witte, 2003). In health messages, this often involves providing information that individuals believe can avert a threat of illness (Dillard, & Nabi, 2006). Understanding of this information can thus result in behavior change because individuals comprehend the actions to be taken and that it works (Murray-Johnson & Witte, 2002).

Perceived Evidence Quality

In 2002, Reynolds and Reynolds posited that perceived evidence quality is an area for future direction among persuasion scholars studying the effects of evidence. They argue that "it is not only merely enough to manipulate evidence" (Reynolds & Reynolds, 2002, p. 435), but that it is important that receivers perceive the evidence to be high in quality. Parrott et al. (2005) found that perceived evidence quality was mediated by comprehension of statistical evidence, and also moderated the impressions of message persuasiveness. In other words, if the information is perceived to be easily comprehended, then it is likely that the overall evidence will be perceived to be of higher quality (Parrott et al. 2005).

Perceived Message Effectiveness

Perceived message effectiveness is important towards understanding if a message is "effective, convincing, compelling and so on" (Dillard, Shen, & Vrail, 2007, p. 467). An important component of perceived message effectiveness is often the quality of the message. Often, message quality is a judgment by the receiver that the content matches their attitude function, and is operationalized "using terms such as 'plausible,' 'compelling,' 'sound,' and 'reasonable' " (Dillard et al., 2007, p. 468). Additionally, message quality can be perceptions about how convincing the arguments are made within a message, as well as the persuasiveness of the message (Bordia, DiFonzo, Haines, & Chaseling, 2005). As evidence is often used to support a message, perceived message effectiveness has been studied in order to understand what elements of evidence can add to the convincing and compelling nature of the message (Reynolds & Reynolds, 2002). As a result, it has been argued that effectiveness can be a predictor of persuasion (Dillard et al., 2007). Research by Dillard et al. (2007) found that perceived message effectiveness may be considered as a causal antecedent to actual effectiveness of messages, and thus is a recommended variable to assess when doing formative research on messages. Furthermore, "earlier work has shown perceived effectiveness to be sensitive to the influences of both emotion and cognition" (Dillard et al., 1996) and "to serve as the proximal precursor to attitude change" (Dillard & Peck, 2001, p. 43). A study of PSAs found that guilt, sadness and happiness were positively associated with perceived message effectiveness (Dillard & Peck, 2001).

Cognitive Thoughts

One of the arguments about the persuasiveness of narrative evidence is their ability to transport individuals (Green & Brock, 2000) and an individual's acceptance of the narrative, such that it limits the counter-arguing that may occur. This has been debated, as research has found that cognitive thoughts are aroused after narrative evidence exposure, such as counter-factuals, can create longer lasting attitude change (Tal-Or, Boninger, Poran, Gleicher, 2004). Furthermore, the proportion of cognitions has been shown to be related to affect after message exposure and related to both peripheral and central processing (Hale et al., 1995). When considering the context of osteoporosis for young women, many thoughts are generated when discussing personal experiences with the disease (Volkman, in progress). During focus group sessions, a young woman sharing her family's experience with the disease raised thoughts and statements about the disease, its risk factors and severity (Volkman, in progress). Thus, cognitive thoughts are relevant when examining the persuasiveness of narrative evidence for young women about osteoporosis.

Behavioral Intentions and Behaviors

Persuasion literature is often interested in understanding ways to motivate behavior change among individuals. In health communication, this often results in motivating individuals to consider changing a current health behavior practice, or adopting a new behavior in order to curb illness and disease (Murray-Johnson & Witte, 2003). Behavioral intentions can be defined as, "the plans individuals have about whether or not they intent to perform the recommended behavior (from adoption to discontinuance)" (Murray-Johnson & Witte, p. 487). Different theoretical perspectives

have been offered to explain how behavioral intentions can be accomplished (Dillard & Pfau, 2002), with mediators of behavioral intentions ranging from attitudes, social norms, beliefs and message effects such as comprehension (Murray-Johnson & Witte, 2002). Larkey and Hecht (in press) propose that one of the outcomes of using narratives in health promotion is intentions to change behavior, with behavior change also resulting. Within the use of evidence, behavioral intentions and behavior can also be an outcome studied in relation to the use of evidence to support a message (Reinard, 1988).

For osteoporosis, behavioral intentions focus on a young women's intent to engage in bone healthy behaviors, and behaviors represent carrying-out bone healthy prevention behaviors. Osteoporosis programs (Chang, 2006) are interested in educating women about osteoporosis in hopes to change their behaviors and engage in prevention for the disease. Thus, behavioral intention and behaviors are an important outcome for persuasion and communication, but also in understanding how to reduce incidence of osteoporosis.

With this understanding of the literature on narrative evidence, the role of emotions in narratives, and processing of evidence in persuasion, the following rationale offers hypotheses and research questions to explore these relationships in the context of osteoporosis narrative evidence.

CHAPTER THREE

RATIONALE

The purpose of this research project is to understand how narrative evidence can contribute toward the persuasiveness and processing of osteoporosis health messages, and fulfill a gap in current research understanding narrative evidence in communication and the role of emotions in prompting processing of narrative evidence. As stated by Reinard (1988), narrative evidence has not been fully explored in social science communication research, and many questions are left unanswered about the persuasiveness of narrative evidence along the outcomes of emotions, comprehension, perceived evidence quality, perceived message effectiveness, message processing, behavioral intentions and behaviors. As researchers are often not consistent with their operationalization of types of narratives and narrative evidence, research is needed to understand if different narrative types may be more persuasive than others on these outcomes, the role of emotions in predicting these outcomes, and the nuances associated with processing narrative evidence.

This research explores the possible roles of different types of narrative evidence relating to the source of the narrative and different expressed emotions in narratives on message processing outcomes and health intentions and behaviors. Comparisons are made between firsthand, secondhand and official narrative evidence types about osteoporosis compared to an attention-control narrative evidence that is not about osteoporosis. Comparisons also consider expressions of positive, negative, or no emotions to acknowledge one of narrative's greatest strengths—the ability to express experiences of emotion. Given the literature on narratives and narrative evidence, several

important considerations need to be addressed when studying different types of narratives, the motivations and abilities of individuals to process narrative evidence, and the role of emotions in narrative evidence. In particular, it is important to understand if different emotional statements expressed within narrative evidence can impact persuasive outcomes such as comprehension, processing, behavioral intentions and behaviors.

As argued by Oatley (2002), narratives hold an advantage for conveying emotions, and this emotional connection adds to the identification individuals experience with narratives. For narratives such as firsthand narratives, they express one's emotional journey with an illness (Kreuter et al., 2007; Sunwolf et al., 2008). Furthermore, narratives can implicitly or explicitly express one's emotional experience with an illness (Sunwolf et al., 2008). Research supports that a unique contribution of narrative evidence is that it has an ability to convey emotions (Kopfman et al., 1998; Schank & Berman, 2002), often thought to be absent in statistical evidence (Kopfman et al., 1998). Thus, inherent in narratives is an emotional connection that bridges the imagery, vividness and experience that is being told (Oatley, 2002; Polichak & Gerrig, 2002).

When examining narratives from osteoporosis organization websites by women diagnosed with osteoporosis, they often express negative emotions and experiences with the disease. These narratives are told from the point of view of someone diagnosed with the disease, or someone re-telling a story. In this regard, the narratives are firsthand narratives and second-hand stories. These types of stories are evidenced in other health contexts, such as cancer, when a spouse or family member recounts a loved one's experience of an illness. Emotion statements in the available narratives range from "The results shocked me," "My parents and friends were shocked that I had what they

perceived ‘an old woman’s disease’,” “excruciating pain and emotional distress,” “I was crying uncontrollably,” and “With the constant pain in my entire back, I began to suffer both physically and emotionally.” These statements are often positioned within the beginning and middle of the narratives. By the end of the narratives, however, statements reveal women overcoming odds, and an implicit reference to positive emotions. For example, statements such as, “From this negative and devastating experience evolved my desire to construct a positive situation” suggest that positive emotions can be expressed in narratives. This small sampling of osteoporosis narratives, however, does not represent a full range of experiences that can be shared. Thus, the following is asked:

RQ1: What are the positive and negative emotions being expressed in osteoporosis firsthand narratives and secondhand narratives?

As part of understanding some narratives as a re-telling of someone’s experience and the hereditary risk factor of osteoporosis, it is critical to understand young women’s family history and family discussions about this disease. Although both men and women are diagnosed with osteoporosis, the disease is four times more likely to occur in women (Surgeon General, 2004). Also, prevention efforts started early in life can help prevent diagnosis (Surgeon General, 2004). Thus, communication to young women about the disease is crucial towards reducing incidence. In addition, research has shown that knowing one’s family health history is a growing influence towards engaging in healthy behaviors (Guttacher et al., 2004). The importance of family when involving health has resulted in many narratives often from the viewpoint of the person with an illness or a family member or friend sharing a secondhand experience about a loved one’s illness. When considering family health history of osteoporosis, focus groups with young women

ages 18-33 (Volkman, in progress) revealed that one motivation to attend to osteoporosis messages was family disclosure of a family member's osteoporosis. If a family member (e.g., parent) specifically discloses details of a grandparent's or other family member's osteoporosis, young women may tend to find osteoporosis messages relevant to their lives (Volkman, in progress). The science linked to osteoporosis suggests that by the year 2050, the worldwide incidence of osteoporotic hip fractures in women is expected to increase 240% in women (International Osteoporosis Foundation (IOF), 2009). To date, no research has considered whether those diagnosed with this condition discuss it in their families. Thus, there is no baseline data on which to draw in considering how to communicate about family history and osteoporosis. Therefore, the following is asked:

RQ2: Do young women know about a family history of osteoporosis?

Awareness of the emotions expressed in osteoporosis narratives and insights about young women's familial discussions relating to a history of this disease forms a framework to consider message processing and health intentions and behavior. As reviewed in the previous chapter, these key processing variables and mediators have been understudied in efforts to build theoretical frameworks to guide the use of narrative evidence.

Outcomes of Narrative Evidence

Several outcomes of interest should be considered in regards to narrative evidence, especially when trying to understand the nuances associated with narrative evidence and systematically understanding how narrative evidence types may differ. Cognitive outcomes such as cognitive thought statements, comprehension, perceived evidence quality, perceived message effectiveness and behavioral intentions have

previously been studied in relation to evidence (Baeslar & Burgoon, 1994; Dillard et al., 1996; Hale et al., 1995; Kopfman et al., 1998; Massi Lindsey & Ah Yun, 2003; Parrott et al., 2005). Additional research has sought to understand how emotional responses to evidence and messages can influence cognitive responses (Dillard et al., 1996) and processing outcomes (Kopfman et al., 1998). Thus, both cognitive and emotional responses are warranted when assessing differences between narrative evidence types.

Specifically, the cognitive outcomes of narrative evidence compared to statistical evidence have been studied as differing, with statistical evidence often being estimated to be more persuasive (Baeslar & Burgoon, 1994; Kopfman et al., 1998; Massi Lindsey & Ah Yun, 2003). In addition, studies suggest that individuals engage in more careful and systematic processing of statistical evidence compared to narrative evidence (Baeslar & Burgoon, 1994; Kopfman et al., 1998; Massi Lindsey & Ah Yun, 2003). Interestingly, scholars contend that the "n of one" can be both a benefit (Cox & Cox, 2001) and also hindrance (Baeslar & Burgoon, 1994) to the processing of narrative evidence. Individuals can identify with a story of "one" (Sunwolf et al., 2008), yet at the same time only focusing on "one" versus the "many," which can be offered with statistical evidence, may limit the attention paid to narrative evidence because it does not afford the same level of generalizability (Baeslar & Burgoon, 1994). This is a bold claim that presents a challenge for communication scholars to better understand this use of evidence based on the case study of "one."

Previous studies have often lacked a systematic approach to studying narrative evidence and understanding differences that may occur between *types* of narrative evidence that can be used, which could afford new insights into the debate. Narrative

evidence provides special nuances when thinking about the fidelity, point of view, consistency and temporality characteristics associated with narratives (Fisher, 1987; Ochs & Capps, 1996), and different types of narrative evidence afford separate ways of conveying information. It is not a question of simply understanding if statistic or quantitative information as found in statistical evidence is more persuasive than a story as in narrative evidence, but more an understanding if the characteristics associated with narrative evidence give itself to different ways of processing. Thus, standards of processing and outcomes associated with statistical evidence could fall short of fully capturing outcomes and processing associated with narrative evidence because they do not account for the special characteristics of narrative evidence.

In this vein of learning differences to various narrative evidence types, it is critical to understand the relationship between narrative evidence type and processing of the narrative evidence. While previous research has argued that narrative evidence can be processed differently than statistical evidence (Allen & Preiss, 1997; Reynolds & Reynolds, 2002), it is unclear if this is the case across all narrative evidence types. Previous research has not taken into account the differences in processing that may occur when reading a firsthand or secondhand experience with a disease, or official health organization narrative evidence. Also, when comparing the types of processing between systematic and heuristic processing, it is concluded that narrative evidence results in heuristic processing and statistical evidence results in systematic processing (Allen & Preiss, 1997; Reynolds & Reynolds, 2002). It is possible with motivation and ability to do so, individuals may process narrative evidence systematically, rather than heuristically. In particular, individuals may pay careful to attention to the experiences

being conveyed because they feel connected and identify with the narrative evidence as part of the vividness and imagery that is conveyed. Specifically, if the narrative evidence follows the criteria mentioned by Ochs and Capps (1996) and Fisher (1987) for fidelity, consistency, temporality and point of view, then it is possible that individuals will systematically process the narrative evidence because it would represent a level of high quality narrative evidence to which greater attention would guide systematic processing. On the other hand, education in the Western tradition of medicine may lead individuals to discount narrative evidence when it is recognized as such, based on its reliance on a case study rather than a larger sample. Thus, the following is asked:

RQ3: Do women reading different types of narratives differ in their processing of the evidence?

A key cognitive outcome from receiving evidence is whether individuals were able to respond to the message. Previous research attests that the cognitive statements in response to a message may differ as a result of the information and the emotional content within the message (Dillard et al., 1996; Hale et al., 1995), and that the thoughts aroused after reading narrative evidence can create longer lasting attitude change (Tal-Or et al., 2004). In addition, thought statements have been found to increase persuasiveness of messages (Dillard & Peck, 2001). Furthermore, the proportion of cognitions has reported to be related to fear after message exposure and related to different processing styles (Hale et al., 1995). Thus, it is important to understand if thoughts after reading different types of osteoporosis narrative evidence may differ. It is possible that the personal experiences shared during the firsthand and secondhand narrative evidence may evoke more thoughts because they detail a specific experience of one's journey and the level of

identification can enhance the statements. In addition, the emotional description of this journey may influence the valence of these thoughts as reading a negative or positive experience may arouse positive or negative thoughts (Hale et al., 1995). While previous research has found a non-significant relationship between fear appeal ads and cognitive thoughts (Dillard et al., 1996), there has been little research to understand if the manipulation of the content being presented either positively or negatively can influence cognitive statements. Thus, it is warranted to examine if thought statements may differ after reading different narrative evidence types and the positive or negative statements being offered in this evidence.

When considering some of the outcomes with evidence and health communication, comprehension is another key outcome concerning risks and understanding of diseases (Parrott et al., 2005). It is important to clarify if comprehension differences emerge based on the type of narrative evidence being used. If some narrative evidence types do not aid comprehension and understanding of a disease, it is imperative that health communication scholars adjust the use of these types of narratives. It is possible that the statements aroused after exposure to narrative evidence may allow young women time to process and fully understand the information being conveyed. Thus the ability to write down thoughts may then enhance comprehension assessments of the information. As previous research indicates that comprehension can influence perceptions of perceived evidence quality and persuasiveness (Parrott et al., 2005), comprehension need to be considered in regard to narrative evidence. Specifically, the benefits of firsthand and secondhand experiences with a disease are that they can serve as a connection for individuals to learn about a disease, and create a reality about a disease

through the sharing of a personal experience (Sunwolf et al., 2008). These sharing of experiences may prompt higher levels of comprehension.

As the previous chapter outlined, scholars must also assess judgments on the quality of the evidence provided. These judgments of evidence quality consider the information being conveyed, and if the information cannot be understood it may be considered to be poor and discarded. Furthermore, if the information is perceived to be of quality, it stands that the overall message which contains this information should be considered effective. Research shows that there is a positive relationship between perceived evidence quality and perceived message effectiveness (Parrott et al., 2005). Ultimately, then, the relationship between finding a message to be effective should be related to following the recommended behaviors being advocated within the message. As outlined in the previous chapter, these intended behaviors may result in the behaviors being performed (Larkey & Hecht, in press).

Differences on these variables may emerge, however, dependent upon the evidence provided to young women. The added personal touches are often lacking in an official story that is told by an organization (Oatley, 2002), may prompt young women to find the information within a firsthand and secondhand narrative evidence to be more easily understood and to be of higher quality. Again, young women may also find that the identification and imagery conveyed in firsthand or secondhand narrative evidence to be of higher quality and an overall more effective message. On the other hand, an official story may be elevated in perceptions of credibility relating to the narrative and enhance comprehension. Furthermore, some young women may differ in their responses and perceptions of the narrative evidence dependent upon the emotional tone being used. It is

possible that the young women may find the negative or positive manner in which the narrative is told to be more credible and accurate than without emotion. It could be argued that higher perceptions of quality, and subsequent effectiveness, with positive or negative osteoporosis narrative evidence may be a result of the reality that many illness stories are conveyed with emotions. Thus, narrative evidence without emotions would appear to be unnatural. All of these qualities could contribute to differences in behavioral intentions and behaviors, as the evidence is judged and comprehended. Therefore, the following research question is asked:

> RQ4: Do differences emerge among women reading different types of narrative evidence which vary (a) the source of the narrative or (b) the expressed emotion in the narrative on dominant cognition, comprehension, perceived evidence quality, perceived message effectiveness, behavioral intentions and behaviors?

Processing narrative evidence may be influenced by emotions expressed in the evidence of emotions aroused by the evidence. When considering the processing of narrative evidence, it is necessary to account for the ability to express emotions and how this may impact outcomes and behavioral intentions. Emotion functions as a part of the persuasiveness of narrative evidence that can aid comprehension and coping (Sunwolf et al., 2007). Some research has found that aroused emotions function as a heuristic that guides processing of messages. This has been the case relating to both AIDs and organ donation messages (Dillard et al., 1996; Kopfman et al., 1998) to understand how health issues incorporating emotions such as fear prompt heuristic processing and biasing systematic processing (Dillard et al., 1996). Recent studies have found that arousal of the discrete negative emotion of anger is positively related to systematic processing of

inoculation treatments (Pfau et al., 2001; 2009). Arousal of happiness, on the other hand, was directly related to more heuristic processing (Pfau et al., 2001; 2009). Furthermore, individuals can experience more than one emotion in response to a received message, with some of these emotions being positive and some being negatively valenced, all contributing to influence outcomes (Dillard & Nabi, 2006). For instance, fear has been found to be positively associated to message acceptance, while anger has been negatively associated with message acceptance in response to the same message (Dillard et al., 1996).

Considering the nuances of experiences shared during firsthand and secondhand narrative evidence, and if this experience is shared through expression of positive or negative emotions, it is possible that several emotions are aroused. As previous research has found that fear appeals in AIDs PSAs can elicit the emotions of fear, anger, sadness and happiness (Dillard et al., 1996), it is plausible that separate and distinct emotions will manifest. Additionally, as narrative evidence types can include osteoporosis content in slightly different ways (e.g., different person diagnosed), participants' emotional response could vary not only in different emotions, but in their intensity. It plausible that emotions may be greater for reading a firsthand narrative about a person similar to the reader, versus a secondhand narrative or an official health organization narrative evidence where similarities may not be as great. The following research question is thus proposed:

RQ5: Do different narratives, varying as to the source of the evidence and/or the expressed emotion in the narrative, arouse different discrete emotions?

A Theoretical Model of Osteoporosis Narrative Evidence Processing

Answers to the previous research questions are critical to build a better understanding of the persuasiveness of narrative evidence. Taken as a whole, the rationale suggests a theoretical model of narrative evidence processing and outcomes based on a framework of the HSM (Chaiken et al., 1989). As the previous chapter indicated, the HSM offers a way to understand the persuasiveness of narrative evidence. As this research is interested in differences that emerge across different forms of narrative evidence, it is valid to explore theory-building of a model along these types. To briefly summarize the theory, HSM (Chaiken et al., 1989, Todorov et al., 2002) argues that several individual abilities and motivations can be influencing the heuristic and systematic processing, which can happen concurrently, and these processing styles can influence outcomes associated with evidence use, such as perceived message effectiveness (Chaiken et al., 1989). Other mediators can include the cognitive thoughts, comprehension, and perceptions of evidence quality that have been discovered in previous research studying evidence. As the previous chapter highlights, emotions can serve as heuristic towards the processing of narrative evidence, which may offer unique contributions to understanding how narrative evidence is processed.

This is the first time such a model has been proposed in relation to narrative evidence. The model first addresses the overarching thought of what individual motivations and abilities influence the systematic and heuristic processing of narrative evidence. In turn, this processing can then promote specific evidence outcome towards behavioral intentions after reading narrative evidence. Finally, this model attempts to address how are emotions incorporated into the processing model. As this research is

building theory, several research questions were proposed to begin establishing relationships between variables. Figure 1 illustrates the suggested ordering of relationships among these inquiries. The discussion that follows the proposed exploratory model reflects an extended integration of the constructs considered in this research.

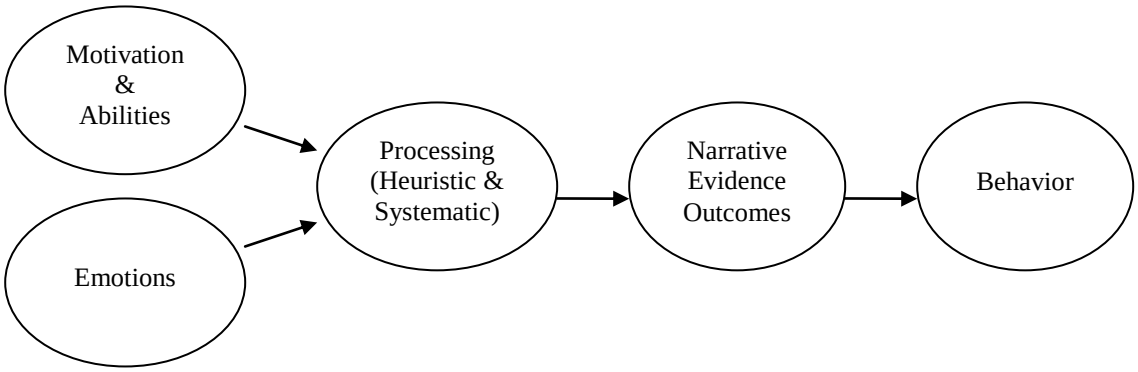

Figure 3.1 Overview of Theoretical Model

Individual Motivations and Abilities toward Processing Osteoporosis Narrative Evidence

Based on the HSM (Chaiken et al., 1989; Todorov et al., 2002), it is necessary to learn if individual differences emerge across motivations and abilities towards processing. As noted previously, scholars contend that part of the persuasiveness of narrative evidence is that they tell the story of one individual's experience, thereby having a heuristic sample size "n of one" which differs from statistical evidence (Baesler & Burgoon, 1994). This comparison between statistical and narrative evidence based upon quantifiable differences suggests that individual differences may emerge towards evidence outcomes and processing of evidence. In particular, for individuals with a low preference for numerical information, this "n of one" (Baesler & Burgoon, 1994) may be appealing because it does not overwhelm them with quantitative information, and thus can add a level of persuasiveness to narrative evidence. For these individuals, the information may be processed carefully because it does not include numerical

information, which they do not desire. Similarly, for individuals with a high preference for numerical information, osteoporosis narrative evidence may be processed heuristically because it offers an "n of one" and does not offer information that young women desire with specific risks and odds associated with osteoporosis.

In addition, if individuals perceive to have a fondness for telling and using narratives (Newman, 2005), it is possible that they will find narrative evidence about health issues to be more persuasive. Newman (2005) has called these preferences narrative tendencies, and they can be considered a way to help understand how individuals may be motivated and able to attend to narratives, and address how some individuals may have a proclivity for telling and attending to narratives. Individuals with high preference for numerical information may have low narrative tendencies. These two tendencies can be considered a proxy for one's ability to process and pay attention to narrative evidence that can lead towards systematically processing narrative evidence. If one has the cognitive capacity to prefer numerical information, and a low tendency for narratives, it is possible that narrative evidence will not be carefully scrutinized and processed systematically. The following is then offered:

RQ6: How does preference for numerical information relate to systematic and heuristic processing after reading osteoporosis narrative evidence?

H1: Preference for numerical information will be negatively correlated with narrative tendencies.

In view of the uniqueness of narrative evidence, it is important to acknowledge that not everyone with a tendency towards narratives may engage in systematic processing of narrative evidence. It is possible, that despite having a proclivity towards

narratives, narrative evidence about a health risk such as osteoporosis may not be paid attention to and carefully scrutinized. It is possible that those with a tendency towards telling and hearing narratives may pay attention to the heuristics offered narrative evidence, such as the emotions, and process the narrative evidence heuristically. Specifically, narrative tendencies may cause individuals to realize that narrative evidence is an "n of one" and rely upon this heuristic to process the narrative evidence. Additionally, as individuals may engage in more systematic processing of narrative evidence, they may realize it is based on an "n of one" and not as generalizable to the population (Baeslar & Burgoon, 1994). This is an important concept to consider as much of health information is communicated via quantifiable terms (e.g., odds, relative risks). Therefore, it is critical to explore all facets accounting for the processing of narrative evidence to glean a better picture of the processing that is occurring. Therefore, the following is asked:

RQ7: How do narrative tendencies relate to systematic processing of osteoporosis narrative evidence and heuristic processing of osteoporosis narrative evidence?

Heuristic and Systematic Processing to Influence Narrative Evidence Outcomes

Scholars however should also note the influence of the concurrent heuristic processing and systematic processing that may be occurring when processing narrative evidence, as argued by HSM (Chaiken et al., 1989; Todorov et al., 2002). As outlined in the previous chapter, one of the hypotheses allowing for the simultaneous heuristic and systematic processing is the biased hypothesis which argues that heuristics can precede and bias the systematic processing (Todorov et al., 2002). While it is important for young women to carefully attend to the narrative evidence in order to understand and judge the

information being conveyed within the evidence, systematic processing could be influenced by the "n of one" inherent with the story of one in narrative evidence. In this sense, heuristic processing could be occurring as young women focus on the "n of one" heuristic available to them with narrative evidence. The structure and content within narrative evidence is a familiar and experienced heuristic that may influence young women to pay attention to the cue. As the topic of osteoporosis may be considered "uncool" for some young women (Volkman, in progress) and there may be little motivation and ability to systematically process, heuristic processing should be acknowledged as occurring with the processing of osteoporosis narrative evidence as a way for women to process the narrative evidence.

This accounting for both systematic and heuristic processing influencing different narrative evidence is critical. Within the context of osteoporosis narrative evidence, it is important that the information being conveyed can aid individual understanding of disease and be a mechanism for giving voice to those providing an illness narrative (Kreuter et al., 2007; Sunwolf et al., 2007). In this regard, narrative evidence may not be a form of entertainment, where individuals become one with a character and change their beliefs and behaviors due to the identification with the character (Slater & Rouner, 2002). In this sense, narratives are a form of evidence that can aid outcomes associated with an illness (Kreuter et al., 2007).

In particular, if young women are able to attend to and process narrative evidence, they should be able to write cognitive thoughts statements about the message and comprehend the information presented to them. HSM argues that systematic processing is when individuals scrutinize information (Todorov et al., 2002). Thus, a model accounting

for the processing and outcomes of narrative evidence would argue that systematic processing of the evidence is needed prior to the writing cognitive statements which evaluate the message and comprehension of the narrative evidence. When considering the context of osteoporosis, narrative evidence can aid young women towards understanding the different outcome expectations that are associated with bone health prevention and osteoporosis, and raise beliefs about the behaviors being able to prevent the disease. Thus, is it is important that narrative evidence of women diagnosed with osteoporosis (e.g., firsthand and secondhand narrative evidence) can exemplify these outcomes through their stories about personal behaviors, interactions with others and feeling of personal achievement (e.g., taking control of their health) in light of their diagnosis and convey these experiences in a way that would encourage careful attention to the information. For young women, these outcomes being expressed can represent the physical outcome of improved bone mass density, a physical marker that calcium intake and weight-bearing exercises can improve. Given that bone density tests are the key indicator for diagnosing osteoporosis (Surgeon General, 2004), it is important that young women be able to process this information and comprehend it.

If women comprehend the narrative evidence, it is arguable that they will be more likely to find the evidence to be of higher quality as previous research supports that comprehension is related to perceptions of evidence quality (Parrott et al., 2005). Thus, as argued previously, if women find evidence to be comprehendible, they may be more likely to perceive the overall message is effective because they could understand the content and experiences being conveyed. If one understands this content, and perceives it

to be of quality, then one may be more willing to plan to engage in the behavior advocated. The following is thus posited:

H2: Increases in comprehension, perceived evidence quality and perceived message effectiveness are positively associated with increases in behavioral intentions for women reading osteoporosis narrative evidence.

RQ8: How do heuristic and systematic processing influence cognitive thought statements, comprehension, perceived evidence quality that predict perceived message effectiveness after reading firsthand, secondhand, and official osteoporosis narrative evidence?

Emotions and Processing of Narrative Evidence

In considering the concurrence of systematic and heuristic processing within the HSM (Chaiken et al., 1989), another heuristic to consider is emotion. A benefit stated about narrative evidence has been its incorporation of emotions and the ability for imagery, vividness and identification to be elicited (Kreuter et al., 2007). Previous research has been expanding on the role emotions find that some emotions can enhance message processing, while others can inhibit processing (Dillard & Meijnders, 2002; Nabi, 2002). For instance, the emotional experience of fear can enhance message acceptance, but other emotions such as happiness can inhibit message acceptance (Dillard et al., 1996). Thus, it has been argued that it is possible for emotions to produce different effects on persuasive outcomes because the emotions enhancing processing can be inhibited by the presence of other emotions (Nabi, 1999; Dillard & Peck, 2001; Dillard et al., 1996). When considering the role emotions may have then to influence the processing

of narrative evidence, and how this may impact later outcomes, it is important to consider this multiple role.

When specifically considering the placement of emotions within the HSM framework, it can be seen that emotions can serve as a heuristic cue that may influence systematic processing (Chaiken et al., 1989; Todorov et al., 2002), which can later influence the comprehension and other subsequent outcomes of processing toward behavioral intentions. Emotions can be considered a relatively available and accessible heuristic that individuals experience especially in the context of narrative evidence where identification and imagery is connected when emotional experiences are conveyed. In other words, it is possible that heuristic and systematic processing can happen concurrently in processing of narrative evidence, but this is biased processing again due to the arousal of discrete emotions which serve as a heuristic for individuals. As many discrete emotions may be aroused in response to narrative evidence, it would be necessary to account for more than one emotion within the model. For instance, the emotions of hope and fear are often associated as being connected (Roseman, Abelson, & Ewing, 1986). As previous research also allows for emotions to have a direct effect on cognitive outcomes such as cognitive thought statements and message acceptance (Dillard et al., 1996; Dillard & Peck, 2001), again it would be necessary to account for this role of emotions as well as emotions direct influence on the processing of narrative evidence. It would be equally important to take into consideration previous arguments about the various emotions can be aroused after reading positive and negative emotional accounts. If differences do arise after reading a positive or negatively worded experience, it would be essential to realize if such differences manifest themselves in a larger model.

Therefore, it is scholars must learn which emotions can influence systematic and heuristic processing concerning osteoporosis narrative evidence, and how this processing in turn can influence the levels of perceived message effectiveness and behavioral intentions.

RQ9: Which emotions influence the heuristic and systematic processing of osteoporosis narrative evidence?

RQ10: How do emotions experienced in response to narrative evidence and emotions expressed in narrative evidence influence the processing of osteoporosis narrative evidence, perceived message effectiveness and behavioral intentions?

In sum, the previous research questions and hypotheses offer a way to model narrative evidence processing and account for the uniqueness of emotions in contributing to this processing. The proposed paths and associations can lead to a better picture of understanding how behavioral intentions are reached, and then the subsequent behaviors that can occur after reading osteoporosis narrative evidence.

Osteoporosis Behavior Outcomes

A final purpose of this research study is to engage in a study of the influence of osteoporosis narrative evidence towards bone healthy behaviors such as calcium and vitamin D consumption. Both of these behaviors are prevention measures for osteoporosis, and are important for young women to incorporate into their lives. As many health communication endeavors strive to meet behavioral outcomes, it is necessary to shed light on how narrative evidence can promote these behaviors. In particular, it is necessary to understand the model of various mediators towards behavior as a whole to understand what can influence calcium and vitamin D consumption.

It is possible that the behaviors of calcium and vitamin D that are included in osteoporosis narrative evidence may require cognitive capacity to process narratives systematically, rather than heuristically. This may be true especially if young women already engage in these behaviors and therefore will scrutinize the message and may be motivated to learn more about the benefits of their behaviors to reinforce their own personal outcome expectations. Thus, osteoporosis messages may reinforce their behaviors and validate their choices (Volkman, in progress). However, young women have been exposed to health messages advocating healthy eating behaviors (Volkman, in progress), and thus may already feel able and motivated to perform osteoporosis behaviors. As a result, young women may heuristically process information because the information is not novel for them and therefore rely upon the heuristics of "n of one" or emotions. In turn, the type of processing, or both types, may influence the comprehension perceived evidence quality, perceived message effectiveness and behavioral intentions toward bone healthy behaviors. Therefore, this final research question is proposed:

> RQ11: Do heuristic processing, systematic processing, discrete emotions, comprehension, dominant cognitive statements, perceived evidence quality, perceived message effectiveness or behavioral intentions explain young women's calcium and vitamin D consumption?

To answer these research questions and hypotheses, the following method is used to create the narrative evidence types and emotion conditions proposed. The method is described in three phases, beginning with formative research and ending with an experimental study.

CHAPTER FOUR

METHOD

The purpose of this study was to expand understanding about narrative evidence as a health communication strategy for use in public health and personal messages. This includes understanding potential effectiveness and processing across different types of narrative evidence (e.g., firsthand, secondhand and official), how emotions (e.g., positive, negative, "no emotion") expressed within these narrative evidence may influence processing, and how the experience of discrete emotions aroused in response to narrative evidence influences processing of narrative evidence. In addition, this research seeks to illuminate how processing affects perceptions of dominant cognitive thought statements, comprehension, perceived evidence quality, perceived message effectiveness and behavioral intentions leading to behaviors. A pre-test/post-test with follow-up interview, between subjects 4x3 factorial design was used to test the hypotheses and research questions (4 Narrative Evidence Type: Firsthand, Secondhand, Official, Attention-Control x 3 Emotion: Positive Emotions Expressed, Negative Emotions Expressed, "No Emotion" Stated Expressed). The research was conducted in three phases, including formative research to identify the range of emotions expressed when discussing osteoporosis experiences and a pilot study to conduct a trial of messages and instruments leading to the pretest/post-test with follow-up study. The chapter discusses the methods and results of both the formative research and pilot study, as the results of these two phases guide the method employed for the final study designed to answer the research questions and hypotheses posed in the previous chapter.

Phase 1: Formative Research

The purpose of Phase 1 was to answer the first research question which considers, "what emotions do young women express when discussing osteoporosis as a firsthand or secondhand narrative?" Firsthand narratives were defined as personal experiences with the disease, whereas secondhand narratives were defined as familial experiences with the disease and re-telling of those experiences. These interviews were used to develop narrative evidence for the experimental treatment message study to test the persuasiveness of narrative evidence types and the role of emotions within narrative evidence types.

Procedures and Recruitment

A total of 17 interviews were conducted among women ages 18-25 years (M = 20.65; SD = 1.69) between March and June 2008 to understand firsthand and secondhand stories being told about osteoporosis, and emotions experienced in connection to osteoporosis. As young women were the focus of this research, it was important to utilize a college-age sample for this phase towards developing narrative evidence content. Participants were either diagnosed with osteoporosis, had a relative (e.g., mother, father, sister, brother, grandmother, grandfather) diagnosed with osteoporosis, or been told by a health professional to be at risk for the disease. Participants reported themselves to be White/Caucasian (n = 14; 82.4%), African-American (n = 1; 5.9%), Indian (n = 1; 5.9%), and Asian (n = 1; 5.9%). An additional five interviews were conducted with women ages 30-50 about their experiences, but these interviews are not included in the analyses due to not being in the age range of interest.

Participants were recruited through an announcement on the Penn State Faculty/Staff Listserv (to reach any woman that may be working with University), undergraduate communication courses being taught during first summer session and flyers posted at the Hetzel Union Building and Willard Building on campus, and the hallways of the Student Athletes office in Morgan Center, and the Centre Medical Surgical Associates in State College. The Centre Medical Surgical Associates was selected because it is the office of a local rheumatologist, a doctor that frequently treats those with osteoporosis. Interested volunteers contacted the researcher to schedule an interview in 218 Sparks Building. Participants recruited via classrooms were compensated for their time with extra credit per instructor agreement (1% or 2%), and those recruited via flyer were paid $10 for their time. All participants were offered a small meal and reimbursement for parking fees (if needed). All interviews were audio-recorded, and lasted approximately 30 minutes. Informed consent was obtained prior to conducting the interviews and the procedures were approved by the Institutional Review Board (IRB).

Participants were asked 10 questions to learn about their diagnosis, family history of the disease, stories being told to them or that they have repeated about osteoporosis, as well as stories that have been (or not been) helpful or memorable to them, and emotions they are experiencing in relation to having osteoporosis, a family member having osteoporosis, or being told to be at risk for the disease. Participants were also asked to share their recommendations to women ages 18-25 to prevent osteoporosis. Questions were based upon prior research for osteoporosis communication, and to fulfill engagement and identification components. Interviews were transcribed by one

researcher, resulting in 90 pages of single-spaced data ranging in 1321 to 2745 words (*M* = 1944) per interview.

Analysis of Interviews

Interviews were read to create the content of the firsthand and secondhand narrative evidence for the pilot study and experimental study. Following Strauss and Corbin (1990) for thematic analysis and constant comparison, interviews were initially read to gather themes in story structure and to determine the type of family member to be diagnosed with osteoporosis in the secondhand narrative evidence. Attention was paid to adhere to the fidelity, temporality, consistency and point-of-view. For example, statements such as "generic supplements," "you don't believe this is in reference to me," "I walk around campus," "My mom sat me and my sister down at dinner," were pulled as examples to represent these narrative evidence components. In addition, it was important to pull statements that represented the content of susceptibility of osteoporosis, how severe the disease is perceived to be, and any barriers thought to be associated with engaging in bone healthy behaviors. These constructs were selected as ways to communicate about osteoporosis to young women, and using interview statements allowed the researcher to highlight how to communicate the risks of the disease. After this initial reading through the transcripts, they were read again to pull specific statements relating to context references, wording and phrasing in order to accurately capture the tone in the firsthand and secondhand narrative evidence. Transcripts were read through a third time to garner specific emotive statements mentioned by participants to express positive and negative emotions in connection to osteoporosis. After this third reading, firsthand and secondhand narrative evidence were constructed.

Firsthand narrative evidence represented the personal experience of a young woman diagnosed with osteoporosis, and secondhand narrative evidence represented a young woman telling her mother's experience with osteoporosis. Interviews revealed that a mother's diagnosis with osteoporosis was the most common family member to have the disease. The two constructed narratives follow Schank and Berman's (2002) typology of different narratives. Interviews also expressed a range of emotions, ranging from positive to negative. Thus, it was necessary to focus on not just one, but many emotional themes in the construction of the narrative evidence. Per Lazarus' (2001) use of core relational themes to arouse discrete emotions, the positive core relational themes were associated with the emotions of happiness, relief and hope, and the negative core relational themes were associated with emotions of anger, fear and sadness. All of these emotions were stated by the interviewees. These emotions were selected to convey the wide range of positive and negative emotions that can be experienced and appraised in regards to a disease.

Phase 2: Pilot Study of Messages

The purpose of the pilot study was twofold: (a) a manipulation check regarding the narrative type evidence manipulation, emotive statement manipulation, level of engagement, interest, and identification with the narrative evidence, and (b) assess the range of emotional responses to the narrative evidence and the measurement of the comprehension items. Messages were randomly assigned so that participants in this phase (N = 104) read one of 12 messages in the pilot study, with randomization assigned in blocks of 12.

Narrative Evidence Type Messages

In constructing the narrative evidence to be used in the pilot and experimental study, message consistency decisions were followed. Phase 1 of the study was conducted to create the firsthand and secondhand narrative evidence to be tested. Additional research was then performed to construct the official narrative evidence and attention-control narrative evidence, as well as the positive, negative and "no emotion" expressed statements within the narrative evidence. These procedures are described below.

Message Consistencies

To ensure the validity of the all narrative evidence messages, the researcher consulted with the program director of the Pennsylvania Osteoporosis Foundation and members of the doctoral committee on the coherence, fidelity, temporality and point of view identified by Och and Capps (1996) as necessary for narrative structure, and to ensure the validity of the core relational themes. Following Parrott et al. (2005), the following message decisions were also included when testing the messages: title, source credibility, literacy and readability, message length, and message typeset. The firsthand and secondhand narrative evidence included "A Young Woman Living with Osteoporosis," in the title, the official narrative evidence included "About Osteoporosis" in the title, and the attention-control narrative evidence included "About Book Preservation" in the title. All messages included a note about the source of information. The firsthand and secondhand narrative evidence cited the interviews as source for compiling the stories, the official narrative evidence cited the MayoClinic.com, and the attention-control narrative evidence cited the Library of Congress website. Additionally, Flesh-Kincaid for all the narratives ranged from 6.7 to 6.9 to represent a sixth to seventh

grade reading level, and narratives were 1178 to 1203 words in length (M = 1186). Furthermore, the style of the messages and control group were consistent such as Times New Roman font, 14 point font for titles, and 12 point font for the narratives and citation (Parrott et al., 2005).

Development of Narrative Evidence Types

Positive, negative, "no emotion." To represent the positive and negative emotion manipulations, the narrative evidence included emotions as a feature of narrative evidence (Oatley, 2002). The positive emotion narrative evidence represent the emotions of happiness, relief and hope, while the negative emotion narratives state emotions of fear, anger and sadness (Lazarus, 1991; 2001). The positive narrative evidence express a story-teller experiencing happiness, as she is making progress to a desired goal of improving her health. The story-teller is open and sharing of her experience, and trusts the medical recommendations to improve her bone health will help. Statements include relief in knowing activities can be done to prevent osteoporosis, and improve bone health, as well as hope for a happy future and healthy life.

The negative narrative evidence expressed a story-teller experiencing sadness, fear and anger in connection to osteoporosis. The story-teller expresses how severe and susceptible they feel to evoke a sense of threat, as well as anger towards having the disease and a sense of sadness for being diagnosed with a disease. Narrative evidence included the benefits and risks associated with osteoporosis prevention, as previous studies have found that presentation of the advantages and disadvantages of prevention behaviors influences persuasive responses (Shen & Dillard, 2007). The "no emotion"

condition has an absence of these emotion statements (e.g., positive or negative), but the same narrative evidence structure.

Firsthand narrative evidence. As discussed earlier, Phase 1 of the research study sought to gain experiences with osteoporosis to develop the narrative evidence for the pilot. Interviews were read for common themes and story structures to develop the firsthand and secondhand narrative evidence types. Firsthand narrative evidence details a young women's experience of breaking her arm and during a bone density exam she learns she is diagnosed with osteoporosis. In the positive condition, the young woman states being relieved about knowing her diagnosis and happy she is working towards a healthy future, and hopeful that she will live a long and healthy life. In the negative condition, the young woman states she is living in fear and afraid all the time, she is angry for missing out on life, and sad that she feels the disease is ruining her life. See Table 4.1 for firsthand narrative evidence.

Table 4.1 *Firsthand Narrative Evidence for Phase 2*

Positive Firsthand Narrative Evidence
"A Young Woman Living with Osteoporosis"
It's weird to talk about osteoporosis. I'm only 21 years old, and osteoporosis is only supposed to happen to older people, right? But, it's true, I have it, and it's not so bad, it's just a part of who I am. I guess I knew something was wrong after visiting a health fair at home. I got one of those heel scans when they test your bone density, and it came back pretty low, so I was a little concerned. When I got to school the following semester, I broke my arm, so I went to the University health office to get checked-out and told them about the heel scan as part of my health history. They also asked about my family's bones, and I told them I think my grandmom was

Table 4.1 continued.

diagnosed with osteoporosis. I mean, I try to get calcium, but it's hard since I'm lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. I mean I do walk around campus. It's huge, right?! I'm happy, I'm smiling, I'm living my life. I didn't even really know what osteoporosis is. I just remember my grandmom having achy joints and breaking her hip. Now I know it was because her bones are soft and brittle, and they can easily break. It was hard for her to do some everyday things, but, it wasn't super bad. I wasn't really certain she even had it.

When I was in the office, the health practitioner started explaining the disease. Really, it's just when your bones become fragile, so you're more likely to break them because of low bone mass. I still thought nothing was wrong with me, I guess I was in denial. She said that this is the time now to help build the best bones possible during your mid-twenties, and she mentioned that family history can put you at risk. Right then, I was like, what? Are you kidding me? I have a million other things to worry about, and now this? She wanted to run another bone density test, just to be safe. I really thought I was fine despite my grandmom, I mean, I'm young, I'm relatively active and stuff. Nothing to worry about, right?

Well, when the test results came back, it showed that my bones weren't quite as strong as they should be for someone my age. I did have osteoporosis. In fact, the health practitioner said she had stronger bones than me. She was like in her 40s! Really, me? Osteoporosis? Come on! Until it happens, you don't realize that this could actually happen to you. I really felt osteoporosis only happens to older women. Even if I had a family history, I thought I would have a long time before it could affect me. After the test results, I immediately thought okay, what can I do to fix this?

So right after I was told I had osteoporosis, she launched into this laundry list of things to

Table 4.1 continued.

do. She asked about my exercise habits. I have to walk to class, so I told her I did that, but otherwise, I'm not a big gym person. She was like, good, that's important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that's fine, maybe try to take it up again, but, then she warned not to do too much – nothing beyond exercise for a healthy lifestyle. She also said that I should really try to get calcium and vitamin D into my diet as a part of a healthy lifestyle everyday. Since I'm lactose intolerant, she skipped over the whole eat dairy from milk and yogurt and cheese and stuff. At first, I was like great, I have to buy those expensive supplements. But, she mentioned the generic ones would be okay just as long as I get enough calcium. She went on to say that Vitamin D is important because it helps the body absorb calcium. I didn't know, but you can really get Vitamin D from just being outside in the sun from walking to and from class. Which I was relieved, because I walk from Thomas to Willard at least twice a day for classes. And, then she told me that green, leafy vegetables have calcium, too, so, I'm like sounds like everything she's saying is just a part of a healthy lifestyle. Then she mentioned to limit the amount of soda I drink, since it can help contribute to weaker bones. She said none would be best. I drink a lot of soda, so that kinda sucked. But otherwise I thought all her recommendations weren't really too hard to do. It was like, okay, cool, I can do this!

You know, it's been a while since then, and I really don't feel that osteoporosis is such a serious health problem that would totally undermine my health. Just like a lot of things, knowing that a few things can help me in the long run is really okay. I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. I try to be a little more aware of my surroundings so I don't break another bone and just prevent falls overall. I know that doing some high intensity sports are really not in the cards for me, but

Table 4.1 continued.

that's okay. Right now, it's fine doing things that are going to benefit me in the long run.

I'm really grateful that my friends and family have been so supportive. My parents always encouraged a healthy lifestyle. (I guess those balanced meals at dinner are a good thing!) My friends aren't milk drinkers and never even thought of osteoporosis before my diagnosis, but, they get what I'm doing to help make my bones stronger and are cool with everything. Now they know that osteoporosis just doesn't happen to older people, and that what you do now really can affect your bones. And I mean, you don't realize how you use your bones for doing everything! I guess I get on their nerves sometimes because I'm always, hey, eat something with calcium or get a supplement to have calcium and Vitamin D. I'm also a fan of getting them to exercise, even just a little, but what can I say, I want them to be healthy.

When people find out that I have osteoporosis and I'm so young, I tell them that my life has been pretty good even since being diagnosed. Nothing has really changed, except now I do things to help make my bones stronger, and in a way, it feels good to be in control of my health. I trust that what I'm doing will help me in the long run and I don't mind talking to others about it. I'm glad that got diagnosed and I'm doing things to improve by bones. I know that this gives me a better chance of having healthy bones when I get older, and I'm cool with that.

Note: This message was created from interviews done March 2008-June 2008.

Negative Firsthand Narrative Evidence:

"A Young Woman Living with Osteoporosis"

It's weird to talk about osteoporosis. I mean, I'm only 21 years old, and osteoporosis is only supposed to happen to older people, right? But, it's true, I have it. And, it's very scary.

I guess I knew something was wrong after I did one of those health fairs at home. I got

Table 4.1 continued.

one of those heel scans when they test your bone density. It came back pretty low, so I was a little concerned. When I got back to school the following semester, I broke my arm. That seemed to me to be part of having low bone density on the heel scan. I went to the University health office to get checked-out and told them about the heel scan when they asked about my health history. They asked about my family and their bones. I told them I think my grandmom was diagnosed with osteoporosis. I try to get calcium, but it's hard since I'm lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. I mean I do walk around campus. It's huge, right?! And I didn't even know what osteoporosis really was. I just know my grandmom's broken her hip twice. She can't even drive to visit people. I would hate to live like that. Now I know it was because she had low bone density meaning her bones are soft and brittle and can easily break.

When you're in the office and the health practitioner starts talking to you about osteoporosis, which in my mind was an older person's disease, it's really scary. I actually started to get angry and frustrated about all of it. I don't want osteoporosis and I can't control my family history. She started explaining the disease, and said it's when your bones become fragile, so you're more likely to break your bones because of low bone mass. She went on and said that this is the time now to help build the best bones possible during your mid-twenties. And, she mentioned that family history is an issue and can put you at risk. I was like, what? Are you kidding me? So, long story short, the health practitioner decided to run another bone density test, just to be safe. I remember being terrified and thinking of my grandmom. But, I also thought I was fine despite my grandmom. I mean, I'm young, I'm relatively active and stuff.

Well, when the test results came back, it showed that my bones weren't as strong as they should be for someone as young as I am. I did have osteoporosis. In fact, the health practitioner

Table 4.1 continued.

said she had stronger bones than me and she was like in her 40s! Those were the scariest words ever! I was so upset and angry and just all these things when she said that. I mean I never realized that this disease could actually be in reference to me. I mean I really felt osteoporosis only happens to older women. Even if I had a family history, I thought I would have a long time before it could affect me. I was like, oh wow, how do you even fix this? So like right after I was told I had osteoporosis, the health practitioner launched into this laundry list of things to do. She asked about my exercise habits. I mean, I have to walk to class, so I told her I did that, but otherwise, I'm not a big gym person. She was like, good, walking to class is important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that's fine, maybe try to take it up again, but, then she warned not to do too much – nothing beyond exercise for a healthy lifestyle. She also said that I should really try to get calcium and vitamin D as a part of a healthy lifestyle everyday. Since I'm lactose intolerant, she skipped over the whole eat dairy from milk and yogurt and cheese and stuff. At first, I was like oh great, I have to buy those expensive supplements, but she mentioned the generic ones would be okay just as long as I get enough calcium. She went on to say that Vitamin D is important because it helps the body absorb all the calcium. I mean I didn't know you can really get Vitamin D from just being outside in the sun from walking to and from class. And, then she told me that green, leafy vegetables have calcium, too. I was telling myself okay, this won't hard, don't get upset, it'll be okay. Oh, then she mentioned to limit drinking soda, since it can contribute to weaker bones. She said none would be best. I like soda, so I was like great. When she was done, I remember thinking am I going to fall apart? and the tears started to fall. It's just so overwhelming and sad that now I have to pay attention to my bones on top of everything else in my life.

Table 4.1 continued.

It's been a while since then, and I can honestly say I feel like osteoporosis has taken over my life and changed who I am. I mean, I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. And I just know that probably doing some high intensity sports are really not in the cards for me. I'm angry about that because I've always wanted to skydive and now I can't and I'm also now super alert of my surroundings to help avoid a fall. It's just terrifying to be so young and fear that not following doctor's orders could mean greater problems like my grandmom had.

My friends and family have been really supportive, but I know they worry. My parents always encouraged a healthy lifestyle, but they're scared I could end up like my grandmother. My friends aren't huge like milk drinkers and never even thought of osteoporosis before my diagnosis. But, they get what I'm doing to help make my bones stronger. I mean now they know that osteoporosis just doesn't happen to older people, and that what you do now really can affect your bones. I'm that person now that always reminds my friends to eat healthy, get calcium and to exercise. I don't mean to nag, but I just don't want them to be like me and have bone problems. You don't realize how much you need your bones to be strong until they aren't anymore.

When people find out that I have osteoporosis and I'm so young, I really tell them that it feels like osteoporosis is control of my life. I'm always afraid of breaking a bone and falling and stuff. I know that doing what the health practitioner said gives me a better chance of having healthy bones when I get older. But, I'm still scared and sad about what has happened. It's sometimes sad to always be thinking about that, but that's my life now.

Note: This message was created from interviews done March 2008-June 2008.

Table 4.1 continued.

"No Emotion" Firsthand Narrative Evidence
"A Young Woman Living with Osteoporosis" It's weird to talk about osteoporosis. I mean, I'm only 21 years old, and osteoporosis is only supposed to happen to older people, right? But, it's true, I have osteoporosis. I guess I knew something was wrong after I did one of those health fairs at home. I got one of those heel scans when they test your bone density, and it came back pretty low. When I got back to school the following semester, I broke my arm. That seemed to me to be part of having low bone density on the heel scan and I thought something was connected. I went to the University health office to get checked-out and told them about the heel scan when they asked about my health history. They also asked about my family and their bones, and I told them I think my grandmom was diagnosed with osteoporosis. I try to get calcium, but it's hard since I'm lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. I mean I do walk around campus a lot. The campus is huge, right?! And I didn't even know what osteoporosis really was. I just remember my grandmom having achy joints and breaking her hip and stuff. Now I know it was because she had low bone density, which means her bones are soft and brittle and they can easily break. It was hard for her to do everyday things because of her bones. But, it wasn't super bad. So, I mean I wasn't really certain she had it, but I knew she had some bone problems and was really fragile. So, when I'm in the University health office, the health practitioner starts explaining the disease. Really, it's just when your bones become fragile, so you're more likely to break your bones because of low bone mass. I still thought nothing was wrong with me. I guess I was in denial. She went on and said that this is the time now to help build the best bones possible during your mid-twenties. And, she mentioned that family history is an issue and can put you at risk.

Table 4.1 continued.

Right then, I was like, what? Are you kidding me? I have a million other things to worry about, and now this? She wanted to run another bone density test, just to be safe. I really thought I was fine despite my grandmom's history. I mean, I'm young, I'm relatively active and stuff. Nothing to worry about, right?

Well, when the test results came back, it showed that my bones weren't quite as strong as they should be for someone as young as I am, and I did have osteoporosis. In fact, the health practitioner said she had stronger bones than me and she was like in her 40s! Really, me? Osteoporosis? Come on! Until it happens, you don't realize that this disease could actually happen to you. I really felt osteoporosis only happens to like older women. Even if I had a family history, I thought I would have a long time before I it could affect me. After the test results, I immediately thought okay, fine what can I do to fix this?

So like right after I was told I had osteoporosis, the health practitioner launched into this laundry list of things to do. She asked about my exercise habits. I mean, I have to walk to class, so I told her I did that, but otherwise, I'm not a big gym person. She was like, good, walking to class is important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that's fine, maybe try to take it up again, but, then she warned not to do too much – nothing beyond exercise for a healthy lifestyle. She also said that I should really try to get calcium and vitamin D into my diet as part of a healthy lifestyle--everyday. Since I'm lactose intolerant, she skipped over the whole eat dairy from milk and yogurt and cheese and stuff. At first, I was like oh great, I have to buy those expensive supplements. But, she mentioned all the generic ones would be okay just as long as I get like enough calcium. She went on to say that Vitamin D is important because it helps the body absorb all the calcium. I mean, I didn't know, but you can really get Vitamin D from just being

Table 4.1 continued.

outside in the sun from walking to and from class. And, then she told me that green, leafy vegetables have calcium, too. So, I'm like "sounds like everything she's saying is just a part of a healthy lifestyle." Then she mentioned to limit the amount of soda I drink, since it can help contribute to weaker bones. I drink a lot of soda, so that kinda sucked. I wanted to know how much I could drink and she said none would be best.

You know, it's been a while since then. Just like a lot of things, osteoporosis is just something I have to be aware of, and knowing that a few things can help me in the long run is really okay. I mean, I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. I also try to make sure to be a little more aware of my surroundings so I don't break another bone and just prevent falls overall. I know that probably doing some high intensity sports are really not in the cards for me, but that's okay. Right, now it's fine doing things that are going to benefit me in the long run.

I'm really grateful that my friends and family have been so supportive. My parents always encouraged a healthy lifestyle. (I guess those balanced meals at dinner are a good thing!) My friends aren't milk drinkers and never even thought of osteoporosis before my diagnosis, but, they get what I'm doing to help make my bones stronger and are really cool with everything. Now they know that osteoporosis just doesn't happen to older people, and that what you do now really can affect your bones. And I mean, you just don't realize how you use your bones for doing everything! I guess I get on their nerves sometimes because I'm always like, hey, eat something with calcium or get a supplement to have calcium and Vitamin D. I'm also a fan to get them to exercise, even just a little. And follow their doctor's orders to have strong bones! What can I say, I want them to be healthy.

Table 4.1 continued.

When people find out that I have osteoporosis and I'm so young, I really tell them nothing has really changed, except now I do things to help make my bones stronger.
Note: This message was created from interviews done March 2008-June 2008.

Secondhand narrative evidence. Based on Phase 1 of the research study, the secondhand narrative evidence highlights a young women telling of her mother's diagnosis with osteoporosis. The secondhand narrative includes the daughter discussing the disease with her mother and actions her mother is taking after being diagnosed with osteoporosis. In the positive condition, the mother expresses happiness and hopefulness for a healthy future for herself and her family, and relief that she learned the diagnosis. In the negative condition, the mother expresses sadness, fear and anger in relation to the disease and evokes a sense of feeling lost and overwhelmed by the negativity of having osteoporosis. See Table 4.2 for the secondhand narrative evidence.

Table 4.2 *Secondhand Narrative Evidence for Phase 2*

Positive Secondhand Narrative Evidence
"A Young Woman Living with Osteoporosis"
When thinking about osteoporosis, I don't think of it as something bad. I see my mom diagnosed with osteoporosis and she's okay. Sometimes I still can't believe that she was diagnosed, I mean, she's only 47 years old and I'm 21. Osteoporosis is only supposed to happen to old people, right?

Table 4.2 continued.

It's actually kinda normal how she found out. It wasn't like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis. My mom was a little concerned, but not really worried because she felt she was healthier than my aunt. But, she went to get checked-out and while she was there, the doctor asked about a family health history. My mom told them about my grandmom who was diagnosed with osteoporosis and now my aunt. I know my mom tries to get calcium and she always serves us milk at home with breakfast and dinner. She is a runner, so I know she does some exercise, but, I really don't even know what osteoporosis is. I just know my grandmom broke her hip and it was hard for her to do everyday things because of her bones. It was not super bad at all. Now I know it was because she had low bone density and that means her bones are soft and brittle and they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy. My aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. We were like what? I said, "I thought you had to be older like grandmom or at least in your sixties to be diagnosed." Guess not! "Nope, afraid not. It's really okay. I mean, I'm glad I know now, so I can help you and your sister. Now, your twenties, is actually a good time to help build the best bones possible. So this means you need to focus on your bones. Since you now have a family history, we really need to make sure to do this. I mean, I don't want you to get low bone mass so your bones are fragile, because then you're more likely to break them." I didn't realize that my family history could affect me now, not later.

I remember she sounded really calm at that moment, but the truth was, my mom was pretty thinking a lot about how to handle with bones being weak and all. A few days later we

Table 4.2 continued.

were making dinner and I asked her how she was doing. “Until it happens, you don’t realize what this disease means for people my age and younger--people that aren’t like grandmom’s age,” she said. “It doesn’t just happen to women in their sixties. But it’s a relief knowing that the doctor recommended doing a few things that can really help make your bones stronger. I know that I can do them. He wants me to try them for six months, and maybe later I will go on medication like your aunt.” She smiled and said, “And I’m also going to work with you girls. Aren’t you glad I’ve always served milk for you and your sister at breakfast and dinner?” I laughed at that. “I’m also going to get you some supplements, just to help all of us get enough calcium and vitamin D, and try to get you girls to eat some veggies that have calcium. You like broccoli, right?” she asked. So, now we will have some type of green, leafy vegetable at every dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it’s one of the things that can contribute to weaker bones, so my mom has seriously stopped stocking it in the refrigerator. I think the doctor told my mom no soda is probably best.

Since the diagnosis, my mom hasn’t really changed and actually is doing okay. Since the doctor recommended some exercises like weight-bearing ones, and she’s a runner, she’s been keeping up with it. She doesn’t run when it’s really icy out, but otherwise, she’s doing well. I’m not a big runner, so I try to do more walking around campus to get my weight-bearing exercise. My sister used to dance in grade school, and decided it take it up. I never knew that being outdoors is a way to get Vitamin D through the sun and it helps the body absorb calcium. My mom is always relieved when I tell how many times I walked from Thomas to Willard to the HUB and I’m “getting my Vitamin D.” I guess looking back, the recommendations are pretty simple and part of just a normal healthy lifestyle, I mean my mom said she can do this. She knows following the doctor’s orders will really help in the long run.

Table 4.2 continued.

When talking to my mom about osteoporosis, she always says she's relieved to know and relieved she's doing things to help her bones. For her, osteoporosis really hasn't gotten to be a serious health problem that totally undermines her health or defines who she is. "Just like a lot of things, osteoporosis is just something I have to be aware of. Knowing that a few things can help me in the long run is really okay," my mom said. "I bought some supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium a little bit more. And I try to be a bit more careful not to fall and be aware of our surroundings."

Our entire family has been really supportive. Our dad has been a real trooper, and things are going well. I mean all of us now know that osteoporosis just doesn't happen to older people like my grandmom's age. And osteoporosis is something that both my sister and I need to think about, even though we're in our twenties because now is the time to help build strong bones so we don't get diagnosed when we're our mom's age. I'm planning on getting one of those heel scans at the local health fair next time I'm home, so I know what I'm dealing with.

So, all in all, my mom told me that life has been pretty happy and good since being diagnosed. From what I can tell, nothing has really changed, except now she does things to help make her bones stronger and she's conscious of her bones. She said, "I'm glad I'm doing things to improve by bones. I trust what I'm doing will help me and I don't mind talking about it. I know that this gives me a better chance of having healthy bones when I get older, and being able to keep doing everyday things when I'm grandmom's age."

Note: This message was created from interviews done March 2008-June 2008.

Table 4.2 continued.

Negative Secondhand Narrative Evidence

"A Young Woman Living with Osteoporosis"

When thinking about osteoporosis, it's definitely something that sounds serious to me because I see the fear of breaking a bone that my mom has since being diagnosed. I still can't believe that she has it, she's only 47 years old and I'm 21. Osteoporosis is only supposed to happen to old people, right? I mean I always that that was the case.

It's actually kinda normal how she found out, and it wasn't like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis, and that my mom should probably get checked-out. My mom was a little concerned, but not really worried because she felt she was healthier than my aunt. But, she went to the doctor and while she was there, the doctor asked about a family health history, and my mom told them about my grandmom who was diagnosed and now my aunt. I know my mom tries to get calcium and eats dairy because of my grandmom and she always serves us milk at home with breakfast and dinner. And she's a runner, so I know she does some exercise, but, I don't even really know what osteoporosis really is. I just remember grandmom has achy joints and she's broken her hip twice and that it is really hard for her to do everyday things because of her bones. I mean it was really scary to see because she can't even drive to visit people. I know my mom would hate to live like that and thinks it's sad that my grandmom is missing out on things. Now I know it was because she had low bone density, and that means her bones are soft and brittle, so they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy because my aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. I

Table 4.2 continued.

was like “What?! I thought you had to be older like grandmom or at least in your sixties to be diagnosed?” “Nope. Afraid not. In fact, it’s your early twenties that are a good time to help build the best bones possible. So, you and your sister need to start thinking about your bones.” We were stunned and scared. “I mean, family history is an issue and can put you at risk, so now that grandmom, auntie and me have it, you two have to consider it. I’m really scared for you guys. You need to do whatever it takes to build your bones. It’s not too late for you. I don’t want you to be like me and have osteoporosis. I mean, I don’t want you to fear breaking a bone because you have low bone mass and your bones are fragile”

A few days later, I asked my mom how she was doing and I could see the anger. “There are so many other things I need to worry about, not just this disease. I do not want osteoporosis,” she said. “Until it happens, you don’t realize. It doesn’t just happen to women in their sixties. The doctor wants me to try some things at home first for six months, and maybe later I will go on medication like your aunt.” She half-heartedly smiled and said, “And I’m also going to work on you girls. I guess I’ll keep serving both of you and your sister drink milk at breakfast and dinner.” It was kinda sad the way she said it to me. “I’m also going to get you some supplements, just to help all of us get enough calcium and Vitamin D, and try get you girls to eat some veggies that have calcium. You still like broccoli, right?” she asked. So, we will have some type of green, leafy vegetable at dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it’s one of the things that can contribute to weaker bones, so my mom has seriously stopped stocking it in the refrigerator. I think the doctor said no soda is probably best.

Since the diagnosis, my mom has changed and is actually I think looks more scared all the time. The other day she said, “It’s sad to know that my bones are getting to be just like your

Table 4.2 continued.

grandmom's and she's twenty years older than me. I know I can do this, but it's like I'm always wondering if I'm going to fall down and break a bone? I feel like osteoporosis is taking over my life and changing me, and I don't want to change." Since the doctor recommended weight-bearing exercises, she has started walking a few miles everyday. She's been too scared to keep up with the running, because she was afraid she may fall. Our entire family has been really supportive, but I know they worry. My dad's afraid that my mom could have a slip and then end up like my grandmother. But, we get what she is doing to help make her bones stronger, and try to do our part. I'm keeping up with walking to all my classes, like from Thomas to Willard to the HUB and stuff to get exercise and vitamin D. Since I live in East Halls, I think that will work and my sister is planning to take up dance again next semester. My mom told me that the Vitamin D you get from the sun can help the body absorb calcium, so it's important to get that too.

I wouldn't say my mom's life is perfect since being diagnosed. She said, "In a way, it feels like osteoporosis is control of my life and I'm always aware of getting calcium or Vitamin D or making sure I eat something like broccoli at dinner. I know that doing what the doctor said gives me a better chance of having healthy bones when I get older, but I'm still scared and sad about what has happened." My mom still does remind all of us to eat foods with calcium or get a supplement to have calcium and Vitamin D and to exercise because she doesn't want us to be like her. She is really clear that we should follow the doctor's orders, and do what we can to prevent osteoporosis, so I'm planning to get a heel scan at the next local health fair to get an idea of my bone density, and, I always have a supplement to help. I can tell that it's sometimes sad for my mom to always be thinking about her bones, but, I guess that's how it goes.

Note: This message was created from interviews done March 2008-June 2008.

Table 4.2 continued.

"No Emotion" Secondhand Narrative Evidence

"A Young Woman Living with Osteoporosis"

When thinking about osteoporosis, I think of my mom because she was diagnosed with osteoporosis. She's only 47 years old and I'm 21. I always thought that osteoporosis was something for older women, like my grandmom, to consider and people younger do not need to think about it.

It's actually kinda normal how she found out, and it wasn't like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis. My mom was a little concerned, but not really worried because she felt she was healthier than my aunt. But, she went to get checked-out at the doctor's. While she was there, the doctor asked about a family health history. My mom told them about my grandmom who was diagnosed with osteoporosis and now my aunt. I know my mom tries to get calcium. She always makes us drink milk at home with breakfast and dinner. She is a runner, so I know she does some exercise. But, I really don't even know what osteoporosis is. I just know my grandmom broke her hip and it was hard for her to do everyday things because of her bones. It was not super bad at all. Now I know it was because she had low bone density and that means her bones are soft and brittle and they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy. My aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. I said, "I thought you had to be older like grandmom or at least in your sixties to be diagnosed." My mom told me that's not really the case. "Nope. I mean, I'm glad I know now, so I can help

Table 4.2 continued.

you and your sister. Now, your twenties, is actually a good time to help build the best bones possible. So this means you need to focus on your bones. Since you now have a family history, we really need to make sure to do this. I mean, I don't want you to get low bone mass so your bones are fragile, because then you're more likely to break them." I didn't know family history would affect me right now, not later.

I remember she sounded really matter of fact at that moment when she was talking to us. A few days later we were making dinner and I asked her how she was doing. I wanted to make sure how things were going after the diagnosis. My sister and I had been talking about it and I thought dinner was a good time to bring it up. "Until it happens, you don't realize what this disease means for people my age and younger--people that aren't like grandmom's age," she said. "It doesn't just happen to women in their sixties. The doctor wants me to try to do things like eating foods to get calcium and Vitamin D, and exercising at home for six months. Maybe later I will go on medication like your aunt, but we will see." She smiled and said, "And I'm also going to work with you girls. Aren't you glad I've always served milk for you and your sister at breakfast and dinner?" I laughed at that. "I'm also going to get you some supplements, just to help all of us get enough calcium and vitamin D, and try to get you girls to eat some veggies that have calcium. You like broccoli, right?" she asked. So, now we will have some type of green, leafy vegetable at every dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it's one of the things that can contribute to weaker bones, so my mom has seriously stopped stocking it in the refrigerator. I think no soda is probably best.

Since the diagnosis, my mom hasn't really changed and actually is doing okay. Because the doctor recommended some exercises like weight-bearing ones, and she's a runner, she's been keeping up with it. She doesn't run when it's really icy out, but otherwise, she's doing well and

Table 4.2 continued.

still does it almost everyday. I'm not a big runner, so I try to do more walking around campus to get my weight-bearing exercise. It seems my classes are always in Thomas or Willard so I walk between the buildings a lot almost everyday. I think this is a good way to get some exercise since I live in East Halls. My sister used to dance in grade school, and decided it take it up again next semester as a way to get a weight-bearing exercise. I never knew that being outdoors is a way to get Vitamin D through the sun and Vitamin D helps the body absorb calcium. So, walking I guess helps my bones both as an exercise and getting Vitamin D. I guess looking back on everything, the recommendations are pretty simple and part of just a normal healthy lifestyle. I mean my mom said she can do this. She knows following the doctor's orders will really help in the long run.

When talking to my mom about osteoporosis, she says, "Just like a lot of things, osteoporosis is just something I have to be aware of. Knowing that a few things can help me in the long run is really okay," my mom said. "I bought some supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium a little bit more. And I try to be a bit more careful not to fall and be aware of our surroundings."

Our entire family has been really supportive about my mom's diagnosis. Our dad has been a real trooper, and things are going well. I mean all of us now know that osteoporosis just doesn't happen to older people like my grandmom's age. And osteoporosis is something that both my sister and I need to think about, even though we're in our twenties. Because now is the time to help build strong bones so we don't get diagnosed when we're our mom's age. I'm planning on getting one of those heel scans at the local health fair next time I'm home, so I know what I'm dealing with.

Table 4.2 continued.

From what I can tell, nothing has really changed for my mom. Except now, my mom does things to help make her bones stronger and she's conscious of her bones. It is has become a normal routine of life for us to be thinking about our bones and doing things to help make them stronger as a part of our family life.

Note: This messages was created from interviews done March 2008-June 2008.

Official narrative evidence. To generate an official narrative evidence, a review of the narratives and information about osteoporosis available from various health organizations were read to represent an organization's viewpoint about osteoporosis without personal experiences. Research for online health information about osteoporosis revealed content on MayoClinic.com that was easy to understand and provided content that can meet the study's manipulation criteria. This information follows a health organization narrative by following a story structure of defining osteoporosis, explaining how it can occur, problems associated with the disease, and concludes with prevention and treatment of the disease. This narrative evidence will be referred to as official health organization narrative evidence to clearly demonstrate the source of the official narrative evidence for this study. The positive condition states how individuals can be happy, hopeful and relieved to know about the disease and being able to prevent it. The negative condition highlights that individuals would be angry for not knowing the prevention behaviors, and that people are afraid of the disease and saddened to know they have it. Table 4.3 lists the official health organization narrative evidence.

Table 4.3 *Official Health Organization Narrative Evidence for Phase 2*

Positive Official Health Organization Narrative Evidence

"About Osteoporosis"

There is a lot of information available about osteoporosis because it is a disease that affects a lot of men and women. For young women, there are some important things to consider when thinking about the disease. Living with the disease doesn't stop many people from living happy lives.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak and bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals and both can cause bones to break more easily.

A common result of the disease is broken bones. Most broken bones are in the spine, hip or wrist. It is not just a women's disease, it can also affect men. Many people also have low bone density. It is never too late or too early to do something about the disease -- you can take steps to keep bones strong and healthy throughout life. There is hope for those with osteoporosis. There is also hope to preventing the disease.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your

Table 4.3 continued.

bones depends on their size and density. Bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made. Bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. A full cycle of bone remodeling takes about two to three months. Your body makes new bone faster than it breaks down old bone when you are young. You reach your peak bone mass in your mid-thirties. After your mid-thirties, bone remodeling continues, but, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss. The leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. One key factor is how much bone mass you attained between ages 25 and 35. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have "in the bank." It means you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and can also cause faster bone loss later.

Three factors are important for keeping your bones healthy to help you throughout your life. It is a relief for some people to know these few things to help prevent the disease. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. Getting enough calcium and Vitamin D is an important factor in reducing your risk of the disease. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker. It is possible in some cases to replace bone

Table 4.3 continued.

you have lost. The amount of calcium you need to stay healthy changes over your lifetime -- your body's demand for calcium is greatest during childhood and adolescence when your skeleton is growing rapidly. Older women and older men also need to consume more calcium; as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough Vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and may also improve muscle strength. Many people get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis which is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium. There are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed. Calcium and Vitamin D supplements are most effective taken together. It is best to take them in divided doses with food.

These measures also may help you prevent bone loss. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young. It is important to

Table 4.3 continued.

continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Family health history of the disease is one risk factor. So you can do things to decrease your risks. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is important to start these habits when hoping to have the strongest bones possible. Keeping a happy healthy lifestyle will help many people prevent the disease.

Note: This is only some of the information available about osteoporosis. To learn more, please visit MayoClinic.com to learn about this disease.

Negative Official Health Organization Narrative Evidence

"About Osteoporosis"

There is a lot of information available about osteoporosis. It is a disease that affects a lot of men and women. For young women, there are some important things to consider when

Table 4.3 continued.

thinking about the disease. The effects of osteoporosis are frightening.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak. Bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals and both can cause bones to break more easily.

A common result of the disease is broken bones and most broken bones are in the spine, hip or wrist. It is not just a women's disease; it can also affect men. Many people also have low bone density. It is never too late or too early to do something about the disease. You can take steps to keep bones strong and healthy throughout life. It is scary for those with the disease. You need to learn about the disease to help avoid it.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your bones depends on their size and density and bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made and how bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. A full cycle of bone remodeling takes about two to three months. Your body makes new bone faster than it breaks down old bone when you are young.

Table 4.3 continued.

You reach your peak bone mass in your mid-thirties and after your mid-thirties, bone remodeling continues. But, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss and the leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. One key factor is how much bone mass you attained between ages 25 and 35. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have "in the bank." It means you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and it can also cause faster bone loss later.

Three factors are important for keeping your bones healthy and these can help you throughout your life. Many people with the disease are angry they did not know this earlier. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. Getting enough calcium and Vitamin D is an important factor in reducing your risk of the disease. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker. It is possible in some cases to replace bone you have lost. The amount of calcium you need to stay healthy changes over your lifetime and our body's demand for calcium is greatest during childhood and adolescence because this is when your skeleton is growing rapidly. Older women and older men also need to consume more calcium because as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and it may also improve muscle

Table 4.3 continued.

strength. Many people get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis. That is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium. There are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed. Calcium and Vitamin D supplements are most effective taken together. It is best to take them in divided doses with food.

These measures also may help you prevent bone loss. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young. It is important to continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Family health history of the disease is one risk factor that people are sometimes angry about not knowing. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability

Table 4.3 continued.

for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is important to start these habits to avoid the awful effects of the disease.

Note: This is only some of the information available about osteoporosis. To learn more, please visit MayoClinic.com to learn about this disease.

“No Emotion” Official Health Organization Narrative Evidence

“About Osteoporosis”

There is a lot of information available about osteoporosis because it is a disease that affects a lot of men and women. For young women, there are some important things to consider when thinking about the disease.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak and bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals but both can cause bones to break more easily.

A common result of osteoporosis is broken bones. Most broken bones are in the spine, hip or wrist. The disease is not just a women’s disease. Osteoporosis can also affect men, and many people also have low bone density. It is never too late or too early to do something about

Table 4.3 continued.

the disease. You can take steps to keep bones strong and healthy throughout life.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your bones depends on their size and density. Bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made and how bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. A full cycle of bone remodeling takes about two to three months. Your body makes new bone faster than it breaks down old bone when you are young. You reach your peak bone mass in your mid-thirties and after your mid-thirties, bone remodeling continues. But, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss, but the leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. One key factor is how much bone mass you attained between ages 25 and 35. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have "in the bank." It means you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and it can also

Table 4.3 continued.

cause faster bone loss later.

Three factors are important for keeping your bones healthy and these can help you throughout your life. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. Getting enough calcium and Vitamin D is an important factor in reducing your risk of the disease. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker and it is possible in some cases to replace bone you have lost. The amount of calcium you need to stay healthy changes over your lifetime. Your body's demand for calcium is greatest during childhood and adolescence which is when your skeleton is growing rapidly. Older women and older men also need to consume more calcium, and as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and it may also improve muscle strength. Many people get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis which is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium and there are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed, too. Calcium

Table 4.3 continued.

and Vitamin D supplements are most effective taken together. But, it is best to take them in divided doses with food.

These measures also may help you prevent bone loss, too. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young and it is important to continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Family health history of the disease is one risk factor. So you can do things to decrease your risks. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is important to have these habits to have the strongest bones possible.

Note: This is only some of the information available about osteoporosis. To learn more, please visit MayoClinic.com to learn about this disease.

Official attention-control narrative evidence. Official attention-control narrative content was obtained from the Library of Congress on the preservation of books to represent official narrative evidence about book preservation. A book preservation narrative was selected for several reasons. The majority of participants in the target audience are attending school and have a personal interest in maintaining books well in order to benefit from a higher re-sell value. In addition, many other health issues would potentially confound the study results as many health issues also incorporate healthy eating and exercise as prevention behaviors. This topic has been used in past studies as an attention-control with college students (Parrott et al., 2005). As part of the pilot study, levels of interest and involvement were assessed to insure that this remained a valid choice. In the positive condition, it is emphasized that individuals are happy and relieved to know about the nation's history is being saved and hopeful that future works will be saved. In the negative condition, the narrative evidence discusses how there is fear that history will be lost, and that individuals are angered and saddened to know that this history is gone forever. Table 4.4 following is the official attention-control narrative evidence.

Table 4.4 *Official Attention-Control Narrative Evidence for Phase 2*

Positive Official Attention-Control Narrative Evidence
"About Book Preservation"
We hear a lot about how important it is to preserve the history of our country. A lot of money is spent on doing things to keep things for the future. But no one really talks about book preservation or even saving books. Books are an important part of our heritage; it is believed that nearly three-fourths of books published thirty years ago cannot be used now. These books do not

Table 4.4 continued.

have digital files and will be lost to us without efforts to preserve them. Research has found that most people do not know a lot about how to preserve books; they do not even know how to begin to talk about it. People do not often discuss the topic with friends or discuss it with family. But there is hope. Many people do not know that the Library of Congress has approved millions of dollars towards saving books because it believes that saving books is as important as other efforts to preserve our history. Books have an important and long history and people don't know about book's history. Two centuries ago, books were printed on a high quality paper, cotton-fiber paper. However, in the 19th century printers changed to acid-based paper because this was cheaper than the cotton-fiber paper. Over time, the acid has broken down the paper in books and has caused them to completely fall apart. Books and other types of documents that record our heritage are at risk, so we need to learn about saving them. This information is intended to help you begin talking about how to save books because many of them are falling apart.

To begin, know that there are resources available to help you. A large resource is the Library of Congress. One of the missions at the Library of Congress is to promise long-term access to what the Library has. This includes content either in original or preserved form. This mission is done through many means such as binding and repair. The collections of the Library are huge. The Library of Congress is the only library that has the contents of President Abraham Lincoln's pockets the night he was killed and they also have President Thomas Jefferson's drawing of a macaroni machine. It also has the photographs of migrant workers during the Depression and it also contains television episodes of "I Love Lucy". The collections come in a variety of formats. It is a relief that such treasures are not lost! They know a lot about keeping things in good shape.

There are several methods to save books in a larger sense. Mass de-acidification is one. It

Table 4.4 continued.

is a liquid-based process. It lowers the amount of acid in the paper. It is a cost-effective. It is also a long-term solution. Microfilm is another solution that lasts a long time. But, it is costly. It also makes it hard to find and read information. Lastly, books can be digitized to computers. However, computer transfer methods cost the most money. The Library of Congress uses these three methods to preserve our national treasures and heritage, and the Library also uses a full range of other methods to preserve its collections. Historians are very happy to know the Library has done much to save our history.

When you look up book preservation there is a lot of information. The Library of Congress has provided information on how to save books at home. If books get wet or moldy, the most important thing to do is to take action as soon as possible. In warm and humid conditions, you need to act fast because mold can begin to grow within 24-48 hours after the materials have gotten wet. So, it is important to air-dry as soon as you can. But, what can't be air-dried in 48 hours, you can do something else. It can probably be frozen to dry at a later time, and after the books have frozen, the ice can be brushed off. Then the books can be thawed slowly. During the thawing process, blot all excess water. Then, you should air-dry. It is a relief to know that something can be done to wet books! Books that are half wet have the best result when be air-dried. To begin, fan books open, then let them stand on top or bottom edge. Do not let them stand on the front edge. Stand books on driest edge first as it is the strongest, and as the book dries, turn it upside-down to the opposite edge every few hours.

Learning about book preservation is an easy thing to do to help our heritage. Some simple things can help you save the life of a book in your home. Hopefully, this will help you. For instance, the Library of Congress says not to force books open. They say the covers should always be supported. Covers should really be supported when the book is open. Many books are

Table 4.4 continued.

damaged by the habit of pulling the books off the shelf with the top of the spine. It is a much better practice to push the two adjoining books inward. Then you should remove the book by taking the spine. The Library also says to shelve upright. Then you should support books by book ends if needed. It also says to store large volumes flat. You should also support books when removing them from shelves and when carrying them.

Also, the damages to a book that are growing can be stopped. The repeated incorrect handling and storage of a book can quickly transform a new book. A new book can quickly look like a worn or even an unusable one. Proper handling and storage is key. The Library of Congress says to store in a stable, cool, clean, non-humid environment. This can prolong the life of a book. Too high or too low levels of temperature and humidity will speed up the process. For example, the Library of Congress states that the high humidity in an attic or basement can promote mold growth and attract insects. Extremely low humidity, as found above hot radiators, can dry out leather bindings. In addition, direct sun-light will fade leather and cloth on books. The Library of Congress says that blue leather fades to dull green and red leather to brown with direct sunlight. This mainly happens along the spine of the book. Dust, dirt and grime from handling can harmfully affect books as well. The Library of Congress says that books be stored in a closed glass bookcase. This type of bookcase can minimize the aging.

These are only some things to help you know about book preservation. If you have any questions about preserving books, you should visit the Library of Congress website. There is a lot of useful information that you can learn. You may also want to contact the Library of Congress if you have questions about saving books. For additional information, you can also do an online search using the key words “book preservation.” Lots of other people are happy to have learned more.

Table 4.4 continued.

MORE INFORMATION? This message was modified from materials published by the Library of Congress. It can be retrieved at www.loc.gov.

Negative Official Attention-Control Narrative Evidence

"About Book Preservation"

We hear a lot about how important it is to preserve the history of our country. A lot of money is spent on doing things to keep things for the future. But no one really talks about book preservation and no one talks about even saving books. This is very sad and tragic. Books are an important part of our heritage. It is believed that nearly three-fourths of books published thirty years ago cannot be used now. These books do not have digital files and will be lost to us without efforts to preserve them. Research has found that most people do not know a lot about how to preserve books. They do not even know how to begin to talk about it. People do not often discuss the topic with friends and people do not even discuss it with family. Many people do not know that the Library of Congress has approved millions of dollars towards saving books because it believes that saving books is as important as other efforts to preserve our history. Books have an important and long history, but many people do not know about book's history. Two centuries ago, books were printed on a high quality paper, cotton-fiber paper. However, in the 19th century printers changed to acid-based paper. This was cheaper than the cotton-fiber paper. Over time, the acid has broken down the paper in books. It has caused them to completely fall apart. It's scary to realize how easily this can happen! Books and other types of documents that record our heritage are at risk. It is important to learn about saving them. This information is intended to help you begin talking about how to save book because many of them are falling apart in libraries. It can make you angry thinking how history is being lost.

Table 4.4 continued.

To begin, know that there are resources available to help you. A large resource is the Library of Congress. One of the missions at the Library of Congress is to promise long-term access to what the Library has. This includes content either in original or preserved form. This mission is done through many means. The Library does a lot of binding and repair for instance. The collections of the Library are huge. The Library of Congress is the only library that has the contents of President Abraham Lincoln's pockets the night he was killed and they also have President Thomas Jefferson's drawing of a macaroni machine. It also has the photographs of migrant workers during the Depression and it also contains television episodes of "I Love Lucy". The collections come in a variety of formats, so they know a lot about keeping things in good shape. It is scary to think were we would be without the Library.

There are several methods to save books in a larger sense. Mass de-acidification is one. It is a liquid-based process. It lowers the amount of acid in the paper. It is a cost-effective. It is also a long-term solution. Microfilm is another solution that lasts a long time. But, it is costly. It also makes it hard to find and read information. Lastly, books can be digitized to computers. However, computer transfer methods cost the most money. The Library of Congress uses these three methods to preserve our national treasures and heritage, and the Library also uses a full range of these methods to preserve its collections.

When you look up book preservation there is a lot of information and the Library of Congress has provided information on how to save books at home. If books get wet or moldy, the most important thing to do is to take action as soon as possible. In warm and humid conditions, you need to act fast because mold can begin to grow within 24-48 hours after the materials have gotten wet. So, it is important to air-dry as soon as you can. But, what can’t be air-dried in 48 hours, you can do something else. It can probably be frozen to dry at a later time. After the books

Table 4.4 continued.

have frozen, the ice can be brushed off. Then the books can be thawed slowly and during the thawing process, blot all excess water. Then, you should air-dry. Books that are half wet have the best result when be air-dried. To begin, fan books open. Then let them stand on top or bottom edge. Do not let them stand on the front edge. Stand books on driest edge first as it is the strongest. As the book dries, turn it upside-down to the opposite edge every few hours.

Learning about book preservation is an easy thing to do to help our heritage. Some simple things can help you save the life of a book in your home. For instance, the Library of Congress says not to force books open. They say the covers should always be supported. Covers should really be supported when the book is open. Many books are damaged by the habit of pulling the books off the shelf with the top of the spine. It is a much better practice to push the two adjoining books inward. Then you should remove the book by taking the spine. The Library also says to shelve upright. Then you should support books by book ends if needed. It also says to store large volumes flat. You should also support books when removing them from shelves and when carrying them.

Also, the damages to a book that are growing can be stopped. The repeated incorrect handling and storage of a book can quickly transform a new book. A new book can quickly look like a worn or even an unusable one. Proper handling and storage is key. The Library of Congress says to store in a stable, cool, clean, non-humid environment. This can prolong the life of a book. Too high or too low levels of temperature and humidity will speed up the process. For example, the Library of Congress states that the high humidity in an attic or basement can promote mold growth and attract insects. Extremely low humidity, as found above hot radiators, can dry out leather bindings. In addition, direct sun-light will fade leather and cloth on books. The Library of Congress says that blue leather fades to dull green and red leather to brown with direct sunlight.

Table 4.4 continued.

This mainly happens along the spine of the book. Dust, dirt and grime from handling can harmfully affect books as well. The Library of Congress says that books be stored in a closed glass bookcase. This type of bookcase can minimize the aging.

These are only some things to help you know about book preservation. If you have any questions about preserving books, you should visit the Library of Congress website. There is a lot of useful information that you can learn. You may also want to contact the Library of Congress if you have questions about saving books. For additional information, you can also do an online search using the key words "book preservation."

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"No Emotion" Official Attention-Control Narrative Evidence

"About Book Preservation"

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believes that saving books is as important as other efforts to preserve our history. Books have an important and long history, but many people do not know about book's history. Two centuries ago, books were printed on a high quality paper, cotton-fiber paper. However, in the 19th century printers changed to acid-based paper. This was cheaper than the cotton-fiber paper. Over time, the acid has broken down the paper in books and it has caused them to completely fall apart. Books and other types of documents that record our heritage are at risk, so it is important to learn about saving them. This information is intended to help you begin talking about how to save books because many of them are falling apart in libraries.

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However, computer transfer methods cost the most money. The Library of Congress uses these three methods to preserve our national treasures and heritage. The Library also uses a full range of these methods to preserve its collections.

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Also, the damages to a book that are growing can be stopped. The repeated incorrect handling and storage of a book can quickly transform a new book. A new book can quickly look like a worn or even an unusable one. Proper handling and storage is key. The Library of Congress says to store in a stable, cool, clean, non-humid environment. This can prolong the life of a book. Too high or too low levels of temperature and humidity will speed up the process. For example, the Library of Congress states that the high humidity in an attic or basement can promote mold growth and attract insects. Extremely low humidity, as found above hot radiators, can dry out leather bindings. In addition, direct sun-light will fade leather and cloth on books. The Library of Congress says that blue leather fades to dull green and red leather to brown with direct sunlight. This mainly happens along the spine of the book. Dust, dirt and grime from handling can harmfully affect books as well. The Library of Congress says that books be stored in a closed glass bookcase. This type of bookcase can minimize the aging.

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As a result of these development processes, a total of 12 messages were constructed. Messages were either: (a) positive firsthand narrative [a personal experience of being diagnosed with osteoporosis, and explicit reference to experiencing relief,

happiness and hope]; (b) negative firsthand narrative [a personal experience of being diagnosed with osteoporosis, and explicit reference to experiencing sadness, anger and fear]; (c) "no emotion" firsthand narrative [a personal experience of being diagnosed with osteoporosis, and but no explicit references of emotions]; (d) positive secondhand narrative [a recall of another's personal experience with being diagnosed , and explicit reference to that person's relief, happiness and hope]; (e) negative secondhand narrative [a recall of another's personal experience with being diagnosed , and explicit reference to that person's sadness, anger, and fear]; (f) "no emotion" secondhand narrative [a recall of another's personal experience with being diagnosed, but no explicit reference of emotion]; (g) positive official health organization narrative [health organization narrative of osteoporosis with explicit references of relief, happiness and hope]; (h) negative official health organization narrative [health organization narrative of osteoporosis with explicit references of sadness, anger and fear]; (i) "no emotion" official health organization narrative [health organization narrative of osteoporosis with no explicit reference of emotion]; (j) positive official attention-control narrative [official narrative of book preservation with explicit references to relief, happiness, and hope]; (k) negative official attention-control narrative [official narrative of book preservation with explicit references to sadness, anger and fear]; and (l) "no emotion" official attention-control narrative [official narrative of book preservation with no explicit reference of emotion].

Participants and Procedures

At total of 104 women participated in the pilot with a mean age of 18.5 (*SD* = 1.15). Eighty-four (80.8%) women reported themselves to be Freshmen, with 12 (11.5%) reporting to be Juniors, five (4.8%) as Seniors and three (2.9%) as Sophomores. Ninety-

six (92.3%) of participants self-reported their ethnicity as White-Caucasian, five (4.8%) as Asian, and two (1.9%) as African-American. One participant (1.0%) reported her ethnicity as "Asian American."

Participants were recruited from the basic public speaking courses offered by the university during July 2008 to August 2008. The researcher worked with instructors to announce the study during classroom times as an opportunity to be a part of research at the university and to earn extra credit. Eligible participants were women ages 18-25 years. For those students not eligible and interested in receiving extra credit, an alternative assignment of critiquing an online speech was provided. Participants were given extra credit per instructor agreement (1% or 2%). Interested participants eligible for the study signed a sheet with available days/times and location (e.g., 11:30am in 162 Willard Building). An email reminder was sent 48 hours and 24 hours prior to the study to participants to help ensure attendance.

Two classrooms able to seat 100 students in a conveniently located building on the university campus were obtained to administer the study at various times throughout the day. Participants signed-up to attend one of 18 different time slots; a total of nine times in each classroom. The number of participants ranged from one to 15 per session. As participants entered the room, they were asked to be seated.

Once all participants were in the room and seated, the researcher explained that the informed consent outlines the participant's rights as a part of the research, and handed each participant two consent forms to read and to sign one. Upon returning one of the signed informed consent forms, the participant received the questionnaire and was told to take their time reading the questionnaire, which contained one of several messages, and

completing the answers on their own. This was also emphasized during recruitment. If participants had any questions, they were to quietly approach the researcher. The other informed consent form was kept for their records. The questionnaires were randomly numbered prior to the study in blocks of 12, with participants being assigned to one of the treatment or attention control messages. After completing the questionnaire, participants placed questionnaires in a marked box, and completed an extra credit slip indicating which class she was completing this survey to earn extra credit. All signed informed consent forms, questionnaires and extra credit slips were stored separately to ensure confidentiality of responses. Upon leaving, all participants received a copy of the National Osteoporosis Foundation's "Osteoporosis: What you need to know" brochure. Participants were asked not to discuss the study with anyone to prevent influencing the results. The entire procedure took 20 minutes.

At the completion of the study, the names of all those completing the alternative assignment or the study were compiled. Names of participants were emailed to respective instructors. During the study, some women asked questions about the purpose of the study when returning a questionnaire and expressed interest in learning more about the purpose of the research. A debriefing email was sent at the completion of the study to all participants to explain the purpose of the different conditions, and reiterated the overall goal of the study. Institutional Review Board (IRB) approval was granted for Phase 2.

Instrumentation

The items included for the pilot data are to serve as (a) a manipulation check and (b) assess the range of emotions associated with each type of narrative evidence, and check the measurement model of the comprehension items. These measures included

items to address engagement, interest, and identification with the narrative evidence, questions assessing the use of narrative evidence and type of narrative evidence, and items determining adequate manipulation of the emotive statements within narrative evidence. Additional measures included the range of emotions experienced after reading the narrative evidence type and comprehension of the message. Other measures are described in the experimental study. Skewness and kurtosis was established by dividing skewness and kurtosis values by their standard error to create a *t*-value. Items with values above +/- 3.00 were determined to be deviating from normality at $p < .05$ (Acock, 2008) for this formative research stage. For previously un-validated scales, maximum likelihood exploratory factor analyses were conducted using principal axis factoring and oblique rotation to explain the maximum variance and take into account the correlation of items (Hair, Anderson, Tatham, & Black, 1998). The 60/40 rule was used with eigenvalues above 1 set to determine the extractable factors (Hair et al., 1998). Confirmatory factor analyses were also performed to understand the measurement model of scales. Hu and Bentler (1999) indices (e.g., CFI > .95; SRMR < .08; RMSEA < .06) were followed for assessing model fits for confirmatory factor analyses. SPSS version 16.0 and LISREL version 8.51 were used to perform analyses.

Post-hoc power analyses show that for the pilot study with nine cases per message at an alpha of .05, there is .07 power to detect a .20 (small) effect size, .16 power to detect a .50 (medium) effect size and .35 power to detect a .80 (large) effect size (Cohen, 1988). Collapsing messages to conditions, with approximately 26 cases per narrative condition, there is .11 power to detect a .20 (small) effect size, .42 power to detect a .50 (medium) effect size, and .80 power to detect a .80 (large) effect size (Cohen, 1988).

When collapsing messages to the emotion condition, with approximately 33 cases per emotion condition, there is .13 power to detect a .20 (small) effect size, .51 power to detect a .50 (medium) effect size, and .89 power to detect a .80 (large) effect size (Cohen, 1988). Significance was assessed at the .05 level.

Manipulation Check

Narrative Evidence Engagement, Interest and Identification

Several questions were asked to understand the level of engagement and interest in the narrative evidence as proposed by Ochs and Capps (1996).

Engagement and interest. To assess engagement and interest of narrative evidence and the validity of the narrative, the general measures of the Transportation Theory from Green and Brock (2000) were used. The initial measures use the word "narrative"; this was changed to "message" within the measures. The overall items examine the dimensions of narratives along the concepts of interest, identification, vividness, cognitive attention and emotional involvement (Green & Brock, 2000). The 12 items are scaled along a seven-point scale from "1= Not at all" to "7 = Very much." Previous studies have found these measures to have reliability greater than .65 (Green & Brock, 2000). Questions include, "While I was reading the message, I could easily picture the events in it taking place," and "I wanted to learn how the message ended."

A total of 104 women answered the transportation items. An examination of transportation item responses per message showed the data had no bimodal tendencies. Mean values ranged from 2.41 to 5.65 for the items. Frequency distributions revealed only one item with skewness, "While I was reading the message, activity going on in the room around me was on my mind," [recoded] (Skewness *t*-value = -4.82). Considering

the environment of taking the questionnaire in a quiet classroom setting, this question was deemed not theoretically useful and dropped. Confirmatory factor analyses revealed an adequate model fit (df = 53, Satorra-Bentler χ^2 = 109.97, RMSEA = .12, CFI = .91, SRMR = .09). A composite variable was created with the remaining 11 items (α = .85, M = 4.14; SD = .95).

It was predicted that the there would be no significant differences in judgments about transportation (e.g., interest and engagement) across the evidence types. Narrative evidence types were grouped by conditions and a one-way ANOVA was conducted. Not as predicted, significant differences emerged ($F(3, 100) = 13.62$, $p < .001$, partial η^2 = .29), with post hoc Tukey HSD tests revealing that the mean responses for the official attention-control narrative evidence condition (M = 3.27; SD = .86) were significantly lower compared to the mean responses for the firsthand narrative evidence condition (M = 4.70; SD = .78), secondhand narrative evidence condition (M = 4.28; SD = .86), *and* the official health organization narrative evidence condition (M = 4.20; SD = .75). However, there were no significant differences in transportation between the firsthand, secondhand and official health organization osteoporosis narrative evidence. See Table 4.5.

Table 4.5 *Transportation Values for Narrative Evidence Type*

Narrative Evidence	Mean	SD
Firsthand	4.70_a	.78
Secondhand	4.28_a	.86
Official Health Organization	4.20_a	.75
Official Attention-Control	3.27_b	.86

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

While this did not support the prediction that all narrative evidence types would be engaging and interesting, it was useful to know that the osteoporosis specific narrative evidence types did not differ from each other and all three were perceived as more engaging than the official attention-control narrative evidence type about book preservation.

Identification. Additional questions were added mid-way through data collection to assess specific identification with the teller of the message (n = 19). These items were added after reviewing initial questionnaire responses and finding that the transportation items may not be sufficient for capturing identification with the narrative evidence and the teller of the message, important qualities for first and secondhand narratives. Four items were added: "The teller of the message reminds me of myself," "The teller of the message mentioned places I know," "I trust the teller of the message," and "The teller of the message is someone like me." All items were along a 5 point Likert response scale of "1 = Strongly disagree" to "5 = Strongly agree." Frequency analyses revealed no skewness with the items, and means ranged from 2.89 to 4.16. Examining the means revealed Item 2, "The teller of the message mentioned places I know," and Item 3, "I trust the teller of the message" were not appropriate for the official health organization and the official attention-control condition, as these official narrative evidence types did not include a teller. Therefore, these items were eliminated from analyses to measure identification. A maximum likelihood exploratory factor analysis (KMO = .50) revealed one factor for the measure with the remaining two items. The lack of adequate sample size prevented running a confirmatory factor analyses on these items. The resulting

identification composite variable was created with a reliability of .87 (M = 2.90; SD = 1.07).

It was expected that there would be significant differences between evidence type conditions on identification, such that those reading a firsthand and secondhand narrative evidence conditions would report higher levels of identification compared to those in the official health organization narrative and official attention-control narrative conditions. A one-way ANOVA revealed results were significant, but not as predicted among condition differences ($F(3, 15) = 3.84$, $p < .05$, partial $\eta^2 = .43$). Post-hoc Tukey HSD tests revealed that the mean responses for the official attention-control narrative evidence condition (M = 2.00; SD = .50) were significantly lower compared to the mean responses for the firsthand narrative evidence condition (M = 3.90; SD = .74). However, the official attention-control narrative evidence condition, the secondhand narrative evidence condition (M = 3.17; SD = .93), and the official health organization narrative evidence condition (M = 2.40; SD = 1.08) were <u>not</u> significantly different from each other. See Table 4.6.

Table 4.6. *Identification Values for Narrative Evidence Type*

Narrative Evidence	Mean	SD
Firsthand	3.90_{a}	.74
Secondhand	3.17_{ab}	.93
Official Health Organization	2.40_{ab}	1.08
Official Attention-Control	2.00_{b}	.50

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

Open-ended responses showed that some women found the entire subject of osteoporosis to be novel, while some had personal history of the disease (e.g.,

grandmother diagnosed). It is possible that identification with the firsthand and secondhand narrative evidence and the message teller in these narratives is dependent upon individual differences. For the experimental study, more references to the target age group were added for the firsthand and secondhand narrative evidence to increase identification.

Narrative Evidence Use

Several questions were asked to assess manipulations on the presence of narrative evidence, as well as the type of narrative evidence. Two questions were asked along a five-point Likert scale of "1 = Strongly disagree" to "5 = Strongly agree" to assess the use of narrative evidence being perceived by the participants: (a) "The message used one person's experience to inform you about osteoporosis," (n = 85; M = 3.07; SD = 1.56) and "The message relied on the use of statistics to inform you about osteoporosis," (n = 85; M = 2.22; SD = 1.37). Only 85 participants answered these items as questions were modified mid-way through data collection due to recognizing an error with these questions, which is discussed later.

It was expected to see significant differences on narrative evidence types, such that responses for the firsthand, secondhand and official health organization narrative evidence conditions had higher means compared to the official attention-control narrative evidence condition. As predicted, a one-way ANOVA for the variable assessing "the message used one person's experience" across narrative evidence type conditions was significant ($F(3, 81) = 31.89$, $p < .001$, partial $\eta^2 = .54$); however, results were only partially supportive of the intended effects in the message manipulations. Post-hoc Tukey HSD tests showed mean responses for the official attention-control narrative evidence

condition (*M* = 1.76; *SD* = 1.04), compared to the official health organization narrative evidence condition (*M* = 2.10; *SD* = 1.09) were not statistically different, but that these two conditions were statistically different compared to the secondhand narrative evidence condition (*M* = 4.05; *SD* = 1.20) and the firsthand narrative evidence condition (*M* = 4.32; *SD* = .95). For the experimental study, this question was removed, as there was confusion from those receiving the official health organization narrative evidence and the statement "this message uses verbal text," was added. See Table 4.7.

Table 4.7 *Narrative Evidence "Message Relied on One's Experience with Osteoporosis" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	4.32_a	.95
Secondhand	4.05_a	1.20
Official Health Organization	2.10_b	1.09
Official Attention-Control	1.76_b	1.04

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

It was predicted that there would be no significant differences between the narrative evidence conditions on the "this message relied on the use of statistics" item. Results were not as predicted. A one-way ANOVA for the variable assessing "the use of statistics" found significant differences as well ($F(3, 81) = 22.25$, $p < .001$, partial $\eta^2 = .45$). Post-hoc Tukey HSD tests showed that mean responses for the official health organization online narrative evidence condition (*M* = 3.81; *SD* = 1.17) were statistically different compared to all other narrative evidence conditions. The official health education narrative evidence was examined, and although it uses the numbers 25 and 35 for ages, it does not rely upon statistics to inform about osteoporosis risks. See Table 4.8.

Table 4.8 *Narrative Evidence "Message Relied on Statistics" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	1.82_a	1.05
Secondhand	1.57_a	.75
Official Health Organization	3.81_b	1.17
Official Attention-Control	1.71_a	1.10

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

An examination of responses mid-way through data collection found that participants were confusing statistics with facts, and the first narrative evidence question was not accurately asking about the use of narrative evidence as some participants asked questions during the procedure about what to do if their message was not about osteoporosis. Questions were modified to read along a five-point Likert scale of "1 = Strongly disagree" to "5 = Strongly agree" as: (a) "The message relied on telling the experience about osteoporosis to inform you about osteoporosis risks," (n = 19; M = 3.58; SD = 1.30); (b) "The message relied on the use of numbers to inform you about osteoporosis risks," (n = 19; M = 2.05; SD = 1.27); and (c) "The message relied on the use of facts to inform you about book preservation," (n = 19; M = 2.21; SD = 1.69). It was expected to see significant differences on narrative evidence types for the "experience about osteoporosis to inform you about osteoporosis risks," such that responses for the firsthand, secondhand and the official health organization narrative evidence conditions had higher means compared to the official attention-control condition. As predicted, results of a one-way ANOVA for the variable "relied on the telling of an experience about osteoporosis," was marginally significant at the .05 level ($F(3, 15) = 4.17$, $p < .05$, partial $\eta^2 = .45$). Post hoc Tukey HSD tests display that the

firsthand narrative evidence condition (*M* = 4.00; *SD* = .71) and the secondhand narrative evidence condition (*M* = 4.17; *SD* = .75) are statistically different compared to the official attention-control narrative evidence condition (*M* = 1.67; *SD* = 1.15). The official health organization narrative evidence condition (*M* = 3.60; *SD* = 1.52), though, is not statistically different from the official attention-control condition, or the firsthand and secondhand narrative evidence conditions. See Table 4.9.

Table 4.9 *Narrative Evidence "Message Relied on Telling an Experience about Osteoporosis" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	4.00_{a}	.71
Secondhand	4.17_{a}	.75
Official Health Organization	3.60_{ab}	1.52
Official Attention-Control	1.67_{b}	1.15

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

It was expected to see no significant differences on narrative evidence conditions for the variable "the message relied on the use of numbers." This was not supported. The one-way ANOVA for the variable across the four narrative evidence type conditions was marginally statistically significant ($F(3, 15) = 3.74$, $p = .04$, partial $\eta^2 = .43$). However, post hoc Tukey HSD tests showed that the conditions were not statistically significant compared to each other.

For the variable "the message relied on the use of facts about books," it was expected to see significant differences such that the official attention-control narrative evidence condition would have higher responses than the other narrative evidence conditions. As predicted, the one-way ANOVA for this variable was statistically significant across the four evidence type conditions ($F(3, 15) = 7.96$, $p < .05$, partial $\eta^2 =$

.61) and post-hoc Tukey HSD tests displayed that the official attention-control narrative evidence condition (*M* = 5.00; *SD* = .00) was statistically different compared to all other three conditions. See Table 4.10.

Table 4.10 *Narrative Evidence "Message Relied on Facts about Books" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	1.40_a	.89
Secondhand	1.33_a	.52
Official Health Organization	2.40_a	1.95
Official Attention-Control	5.00_b	.00

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

Types and Source of Narrative Evidence

To assess whether the participant perceived the presence of a firsthand, secondhand, official health organization, or official attention-control narrative evidence type, the manipulation check included items designed to assess the reader's judgments regarding the point of view of the message. Responses were asked along a five-point Likert scale of "Strongly disagree" to "Strongly agree." Questions included the stem "The point of view in this story is:" and the following questions: (a) a woman who experienced osteoporosis (*n* = 84; *M* = 2.92, *SD* = 1.40); (b) someone who is telling about a woman in their family's experience with osteoporosis (*n* = 84; *M* = 2.82, *SD* = 1.42); (c) a health organization's story about osteoporosis (*n* = 84; *M* = 2.76, *SD* = 1.46); and (d) someone not talking about osteoporosis (*n* = 103; *M* = 1.78; *SD* = 1.43). Questions were modified mid-way through data collection, as discussed below.

It was expected to see significant differences for each narrative type for the "woman who experienced osteoporosis" question. The first person narratives should be

judged to depend upon a first person story significantly more often than the secondhand narratives, although elements of the first person narratives may appear to include some reference to secondhand knowledge and vice versa. Results of a one-way ANOVA for the variable "a woman who experienced osteoporosis" across the four narrative evidence conditions revealed significant differences ($F(3, 80) = 43.84$, $p < .001$, partial $\eta^2 = .62$). As expected, post-hoc Tukey HSD tests show that the firsthand narrative evidence condition ($M = 4.71$; $SD = .46$) is statistically different compared to the secondhand narrative evidence condition ($M = 2.81$; $SD = 1.29$), the official health organization narrative evidence ($M = 2.33$; $SD = .73$) and the official attention-control narrative evidence condition ($M = 1.81$; $SD = .81$). Due to the formatting of the questions, individuals that answered "Strongly agree" or "Agree" to this question when they were in the firsthand narrative evidence condition would not distinguish between the other osteoporosis content narrative evidence types. See Table 4.11.

Table 4.11 *Narrative Evidence Source "Women's Experience with Osteoporosis" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	4.71_a	.46
Secondhand	2.81_b	1.29
Official Health Organization	2.33_{bc}	.73
Official Attention-Control	1.81_c	.81

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

It was predicted that there would be significant differences for the variable "someone who is telling about a woman in their family's experience with osteoporosis," such that secondhand narrative should be judged to rely on upon another's experience more than the other conditions. Results of a one-way ANOVA across the narrative

evidence conditions showed significant differences ($F(3, 80) = 38.83$, $p < .001$, partial $\eta^2 = .59$). As expected, the post-hoc Tukey HSD tests showed the secondhand narrative evidence condition ($M = 4.62$; $SD = .59$) is significantly different compared to the firsthand narrative evidence condition ($M = 2.47$; $SD = 1.08$), the official health organization narrative evidence condition ($M = 2.33$; $SD = 1.12$), and the official attention-control narrative evidence condition ($M = 1.71$; $SD = .78$). See Table 4.12.

Table 4.12 *Narrative Evidence Source "Women's Telling of Family Experience" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	2.47_b	1.08
Secondhand	4.62_a	.59
Official Health Organization	2.78_b	1.12
Official Attention-Control	1.71_c	.78

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

For the variable "a health organization's story about osteoporosis," it was expected that there would be significant differences for the variable such that official health organization narrative evidence should be judged to rely on upon an overview of osteoporosis, and not an experience, more than the other conditions. Results of a one-way ANOVA across the four narrative evidence conditions showed significant differences ($F(3, 80) = 27.16$, $p < .001$, partial $\eta^2 = .50$). As expected, post hoc Tukey HSD tests show that mean responses for the official health organization narrative evidence ($M = 4.52$; $SD = .75$) are significantly different compared to the firsthand narrative evidence condition ($M = 2.24$; $SD = 1.18$), the secondhand narrative evidence condition ($M = 2.38$; $SD = 1.16$) and the official attention-control narrative evidence condition ($M = 1.90$; $SD = 1.04$). See Table 4.13.

Table 4.13 *Narrative Evidence Source "Health Organization's Message" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	2.24_b	1.18
Secondhand	2.38_b	1.16
Official Health Education	4.52_a	.75
Official Attention-Control	1.90_b	1.04

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

Significant differences were expected for the variable, "someone not talking about osteoporosis," such that the official attention-control narrative evidence condition should be judged to rely on upon book preservation, and not osteoporosis, more than the other conditions. Results of a one-way ANOVA for the variable "someone not talking about osteoporosis" revealed significant differences ($F(3, 99) = 124.27$, $p < .001$, partial $\eta^2 = .83$). As predicted, post hoc Tukey HSD tests show that mean responses for the official attention control narrative evidence condition ($M = 4.13$; $SD = 1.12$) were significantly different compared to the firsthand narrative evidence condition ($M = 1.04$; $SD = .20$), the secondhand narrative condition ($M = 1.04$; $SD = .19$), and the official health organization narrative condition ($M = 1.12$; $SD = .43$). See Table 4.14.

Table 4.14 *Narrative Evidence Source "Not Discussing Osteoporosis" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	1.04_b	.20
Secondhand	1.04_b	.19
Official Health Organization	1.12_b	.43
Official Attention-Control	4.13_a	1.12

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

Comments by a few participants when handing their questionnaire to the researcher indicated confusion about the point of view questions. Three questions were changed to be more explicit to the source of the narrative in the evidence. A total of 19 participants answered the modified questions along a five-point Likert response scale of "1 = Strongly disagree" to "5 = Strongly agree": (a) a woman who experienced being diagnosed with osteoporosis (M = 3.37; SD = 1.34); (b) someone who is telling about a family member's diagnosis with osteoporosis (M = 3.37; SD = 1.38); and (c) a health organization's message about osteoporosis risks (M = 2.84; SD = 1.38). It was expected to see significant differences per narrative evidence type.

Results were not supported for the "woman who experienced being diagnosed," and "a health organizations' message about osteoporosis risks." Results of a one-way ANOVA for the four narrative evidence type conditions revealed no significant differences for the "woman who experienced an osteoporosis diagnosis" ($F(3, 15) = 2.95$, $p = .07$, partial $\eta^2 = .37$), and marginally significant differences for the "health organization's message about osteoporosis" ($F(3, 15) = 3.30$, $p = .05$, partial $\eta^2 = .40$). Post-hoc Tukey HSD tests revealed conditions did not differ from one another.

For the "someone telling about a family member's diagnosis," the predictions were partly supported. A one-way ANOVA for the "someone telling about a family member's diagnosis" was significant, ($F(3, 15) = 4.62$, $p < .05$, partial $\eta^2 = .48$), but post-hoc Tukey HSD tests showed that mean responses in the secondhand narrative evidence condition (M = 4.50; SD = .84) were significantly different *only* compared to responses in the official attention-control narrative evidence condition (M = 2.00; SD =1.00). See Table 4.15.

Table 4.15 *Narrative Evidence Source "Family Member's Diagnosis" Manipulation Check*

Narrative Evidence	Mean	SD
Firsthand	2.60_{ab}	.1.34
Secondhand	4.50_{a}	.84
Official Health Organization	3.60_{ab}	1.14
Official Attention-Control	2.00_{b}	1.00

Note. Means with different subscripts differ significantly at $p < .05$ by the Tukey honestly significant difference test.

Manipulation Check on Emotive Statements within Narratives

To understand if the manipulation of positive emotive statements versus negative emotive statements is perceived, statements were posed along five-point Likert scales of "1 = Strongly disagree" to "5 = Strongly agree." The positive emotions emphasized in the narratives are happiness, relief and hope; the negative emotions emphasized are fear, sadness and anger. Three questions asked about the general positive, negative or "no emotions" in the message: (a) "The message mentioned specific positive emotions," (b) "The message mentioned specific negative emotions," and (c) "The message did not mention emotions." An additional six questions asked if the story-teller mentioned feelings of happiness, relief, hope, sadness, fear and anger to assess emotive statement manipulations. A total of 85 participants answered these nine questions. Conditions were grouped into positive (n = 29), negative (n = 28) and no emotion groups (n = 28) to test the manipulation across the emotion conditions.

Results of nine one-way ANOVAs show significant differences emerged for the statements of overall positive emotions ($F(2, 82) = 3.98$, $p < .05$, partial $\eta^2 = .09$), statements of overall negative emotions ($F(2, 82) = 8.30$, $p < .05$, partial $\eta^2 = .17$),

statement of happiness (F(2, 82) = 5.02, $p < .05$, partial $\eta^2 = .11$), statement of sadness (F(2, 82) = 6.21, $p < .05$, partial $\eta^2 = .13$), statement of hope (F(2, 82) = 5.66, $p < .05$, partial $\eta^2 = .12$), statement of fear (F(2, 82) = 9.88, $p < .001$, partial $\eta^2 = .19$), statement of relief (F(2, 82) = 8.81, $p < .001$, partial $\eta^2 = .18$), and statement of anger (F(2, 82) = 23.02, $p < .001$, partial $\eta^2 = .36$). No significant differences emerged for overall "no emotion" statement variables (F(2, 82) = .412, $p = .66$, partial $\eta^2 = .01$). See Table 4.16.

Table 4.16 *Emotive Statement Manipulation Check*

Emotion	*F*-value	partial η^2
Positive Emotions	3.98*	.09
Negative Emotions	8.30*	.17
"No Emotions"	.41	.01
Happiness	5.02*	.11
Sadness	6.21*	.13
Hope	5.66*	.12
Fear	9.88**	.19
Relief	8.81**	.18
Anger	23.02**	.36

*$p < .05$; **$p < .001$

It was expected that significant differences would appear such as positive emotion conditions would rely upon the statements of happiness, hope, and relief compared to the negative emotion conditions, and the negative emotion conditions would rely upon the statements of sadness, anger and fear compared to the positive emotion conditions. Examining the post-hoc Tukey HSD tests reveals some significant differences between the positive and negative emotion conditions for the messages.

Positive emotions. As expected for the "message mentioned feelings of positive emotions," both the positive emotion condition ($M = 3.59$; $SD = .87$) and the negative emotion condition ($M = 2.82$; $SD = 1.06$) are statistically significant compared to each

other. Post-hoc Tukey HSD tests, however, show that the "no emotion" condition is not statistically different (M = 3.21; SD = 1.13) from the other two conditions.

Negative emotions. As expected for the "message mentioned feelings of negative emotions" variable, the negative emotion condition (M = 3.96; SD = .88) is statistically significant compared to the positive emotion condition (M = 3.24; SD = .99) and the "no emotion condition" (M = 2.93; SD = 1.05). Both the positive emotion condition and the "no emotion condition" were not statistically different from each other for this variable.

Happiness. As predicted for the variable, "this message mentioned feelings of happiness," the positive emotion condition (M = 3.21; SD = 1.08) is statistically different compared to the negative emotion condition (M = 2.43; SD = .92) and the "no emotion" condition (M = 2.50; SD = 1.07). Both the negative emotion condition and the "no emotion" condition were not statistically different compared to each other for the "happiness statement" variable.

Sadness. Results were not as expected for the variable, "this message mentioned feelings of sadness." Post hoc Tukey HSD tests reveal that the negative emotion condition (M = 3.82; SD = 1.09) and the "no emotion" condition (M = 2.82; SD = 1.06) are statistically different from each other. The positive emotion condition (M = 3.31; SD = 1.04) is not statistically different from the negative emotion condition and the "no emotion" condition on the "sadness statement" manipulation check variable.

Hope. As expected, the manipulation check variable, "this message mentioned feelings of hope," showed the positive emotion condition (M = 4.31; SD = .66) and the negative emotion condition (M = 3.39; SD = 1.22) are statistically different compared to

each other. However, the "no emotion" condition (*M* = 3.79; *SD* = 1.13) is not statistically different from either the positive nor negative emotion conditions.

Fear. Results were not as expected for the manipulation check variable "this message mentioned feelings of fear." Post hoc Tukey HSD tests revealed that the negative emotion condition (*M* = 4.18; *SD* = 1.06) is statistically different compared to the "no emotion" condition (*M* = 2.89; *SD* = 1.23). The positive emotion condition (*M* = 3.52; *SD* = .95) is not statistically different from either condition.

Relief. As expected for the manipulation check variable, "this message mentioned feelings of relief," the post hoc tests show that the positive emotion condition (*M* = 3.48; *SD* = .87) is significantly different compared to the negative emotion condition (*M* = 2.46; *SD* = .92). The "no emotion" condition (*M* = 2.75; *SD* = 1.04) is not statistically different compared to the negative emotion condition on this variable, but is statistically different compared to the positive emotion condition.

Anger. As predicted, for the manipulation check on statements of "anger," post-hoc tests show that the negative emotion condition (*M* = 3.64; *SD* = 1.31) is statistically different compared to the positive emotion condition (*M* = 1.93; *SD* = .88). The no emotion condition (*M* = 2.00; *SD* = .98) is not statistically different from the positive emotion condition, but is statistically different from the negative emotion condition for the manipulation check of statements of anger.

Manipulation check measures were changed mid-way through data collection to emphasize the specific feeling being mentioned in connection to the experience of osteoporosis (e.g., "The person in the message mentioned happiness about the experience of osteoporosis"). A total of 19 people answered all these questions. A manipulation

check via nine one-way ANOVAs revealed no significant differences across positive, negative or "no emotion" conditions for all statements, *except* for fear ($F(2, 16) = 7.10$, $p < .05$, partial $\eta^2 = .49$) and anger ($F(2, 16) = 4.51$, $p < .05$, partial $\eta^2 = .36$). As expected, post hoc Tukey HSD tests showed that for the manipulation statement on fear, the negative emotion condition ($M = 4.36$; $SD = .85$) was statistically different compared to the positive emotion condition ($M = 2.17$; $SD = 1.47$) and the "no emotion" condition ($M = 3.67$; $SD = .52$). The "no emotion" condition was not statistically different compared to the positive emotion condition for the manipulation check on fear. Also as expected, post hoc Tukey HSD tests for the manipulation check on anger showed that the negative emotion condition ($M = 3.43$; $SD = .98$) was statistically different compared to the positive emotion condition ($M = 1.67$; $SD = 1.03$). The "no emotion condition" was not statistically different compared to either condition for the manipulation check on anger.

Measurement of Emotion and Comprehension

Within the pilot questionnaire, questions were included to assess the range of emotional responses to the narrative evidence types, regardless of the manipulated emotion condition, and comprehension of the narrative evidence. Literature argues that messages can evoke many emotions (Dillard & Peck, 2001); it was therefore important to learn if a range emotions were raised after reading the narrative evidence. It is possible that while participants read a positive narrative and recognize the emotive statements of happy, hope and relief within the narrative, a negative emotion such as fear can be aroused in the individual (Dillard & Peck, 2001). Comprehension of recommended prevention behaviors is also key in health messages so as to ensure material is presented

in a clear manner as well as indicate participants were involved in the material in order to understand it.

Range of Emotional Responses

It was predicted that a range of emotions would be experienced by participants after reading a type of narrative evidence. Oatley (2002) argues that a range of emotional responses indicates identification and involvement with the narrative. To understand the emotional responses to the narrative evidence, measures from Shen & Dillard (2007) assessing discrete emotions were used. These items measure the discrete emotions of surprise (e.g., surprised, startled, astonished), anger (e.g., irritated, angry, annoyed, aggravated), fear (e.g., fearful, afraid, scared), sadness (e.g., sad, dreary, dismal), guilt (e.g., guilty, ashamed), happiness (e.g., happy, elated, cheerful, joyful) and contentment (e.g., contented, peaceful, mellow, tranquil) along a five-point response scale of "0 = none of this emotion" to "4 = A great deal of this emotion" (Shen & Dillard, 2007). Research has found that the positive emotions are happiness, relief, hope, while the negative emotions are anger, fear, sadness and guilt (Lazarus, 1991; 2001). Research has found the discrete emotions of surprise and contentment to be evidenced (Dillard & Peck, 2001), but research is still unclear if these consistently represent positive and negative emotions. Previous research has found that the scale formed from the combined items to be reliable, with Cronbach's alpha to range from .80 to .90 for each discrete emotion (Shen & Dillard, 2007). Additionally, to asses the discrete measures of relief and hope (Lazarus, 1991; 2001), items additional items were used to capture these emotions. Items were relief, assisted and helped to measure relief, and anticipation, optimistic and hopeful to measure hope. The stem asked participants to rate how the message made them feel

and then provided the 29 items representing the nine different emotions to respond to along the scale.

Results indicate that a prediction of a range of emotional responses in response to narrative evidence was accurate. A total of 103 women completed all the questions about discrete emotions felt after reading the message, as one participant left a response blank for the "help" item. Frequency distributions revealed many emotions with skewness with values ranging from 3.23 (tranquil) to 6.63 (ashamed), and means ranging from .37 to 2.10. Some of the items also demonstrated low variance: happy ($\sigma^2 = .25$), elated ($\sigma^2 = .43$), sad ($\sigma^2 = .29$), and relief ($\sigma^2 = .34$). These four items were removed from analyses. Based on histogram distributions showing skewness and previous research (Dillard et al., 1996), items were transformed using a square root transformation. All items were transformed to provide the same metric for responses. This reduced skewness values to .24 to 4.74, and means ranging from .36 to 1.27. All responses with the transformation are within a range of 0 to 2. Confirmatory factor analysis was performed, with items corresponding to the 9 latent emotion variables, using the transformed items minus the four items with low variance. Results show an adequate model fit ($df = 239$, Satorra-Bentler $\chi^2 = 344.39$, RMSEA = .07, CFI = .96, SRMR = .09). The largest modification indices suggested cross-loading of items onto different latent variables; such modifications were not done due the lack of theoretical basis. As with previous research, items assessing each discrete emotion were summed within scales and divided by the number of items in the scales (Shen & Dillard, 2007): surprise (e.g., surprised, startled and astonished, $\alpha = .87$; $M = 1.09$, $SD = .55$), anger (e.g., irritated, angry, annoyed, aggravated, $\alpha = .89$; $M = .51$, $SD = .56$), fear (e.g., fearful, afraid, scared, $\alpha = .95$; $M =$

1.05, *SD* = .65), sadness (e.g., dreary, dismal, α = .81; *M* = .55, *SD* = .59), guilt (e.g., guilty, ashamed, α = .85; *M* = .55, *SD* = .63), happy (e.g., cheerful, joyful, α = .86, *M* = .38, *SD* = .53) contentment (e.g., peaceful, mellow, tranquil, content, α = .86; *M* = .76, *SD* = .56), relief (e.g., assisted, helped, α = .81; *M* = 1.04, *SD* = .66), and hope (e.g., hopeful, optimistic, anticipation, α = .82; *M* = 1.14; *SD* = .60).

Comprehension of Narrative Evidence

It was expected that participants would comprehend the content of the message. To assess comprehension several questions were asked to assess the overall understanding of the message. A series of eleven, five-point semantic differential pairs were asked. Five items were introduced with the phrase, "According to the message," with response items including: (a) unimportant (important); (b) necessary (unnecessary) [re-coded]; (c) relevant (irrelevant) [re-coded]; and (d) impossible (possible). These stems included: "the role of personal behaviors on one's risk of osteoporosis is," "the role of calcium is," "the role of weight-bearing exercise is," "the role of family history is," and "friends think doing healthy behaviors is." An additional six items were introduced with the phrase, "After reading the message, I believe" to assess with response items including: (a) unimportant (important); (b) necessary (unnecessary) [re-coded]; (c) relevant (irrelevant) [re-coded]; and (d) impossible (possible). This resulted in 44 items. These items included: "I believe consuming calcium can prevent osteoporosis is," "I believe doing weight-bearing exercises to prevent osteoporosis is," "I believe osteoporosis prevention behaviors are not needed because a pill can cure osteoporosis is," "I believe taking medications to help cure osteoporosis is," "I believe taking calcium to

prevent osteoporosis is," and "I believe getting vitamin D as a part of my lifestyle to prevent osteoporosis is."

As predicted, participants displayed comprehension of the materials. A total of 103 participants answered the all the comprehension questions, with 104 answering all the "according to the message" items and 103 answering the "after reading the message" items. Items with the responses as "Necessary to Unnecessary" and "Relevant to Irrelevant" were re-coded. Means ranged from 2.09 to 4.63. As a comprehension scale was not previously validated, several analyses were done to reduce the number of comprehension items to provide a concise measure of comprehension. A maximum likelihood exploratory factor analyses was performed. The KMO (KMO = .85) test indicated that it was appropriate to conduct maximum likelihood exploratory factor analyses with these data. Several iterations of EFAs were performed including separating the "according to the message" and "after reading the message, I believe" and finding subsequent subscales, as well as EFAs of the all 44 items were conducted. While subscales were revealed when separating out the stems using the 60/40 rule and eigenvalues over 1.0 (Hair et al., 1998), these subscales were not theoretically useful (e.g., grouped by context). A review of open-ended responses for the items indicated that the "possible" item response was difficult for participants to comprehend (e.g., "Do you mean overall possible? I don't understand"), participants found the "after reading the message, I believe" to be redundant, and that respondents answered similarly to the "necessary" and "relevant" responses.

As a result of these analyses and a goal to reduce the number of items for comprehension, the six "after reading the message, I believe" items and the "possible"

responses were removed. The "necessary" response items to the "according to the message" items were also removed. The responses of "important" and "relevant" indicate a level of understanding material, as well as finding the material engaging (Parrott et al., 2005; Zaichkowsky, 1994). As participants did not differ on their responses to either "necessary" or "relevant" responses, it was decided to remove the "necessary" items. This resulted in 10 items, and a total of 102 responses. The resulting 10 items are: "According to the message, the role of personal behaviors on one's risk of osteoporosis is: Unimportant to Important and Relevant to Irrelevant," "According to the message, the role of calcium is: Unimportant to Important and Relevant to Irrelevant," "According to the message, the role of weight-bearing exercise is: Unimportant to Important and Relevant to Irrelevant," "According to the message, the role of family history is: Unimportant to Important and Relevant to Irrelevant," and "According to the message, friends think doing healthy behaviors is: Unimportant to Important and Relevant to Irrelevant." A confirmatory factor analysis was performed, showing an adequate model fit (df = 34, Satorra-Bentler χ^2 = 80.17, RMSEA = .12, CFA = .82, SRMR = .10). A resulting composite variable was created showing a reliability of .87 (M = 4.20; SD = .75).

Phase 2 Pilot Summary

Narrative Evidence

Results of the pilot and manipulation check suggested several changes to the narratives to increase the level of interest, engagement and identification, a need to de-emphasize numerical references, as well as increase the presence of emotive statements within the narratives. Changes are outlined below per manipulation check. After changes

were made, narratives were re-read and transitional statements added to provide fidelity to the narrative evidence type.

Interest

Because responses to the official attention-control narrative evidence types showed significantly less interest and engagement compared to the other narrative evidence types, the topic was changed from book preservation to interviewing skills. Many students during the fall semester are interviewing for internships and jobs for the following year. Tips on handling interview expectations will be relevant to all students. Facts about interviewing were obtained from the Penn State Career Services Web site, and from About.com to create a new attention-control message. This new attention-control message will be considered an invented attention-control message because it is relying upon a weaving of stories and recommendations about interviewing well, but is not a firsthand or secondhand experience being told. While information is taken from the credible organizations, there are characters in the story expressing experiences.

Identification and Source of Message

Because the firsthand and secondhand narrative evidence types did not significantly differ from the official health organization narrative and the official attention-control narrative on identification, and there was confusion that the official health organization narrative evidence types as a source of an experience, changes were made regarding the placement of the citation source. It is possible that participants did not read the source at the end of the narrative evidence. In addition, many stories have an introduction to the narrative, which was absent in the pilot. As a result, all firsthand and secondhand narrative evidence types introduce the narrative with, “This message was

created from interviews done March 2008 – June 2008 with young women about osteoporosis" to demonstrate that this narrative is told by someone in the sample's age group to help participants identify with the narrative, and indicate that the narrative is about an experience. In the same token, the official health organization narrative evidence types introduce the narratives with "This message was taken from information available on MayoClinic.com, an online health resource," to emphasize that this message is not from someone in their age group as well as identify what MayoClinic.com is for participants. The invented attention-control narrative evidence types begin with, "This message is taken from Penn State's Career Services and Job Search at About.com."

To also increase identification with the firsthand and secondhand narrative evidence types, statements were added that emphasize the age group and university locale to the firsthand narrative evidence types and secondhand narrative evidence types. As all the participants are attending the same university, this was decided as a way to increase identification with the narrative. This includes statements of, "a college student," and "like a lot of woman my age, I thought osteoporosis was….", as well as University health office was changed to "University Health Services" as this is the building located on the university's campus. When mentioning campus or school, "Penn State" was before the word campus and school to again emphasize the locale. In addition, each narrative mentions to be careful to avoid falls, and this was emphasized by mentioning the snow plowing situation at Penn State, a common complaint among undergraduate students.

Numbers vs. Narratives

Results of the manipulation check indicated that official health organization narrative evidence types are perceived to rely upon numbers. The official health

education narrative was re-read, and the following statement was removed: “A full cycle of bone remodeling takes about two to three months.” Additionally, the numbers “25” and “35” were re-written as “mid-twenties” and “mid-thirties” within the statement about attaining bone mass during these critical periods.

Emotive Statements

Manipulation check measures indicated that the emotive statements emphasizing fear, sadness, happiness and hope were not clear for participants across positive and negative conditions. Within the negative firsthand narrative evidence, the word “sad” was added three times, and the phrase, “I get scared that during the winters at PSU they won’t plow and I could fall,” was added to emphasize fear. Within the negative secondhand narrative evidence, “sad” was added three times, and the phrase “fear of living like that” to indicate fear. Within the negative official health organization narrative evidence types, the word “sad” was added twice, “fearful” was added once, and “afraid” added once.

To de-emphasize fear or sadness within the positive firsthand and secondhand narrative evidence, statements were removed. In the positive firsthand condition, “I still thought nothing was wrong with me, I guess I was in denial,” “Right then, I was like what? Are you kidding me? I have a million other things to worry about and now this?,” “Nothing to worry about, right?” “Really, me? Osteoporosis? Come on!” were deleted. In the positive secondhand, the statements “but the truth was, my mom was thinking a lot about how to handle with bones being weak and all,” and “totally undermines her health or defines who she is,” were removed.

To increase perceptions of happiness and hope, statements were added to the positive narrative evidence conditions. Within the positive firsthand narrative, the

statement, “Okay, cool! I know I can do this!” was changed to, “I was happy to know I could do this and hopeful for the future,” and the statements, “But, I was pretty hopeful about the disease and relieved that the health practitioner was so knowledgeable about what to do,” and “I’m hopeful these things will work to improve my bones I have high hopes that things will continue this way” were added. Within the positive secondhand narrative evidence, the following statements were added: “I mean, I’m hopeful you won’t get low bone mass,” “…and seemed really hopeful about everything,” “….and I’m hopeful it will work,” “She’s relieved to have been diagnosed, and hopeful for the future,” “I’m happy and relieved,” and “She’s still the same happy person.” In the positive official health organization narrative evidence, the statements, “Many people are hopeful to prevent the disease by providing this information to others,” “Many people are happy to know about the different sources of calcium,” “…and increase hopes of preventing the disease” were added.

Measure Modifications

In addition to changes within the narrative evidence, the manipulation check in the pilot indicated changes with measures for the experimental study. The following modifications were made.

Interest, engagement and identification. Within the Transportation Scale (Green & Brock, 2000) to identify interest and engagement with the narratives, the item “While I was reading the message, activity going on in the room around me was on my mind,” was removed. This item was skewed and the testing environment showed controlled for outside activity. In addition, the pilot indicated that the response scale 1 to 7 could be changed to 1 to 5 as more than half of the responses were falling in the 3 to 7 range.

For assessing identification, the items, “The teller of the message mentioned places I know,” and “I trust the teller of the message,” were removed based on EFA analyses. Two additional questions were added to demonstrate identification with the teller as part of being involved with imagining the teller (Oatley, 2002) and the teller of the message being among the sample’s age group. The questions are “While reading the message, I could imagine the message-teller,” and “I think the teller of the message sounded like someone around my age.”

Use of narrative evidence. Within the questions asking to participants to differentiate between the use of narratives versus numbers as evidence, questions removed the phrase “osteoporosis risks” as to make it relatable to the invented attention-control narrative evidence condition. The question asking about “an experience” was a problem for those in the official health organization narrative evidence types. Thus, the questions were re-stated. The questions were re-written from as a five-point Likert scale with the stem was changed to read: “The message relied on using a verbal description to inform you,” and “The message relied on the use of numbers to inform you” to better account for the use of narrative evidence.

Source of the message. Manipulation check analyses showed that the questions using the word “diagnosis” were not suitable when asking about the source of the message. As narratives include information about a grandmother’s possible diagnosis, the word “diagnosis” was removed from questions. Additionally, the phrase “point of view” was removed as open-ended responses indicated that some participants did not know what this meant. It was changed to, “The person telling this message is.”

Emotive statements. When asking about feelings mentioned in the story, the phrase "about osteoporosis risks" was changed to "the issue being discussed" to apply to those in the attention-control condition. The specific emotion was put in italics to help visually emphasize the emotion within the statements. The word "emotion" was also changed to "feeling" to relate better to the lay audience.

Range of emotions. Four items were removed from the items assessing different emotions after reading the narrative due to low variance. "Sad," "happy" "elated" and "relief" were removed. Other items are still within the measure to represent sadness, happiness, and relief. All other items remained to represent the total of nine latent emotions.

Comprehension. The six "After reading the message, I believe" statements were removed from the comprehension questions. It was determined that participants found these questions to be redundant to the "According to the message, the role of…." statements. In addition, the "possible" and "necessary" response options were removed, as participants had difficulty answering the "possible" response and answered "necessary" items similarly as "relevant" items. Thus, to reduce the number of questions and response fatigue, these items were removed. Additional directions about the use of the scale were added to account for those in the attention-control condition (e.g., the use of neutral or "3"), and a question was added about vitamin D, as this is emphasized in the narrative: "According to the message, the role of vitamin D to prevent one's risk of osteoporosis is."

Phase 3: Experimental Study

To answer the hypotheses and research questions about the persuasiveness of narrative evidence types and the role of different emotive statements within narrative evidence types, a total of 308 subjects participated in the experimental study from October 12, 2008 to December 11, 2008. Phase 3 of the study included the 4x3 between subjects factorial design for message exposure and a follow-up 24-hour dietary recall interview, 48-72 hours post message exposure. Preliminary measurement analyses found that one subject did not answer responses on two primary dependent variables of interest (i.e., perceived message effectiveness and perceived evidence quality), thereby reducing the data set to 307. To maintain a consistent sample size throughout the analyses, this subject case was deleted and subsequent preliminary and substantive analyses report on a sample size of 307.

Participants ranged from 18 to 25 years of age (M = 19.92; SD = 1.18). Forty-three percent (n = 132) of the participants self-reported their education as "Junior," with 21.10% (n = 65) as "Sophomores," 20.50% (n = 63) as "Senior," and 14.30% (n = 44) as "Freshman." Only one (.30%) participant stated "Graduate Student," with two (.60%) reporting "Other" as being a "transfer student" or a "fifth year Senior." The majority of subjects (n = 291; 94.80%) responded that they are not of "Hispanic or Latino" ethnicity, with 82.70% (n = 254) reporting their race as "White" and 4.20% (n = 13) as "Black or African-American," and 8.40% (n = 26) as "Asian." Only fifteen (4.9%) participants named their race as "Other" such as "multi-cultural," "Puerto Rican" or "West Indian." Of the 307 participants, only 11 (3.60%) stated a medical professional had diagnosed them as lactose intolerant. In regards to smoking and alcohol health habits among the

general sample, only 267 (86.97%) answered about smoking habits and 299 (97.40%) answered about alcohol use. Most of the participants (*n* = 257; 83.70%) said they do not smoke. The majority of participants (*n* = 124; 40.3%) indicated drinking 0 to 5 drinks per week, with 77 (25.5%) stated drinking six to 10 drinks per week, 66 (21.5%) said they drink zero alcoholic beverages, 30 (9.70%) reported consuming 11 to 20 drinks per week and 2 (.60%) participants drinking more than 20 alcoholic beverages a week. A total of 67 (21.80%) of the 253 women participating in the 24-hour dietary recall indicated they took a vitamin supplement.

Recruitment and Procedure

Participants were recruited in three ways for Phase 3 of the study. First, the study was listed via the basic Communication Arts and Sciences public speaking course research pool for the Fall semester. This sample was selected as it represents a generalized population of undergraduate students attending the university; every student on campus is required to take this course for graduation. Undergraduate students majoring in political science, education, electrical engineering, communication, nutrition, psychology, management and more were registered for the class during Fall 2008. Participants recruited via the research pool received 2% credit in their course for completing the study.

Next, the study was advertised with an ad noting that participants would have a chance to win a $25 gift card (e.g., MasterCard, Downtown State College, or iTunes). Twenty winners were randomly selected to win. This raffle was advertised through (a) five undergraduate communication classrooms during the weeks of October 20th and October 27th, (b) *The Daily Collegian* classified section for the Monday, November 3rd,

Tuesday, November 4th and Wednesday, November 5th editions, and (c) the Penn State Faculty List Serv on Monday, November 10th. These recruitment methods resulted in 229 participants. To increase the number of participants, two instructors agreed to announce the study in their classrooms the week of December 1st. Participants from these classes were granted 2% extra credit for the participation. An alternate assignment of watching an online speech from AmericanRhetoric.com and responding to the speech was given in this instance to those students not eligible. These recruitment methods resulted in a total of 308 participants. As mentioned previously, measurement details are reported on 307 subjects, as one subject did not answer questions on perceive evidence quality and perceived message effectiveness. In all recruitment efforts, it was emphasized that this was a two-part study of questionnaire and an interview (24-hour dietary recall) and compensation was granted upon completion of both parts. The study was approved by the Institutional Review Board (IRB).

Both interested participants from the advertisements and announcements, and those assigned to the study from the basic public speaking course, were given a range of days (e.g., Sunday-Wednesday and Friday), times (e.g., 9:05am to 7:30pm), and locations (e.g., Sackett, Willard, Chambers, and Sparks) to participate in the questionnaire portion of the study. Upon completion of the questionnaire, participants were given a range of times 48-72 hours after their questionnaire time to participate in the 24 hour dietary recall. Times provided ranged from 9am-7:30pm, dependent upon availability. Reminders were emailed 24 hours prior to both the questionnaire and 24 hour dietary recall with time and location information to enhance attendance. The entire study procedure was one hour including both questionnaire and dietary recall procedures.

Narrative Evidence

Participants received one of 12 messages in the experimental study. Based on Phase 2 of the study, changes were made to the messages as discussed earlier in the Phase 2 pilot summary. Most notably, the content of the attention-control narrative evidence changed from an official narrative about book preservation, to an invented attention-control narrative about interviewing skills. This narrative is invented because it characterizes general experiences of meeting with a career services counselor among two characters to discuss interviewing skills and references tips from the university career services to generate the narrative evidence.

As with the pilot, message consistency decisions were followed when testing the messages: title, source credibility, literacy and readability, message length and message typeset. The beginning text asked participants to read the following message and provided the source of the material. The firsthand and secondhand narrative evidence cited the interviews as source for compiling the stories, the official health organization narrative evidence cited the MayoClinic.com, and the invented attention-control narratives evidence cited the Penn State Career Services and About.com. This was written in Times New Roman 12 point font and bolded. Next, all messages listed the title of the message in Times New Roman 14 point font. The firsthand and secondhand narrative evidence included “A Young Woman Living with Osteoporosis,” in the title, the official health organization narrative evidence included “About Osteoporosis” in the title, and the invented attention-control narrative evidence included “About Interviewing” in the title. The remaining text was in Times New Roman 12 point font. Additionally, Flesh-

Kincaid for all the narratives ranged from 6.6 to 6.9 to represent a sixth to seventh grade reading level, and narratives were 1179 to 1259 (M = 1212) words in length.

As a result, participants in Phase 3 received one of the following messages. Messages were either: (a) positive firsthand narrative evidence [a personal experience of being diagnosed with osteoporosis, and explicit reference to experiencing relief, happiness and hope]; (b) negative firsthand narrative evidence [a personal experience of being diagnosed with osteoporosis, and explicit reference to experiencing sadness, anger and fear]; (c) "no emotion" firsthand narrative evidence [a personal experience of being diagnosed with osteoporosis, and but no explicit references of emotions]; (d) positive secondhand narrative evidence [a recall of another's personal experience with being diagnosed, and explicit reference to that person's relief, happiness and hope]; (e) negative secondhand narrative evidence [a recall of another's personal experience with being diagnosed, and explicit reference to that person's sadness, anger, and fear]; (f) "no emotion" secondhand narrative evidence [a recall of another's personal experience with being diagnosed, but no explicit reference of emotion]; (g) positive official health organization narrative evidence [story of osteoporosis with explicit references of relief, happiness and hope]; (h) negative official health organization narrative evidence [story of osteoporosis with explicit references of sadness, anger and fear]; (i) "no emotion" health organization narrative evidence [story of osteoporosis with no explicit reference of emotion]; (j) positive invented attention-control narrative evidence [story of learning job interviewing skills with explicit references to relief, happiness, and hope]; (k) negative invented attention-control narrative evidence [story of learning job interviewing skills with explicit references to sadness, anger and fear]; and (l) "no emotion" invented

attention-control narrative evidence [story of learning job interviewing skills with no explicit reference of emotion]. See Appendix A-L for all narrative evidence.

Questionnaire

Classrooms able to seat 50-100 students were obtained to administer the study throughout the center part of campus. The number of participants per timeslot ranged from one to 15 per session. As participants entered the room, they were asked to be seated every other desk. As with the pilot study, the informed consent was explained to participants outlining their rights as a research participant in the study. Each participant was provided with two copies of the informed consent to read, and instructed to sign one copy and return it, and to keep the other copy for their records. Upon returning the signed informed consent form, they were handed two envelopes. The first envelope was labeled "A" and contained the pre-test questions. The second envelope was marked "B" and contained the manipulated message and post-test questions. Participants were instructed to open envelope "A" and begin the study, and when finished to put questions back in the envelope and seal it before opening envelope "B." These ensured pre-test answers would not be changed after exposure to the message. Similar to the pilot study procedures, the researcher instructed each participant to take their time reading through the questionnaire, complete the answers on their own, and that they would be reading one of several messages. Participants were encouraged to quietly approach the researcher with any questions. Prior to the timeslots, the questionnaires were randomly numbered and participants were assigned to either a message condition or the attention-control condition. Message conditions were randomly assigned in blocks of 12 to help ensure an equal number of participants per message. After completing the questionnaire,

participants placed questionnaire envelopes in a marked box, and were asked to sign-up for a time for the 24-hour dietary recall. All signed informed consent forms and completed questionnaires were stored separately to ensure confidentiality of data.

Dietary Recall

After completing the questionnaire, participants signed-up for a time to complete the dietary recall. In order not to confound message exposure and prime participants, they were told that this would be a brief interview to be done in 324 Chandlee Lab on campus. Participants were provided a map of campus to locate Chandlee Lab, as well as given instructions to the lab's location in the reminder email. Participants signed-up on a first-come, first-serve basis for a time-slot after completing the questionnaire. If a time did not coincide with the participant's schedules, the researcher asked the dietary recall research assistants (RAs) for additional times. If none could be provided, the researcher asked participants to complete a portion of the alternate assignment in lieu of the dietary recall to maintain consistency with time spent on the study among participants who completed the questionnaire and the dietary recall. For those assigned to the study for the basic public speaking course, this ensured a receipt of credit for their course.

After reporting to 324 Chandlee Lab at their designated time, participants were invited into the room by one of the five dietary recall RAs. All of the RAs were nutrition science undergraduate students, and conducted the dietary recalls as part of their research assistantship in the department. For times when more than one participant was assigned, dietary recalls were conducted in either 302 or 324 Chandlee Lab. RAs conducting dietary recalls in 302 Chandlee met with participants outside 324 Chandlee and escorted them down the hall. Upon asking the participant to sit, the RAs briefly explained the

interview process and asked participants to fill out demographic information of the first two letters of their last name, their date of birth, and the first two letters of their mother's maiden name. This same information was collected in the beginning of the questionnaire to enable the researcher to link participant responses from the questionnaires and dietary recalls.

Upon completion, the RAs then conducted the United States Department of Agriculture's 5-step multiple-pass method (Conway, Ingwersen, Vinyard, Moshfegh, 2003) to complete all 24-hour dietary recalls. Interviewers asked participants to name all foods and beverages consumed in the previous 24-hour period (quick list), reflect on categories of foods and beverages often overlooked (forgotten foods), identify the times, locations, and activities around which foods and beverages were eaten (time and occasion), provide descriptions of foods and beverages, including portion sizes and preparation methods (detail cycle), and review the 24-hour recall for any missing details, including use of nutrient supplements (final probe). Food models (3-dimensional) and food pictures (2-dimensional) were used during the detail cycle step of the 24-hour dietary recall interview to promote accuracy in portion size estimations within and among participants. The 5-step multiple-pass method is reliable and valid and is considered a gold-standard for dietary intake assessment (Ard, Desmond, Allison, Conway, 2006; Conway et al., 2003; Conway, Ingwersen, Moshfegh, 2004; Moshfegh et al. 2008).

After answering questions for the dietary recall, participants were provided with a credit slip to complete. This recorded their name and email address in order to grant credit for the basic public speaking course, to enter them in the drawing, or to provide their name to instructors for extra credit. Participants were then given the National

Osteoporosis Foundation, "What you need to know about osteoporosis" (NOF, 2005) informational booklet as a debriefing material. Participants were instructed to not discuss the study with friends or classmates so as to not influence the study.

Consistency of dietary recalls. Prior to the study, the undergraduate RAs met with the researcher to discuss the study and the tasks to be performed during the dietary recall for one hour. The researcher emphasized that the RAs were not to answer any questions by participants, and to direct any inquiries to the researcher. The researcher then met with each RA individually for 30 minutes to practice the dietary recall procedure to maintain consistency of procedures. In addition, the researcher and the undergraduate independent study advisor for the RAs observed each RA during one of their first five dietary recalls conducted. RAs were advised on any improvements and corrections in the procedure or 5-Pass Method. The researcher also observed the RAs at random times throughout the study to ensure consistency.

Instrumentation

To test the two hypotheses and eleven research questions proposed earlier, measurement related to 12 constructs were used. The independent variables and covariates are: (a) preference for numerical information; (b) family health history including family discussion of osteoporosis; (c) narrative tendencies; and (d) pre-test health behaviors. Manipulation check measures of the narrative components, narrative types and emotive statement were assessed at post-test to assess whether manipulations were perceived as intended. Dependent variables are: (a) cognitive responses; (b) emotion responses; (c) perceived evidence quality; (d) comprehension; (e) perceived message

effectiveness; (f) message processing (systematic and heuristic processing); (g) behavioral intentions and (h) behavior.

Prior to analyses, item-analysis and scale analysis were conducted to examine the performance of items (Clark & Watson, 1995) and the distribution of the data (Scott & Mazhindu, 2005). These included analyzing the central tendencies, skewness, and kurtosis of the items. As with the pilot in Phase 2, skewness and kurtosis values were determined by dividing the skewness and kurtosis statistic by its standard error to yield a *t*-value. For Phase 3 of the study, a *t*-value over +/- 1.96 was significantly different from 0 ($p < .05$) and indicated that the measure was lacking in symmetry in distribution (Ray, Hundleby, & Goldstein, 1962). As with the pilot, preliminary analyses included maximum likelihood exploratory factor analyses using principal axis factoring and oblique rotation to explain the amount of variance explained and to take into account the correlation of items for previously un-validated scales (Hair et al., 1998). The 60/40 rule was used and eigenvalues above 1 to determine factors (Hair et al., 1998). Confirmatory factor analyses were also performed to understand the measurement model of scales. Hu and Bentler (1999) indices (e.g., CFI > .95; SRMR < .08; RMSEA < .06) were followed for assessing model fits for confirmatory factor analyses. SPSS version 16.0 and LISREL version 8.51 were used to perform analyses, and the Food Processor SQL was used to assess dietary recall food intake. Significance was assessed at the .05 level. The total of 307 participants exceeds the 277 needed to conduct analyses following MacCullum, Browne and Sugawara (1996) estimations for minimum sample sizes needed as a conservative estimate for path analyses with an alpha of .05 and power of .80. This also

meets the Cohen (1988) requirements for 20 cases per 12 messages (total $N > 240$) for analyses to be performed with a power of .80 to detect small effects (.20).

Independent Variables

The following outlines the measurement of the independent variables used to test the hypotheses and research questions of interest.

Preference for numerical information. Items from the Preference for Numerical Information Scale (PNI) (Viswanathan, 1993) were used to assess individual's tendency to prefer numerical information along a five-point Likert scale of "1 = Strongly disagree" to "5 = Strongly agree." Previous studies show the 20-item scale with Cronbach's alpha of .90 or .91 (Viswanathan, 1993). Questions included, "I prefer to not pay attention to information involving numbers," and "I think more information should be available in numerical form." A total of 304 participants answered all of the PNI questions.

After recoding needed items, only seven items of the 20 items for the scale showed skewness *t*-values as being less than +/- 1.96: "I enjoy work that requires the use of numbers," "I think more information should be available in numerical form," "Thinking is enjoyable when it does not involve numbers [re-coded]" "I like to make calculations using numerical information," "I easily lose interest in graphs, percentages, and other quantitative information [re-coded]," "I like to over numbers in my head," and "It helps me to think if I put down information as numbers."

Of these seven items, three displayed bi-modal distributions: "I enjoy work that requires numbers," "I like to go over numbers in my head," and "It helps me to think if I put down information as numbers." Several analyses were conducted to understand the bimodality of these measures, and if participants were answering these items the same

way in order to retain these items. These three items were re-coded into dichotomous high = 1, low = 0 responses across a median split (3.00). Across these three items, 143 (45.5%) participants answered "low = 0" to all three items, and 60 (19.5%) of participants answered "high = 1" to all three items. This represents n = 199 (65%) of the sample. The other 107 (35%) responded with some variation on these items. Because more than half of the participants answered these bimodal questions the same way, it validated these items and their inclusion. In other words, the majority of responses on either end of the scale reflect the real distribution of participants judgments, and they are not distorting the scale to respond indifferently (or 3, neutral) (Guilford & Jorgensen, 1938). The seven items were thus retained as they were not skewed as the bimodality of the items was seen as not a problem; items were retained along the full range of 1 to 5. However, while reliability was high among these seven measures (α = .89), histogram distribution showed the variable to be bi-modal. It was revealed the removing the item, "I easily lose interest in graphs, percentages, and other quantitative information," [re-coded], eliminated bimodality of the variable and the reliability of the scale remained the same at α = .89. A confirmatory factor analysis with these six items of original 20 PNI revealed an adequate model ft (df = 9, Satorra-Bentler χ^2 = 26.80, RMSEA = .09, CFA = .98, SRMR = .03). A total of 307 participants answered these six items. A composite measure was created for PNI with six items showing a reliability of .89 (M = 2.89; SD = .83).

Current health behaviors. Nine current health behavior questions asked participants to respond along an interval scale of "1 = Never," "2 = Rarely," "3 = Sometimes," "4 = Often," " 5 = Always" about their current use of soy milk, milk, dairy

products, multi-vitamins with Vitamin D, time spent outdoors, physical exercise, consumption of calcium-fortified orange juice and consumption of soda (pop) and coffee. These questions follow similar items asked of participants assessing health variables when testing the success of osteoporosis prevention education programs (Chan et al., 2007). None of the items displayed bimodality issues, although an adequate reliability among the items was not attainable ($\alpha = .29$). A maximum likelihood exploratory factor analyses was performed to understand if subscales of current health behavior were likely. The KMO (KMO = .59) tests indicated that exploratory factor analyses may be problematic with this data (Kaiser, 1970). In fact, subscales were not revealed when separating out the stems using the 60/40 rule and eigenvalues over 1.0 (Hair et al., 1998), as many items did not load onto factors. Several attempts were made to find reliability among diet relevant and exercise relevant items, but none achieved reliability.

To retain the current health behaviors at pre-test, a current health behavior index was created by categorizing the health behaviors into either high or low. Each item was dichotomized at a mean split per item into a high or low category. A summative current health behavior index was thus created with all of the categorized current health behavior items. The index ranges from 0 to 9 with a mean of 3.93 (*SD* = 1.70).

Overall family health history. To understand knowledge of family health history, several questions were used to assess overall family health history of osteoporosis among participants which included knowing a diagnosis and family discussions about osteoporosis in the family. A nominal "No," "Yes" or "Don't Know" question asked about knowing a specific family history of the disease. Questions also asked participants to identify their relationship with this person (e.g., mother, father, sister, brother). A total

of 302 participants answered the question, “Do you know if a medical doctor diagnosed a biological family member with osteoporosis?” Only 58 (18.90%) of participants indicated that a family member had been diagnosed with the disease, with 123 (40.10%) participants stating “no” and 121 (39.40%) indicating they “did not know.”

To further assess family history, two questions asked respondents to answer either “No,” or “Yes” to having a family member disclose information about osteoporosis and bone health related about a family member to them. Additional items also asked for participants to name the family member engaging in this conversation. Focus groups of young women revealed that a parent often told young women about a family member’s health issue and had a discussion about this disclosed health issue (Volkman, in progress). A total of 301 participants answered the question, “Has any biological family member disclosed to you about another biological family member being diagnosed with osteoporosis? (example: your mom told you about your grandmother’s diagnosis). The majority of participants (*n* = 268; 87.30%) responded “no” to this question. To the question, “Has any biological family member disclosed to you about their own diagnosis with osteoporosis?” (example: your grandmother told you about her diagnosis), a total of 281 (91%) of participants responded. The majority of responses (*n* = 256; 83.40%) answered “no” to this question.

These three items were re-coded to represent a range of osteoporosis health history ranging from 0 to 2. A total of 246 (80.10%) of participants replied as either “no” family history, or “don’t know” about family history, or “no” to family discussion about osteoporosis. A total of 50 (16.20%) of participants replied “yes” to family history of osteoporosis or “yes” to discussions about family history. Only 11 (3.60%) of participants

replied to both "yes" for knowing the family history of osteoporosis and having family discussions about the disease.

Narrative tendencies. The narrative tendencies construct measured an individual's predisposition for creating and finding narratives (Newman, 2005) using six items: "I enjoy hearing funny stories," "I enjoy making people laugh with my stories," "I do not enjoy a story with cliché plots or characters (re-coded)," "I enjoy telling stories," "My best stories are about things that happened to me," and "I often exaggerate to make my stories more entertaining." The items developed by Newman (2005) describe the individual cognitive, physiological, and sensory motor conditions associated with narrative tendencies along a five-point scale of "Strongly disagree" to "Strongly agree."

Preliminary analyses indicated that only three items were not skewed at a *t*-value of +/- 1.96: "I do not enjoy a story with cliché plots or characters (re-coded)," "My best stories are about things that have happened to me," and "I often exaggerate a little to make my stories more entertaining." Initial reliability of these three items was poor at α = .28, with initial reliability of all six items at α = .55. Removing the item, "I do not enjoy a story with cliché plots or characters (re-coded)," improved reliability to α = .63. A series of transformations were performed, including a reflect and square root, log transformation and square root transformation, to remedy skewness in order to retain all items (Pallant, 2007). Resulting skewness *t*-values worsened for each of the transformations. A maximum likelihood exploratory factor analysis was then conducted to identify possible items to retain for analyses among the original six items. The KMO of .69 indicated to proceed with caution for analyses (Kaiser, 1970) and resulted in two factors for narrative tendencies: Factor 1, Enjoying narratives: "I enjoy hearing funny

stories," "I enjoy making people laugh," and "I enjoy telling stories" (α = .67); and Factor 2, Telling narratives: "My best stories are about things that have happened to me," and "I often exaggerate a little to make my stories more entertaining" (α = .53). The item, "I do not enjoy a story with cliché plots or characters (re-coded)," did not load onto either factor. This item was subsequently deleted. As the items did not demonstrate bimodal tendencies, and skewness could not be eliminated, five items were used to create the narrative tendencies measure. A confirmatory factor analysis revealed a good model ft (*df* = 5, Satorra-Bentler χ^2 = 3.55, RMSEA = .00, CFA = 1.00, SRMR = .02) for the composite narrative tendencies measure of five items (α = .63; *M* = 4.11; *SD* = .50).

Manipulation Checks

Identification with message. To assess participant's identification with the message, participants were asked four questions along a Likert scale of "1 = Strongly disagree," to "5 = Strongly agree." These questions include: "The teller of the message reminds me of myself," "While reading the message, I could imagine the message-teller," "The teller of the message is someone like me," and "I think the teller of the message sounded like someone around my age." Frequency distributions showed three of the four items were skewed with *t*-values greater than +/- 1.96, ranging from .23 to -4.82. The only item not skewed was "The teller of the message reminds me of myself." A series of transformations including square root, reflect and square root and log were attempted to reduce skewness (Pallant, 2007); unfortunately, each transformation increased skewness *t*-values (e.g., range rose from -.75 to -7.13). Given that skewness could not be improved, a maximum likelihood exploratory factor analysis (KMO = .71) was performed on the non-transformed items. This showed the model as unidimensional. A resulting

confirmatory factor analysis indicated that the items were a good model fit when allowing Item2: "While reading the message, I could imagine the story-teller" and Item 4: "I think the teller of the message sounded like someone around my age," to covary error variance (df = 1, Satorra-Bentler χ^2 = 1.96, RMSEA = .06, CFA = .99, SRMR = .01). A resulting composite measure of identification showed a reliability of α = .77 (M = 3.20; SD= .79).

It was predicted that significant differences would emerge, such that participants would identify more with the firsthand narrative and secondhand narrative evidence compared to the official health organization and invented attention-control narrative evidence. This was partially supported with a one-way ANOVA of narrative evidence condition across the dependent variable of identification ($F(3, 303) = 20.27$, $p < .05$, partial $\eta^2 = .17$). Post-hoc Tukey HSD tests revealed that participants were less likely to identify with the official health organization narrative evidence (M = 2.67; SD = .63), compared to the firsthand narrative evidence (M = 3.48; SD = .79), secondhand narrative evidence (M = 3.45; SD = .68) and invented attention-control narrative evidence (M = 3.20; SD = .79) conditions. The firsthand, secondhand, and invented attention-control narrative evidence conditions were not significantly different than each other regarding identification. Given that the invented attention-control message was changed to a topic of interviewing, which all college-students do for jobs and internships, it can be assumed that participants found higher identification with this narrative evidence.

Narrative engagement and interest manipulation check. Similar to the Phase 2 pilot study, the manipulation check variables used to test the messages along narrative properties of interest and engagement using the Transportation Theory scale items from

Green and Brock (2000). This manipulation ensured that all conditions were perceived to be equal in narrative engagement and interest invoked. Narrative component questions were asked along 11 items along a five-point scale from "1 = Not at all" to "5 = Very much." Questions include, "While I was reading the message, I could easily picture the events in taking place," "I wanted to learn how the message ended," and "I was involved in the message while reading it." A total of 307 participants answered the all the transportation questions. Preliminary analyses showed seven of the 11 items to be skewed, with skewness *t*-values ranging from -1.97 to -7.25. Based on the histogram distribution, a reflect and square root transformation was performed (Pallant, 2007) which improved skewness to only four versus seven items, ranging in *t*-values from 3.86 to 4.69. Similar to the pilot study in Phase 2, a confirmatory factor analysis was performed with all items, resulting in a poor model fit (df = 35, Satorra-Bentler χ^2 = 344.42, RMSEA = .16, CFA = .80, SRMR = .10). A maximum likelihood exploratory factor analysis was performed to understand how to improve model fit (KMO = .80) resulted in four factors. Factor 1: engagement (α = .82) included the items, "While I was reading the message, I could easily picture the events in it taking place," "I could picture myself in the scene of the events described in the message," and "I was involved in the message while reading it." Factor 2: interest to life (α = .65) included items, "The message affected me emotionally," "The events in the message are relevant to everyday life," and "The events in the message changed my life." Factor 3: involvement (α = .48) included, "After finishing the message, I found it easy to put it out of my mind," and "I found my mind wandering while reading the message." Finally, Factor 4: imagery (α = .62) had the items "I wanted to learn how the message ended," "I found myself think of

ways the message would have turned out differently" and "While reading the message, I had a vivid image of the message teller." A confirmatory factor analyses showing items loading onto these four factors had a reasonable model fit (*df* = 38, Satorra-Bentler χ^2 = 144.82, RMSEA = .10, CFA = .91, SRMR = .07). Following recommended modification fit indices for this four factor model did not improve model fit. A resulting composite measure with the range of 1 to 2.24 was created showing a reliability of α = .80 (*M* = 1.62; *SD* = .18). As predicted, a one-way ANOVA of narrative evidence type condition across the dependent measure of transportation was not significant (F(3, 303) = .73, *p* = .54, partial η^2 = .01), indicating that participants did not differ in their transportation into the narrative evidence conditions.

Narrative evidence manipulation check. Two questions were asked of participants to evaluate the use of narrative evidence within the messages to ascertain if this type of evidence was detected. Here, too, the aim was to evoke similar perceptions relating to the evidence in the messages. Participants were asked to respond along a five-point Likert scale of "1 = Strongly disagree," to "5 = Strongly agree" to the statements: "The message relied on using a verbal description to inform you," and "The message relied on the use of numbers to inform you." A total of 307 participants answered each question. As predicted, no significant differences emerged between the independent measure narrative evidence types across the dependent measure of the use of verbal descriptions being used in the message using a one-way ANOVA (F(3, 303) = 1.04, *p* = .38, partial η^2 = .01). Not as predicted, significant differences did emerge between the independent measure of narrative evidence types across the dependent measure of the use of numbers used in the message using a one-way ANOVA (F(3, 303) = 4.68, *p* < .05, partial η^2 = .05). Post-hoc

Tukey HSD test showed that participants found the official health organization narrative evidence type (M = 1.91; SD = .85) to be significantly different from the secondhand narrative evidence type (M = 1.45; SD = .66). In other words, participants found the official health organization message to have more numbers compared to the secondhand narrative evidence. No other differences emerged between narrative evidence types on this dependent measure. It can be inferred that participants recognized the source of the official health organization narrative evidence, in which statistics and numbers are often used to convey health risks, and attributed this to the evidence provided.

Source of narrative evidence. To assess that participants identified the different sources and point of view for the narrative evidence, they were asked to respond to four statements along a five-point Likert scale of "1 = Strongly disagree" to "5 = Strongly agree" with the stem "The person telling the message is" about the person telling the message. The four items were: "Someone who experienced osteoporosis themselves," "Someone who is telling about a parent's experience with osteoporosis," "A health organization's message about osteoporosis risks," and "Someone not talking about osteoporosis." A total of 307 participants answered these items, and a series of one-way ANOVAs were performed to assess differences across the items.

As predicted, the firsthand narrative evidence (M = 4.56; SD = .68) was seen as significantly different than all other narrative evidence types for the source being someone who experienced osteoporosis themselves ($F(3, 303) = 163.86$, $p < .001$, partial $\eta^2 = .62$). As predicted, the secondhand narrative evidence (M = 4.71; SD = .56) was seen as significantly different than all other narrative evidence types for the source being someone talking a parent's experience with osteoporosis ($F(3, 303) = 236.65$, $p < .001$,

partial η^2 = .70). As predicted, the official health organization narrative evidence (M = 3.92; SD = .95) was seen as significantly different than all other narrative evidence types for the source being a health organization's message about osteoporosis risks ($F(3, 303) = 63.13$, $p < .001$, partial η^2 = .38). Additionally, as predicted, the invented attention-control narrative evidence (M = 4.52; SD = .82) was seen to be significantly different than all other narrative evidence conditions ($F(3, 303) = 479.32$, $p < .001$, partial η^2 = .83).

Due the nature of these questions, participants identifying their message as a firsthand, secondhand, official health organization or invented attention-control narrative evidence would then mark the same score for all other source questions. For example, marking "Agree" or "Strongly Agree" for a firsthand narrative evidence source, when they were in that condition, but then "Disagree" for all other narrative evidence conditions. Thus, some non-significant differences are seen across narrative evidence types, but are not of concern.

Emotive statements manipulation check. Several questions were asked to ensure that the different emotion condition manipulations worked. Participants were asked to identify across a five-point Likert scale of "1 = Strongly disagree" to "5 = Strongly agree" about the message's use of overall positive feelings negative feelings or "no feelings." Additionally, participants were asked if the person in the message mentioned feeling a specific emotion such as happy, sad, hopeful, fear, relief or anger to represent the different emotions expressed in the conditions. A total of 307 participants answered these items. A series of one-way ANOVAs were used to assess condition differences and predictions. Participants in the positive emotion condition (n =104), negative emotion

condition (n = 103) and "no emotion" condition (n = 100) were approximately evenly distributed.

For the use of positive feelings being used in the message, as predicted, significant differences were seen between the positive emotion condition (M = 3.78; SD = .87) and the negative emotion condition (M = 2.47; SD = 1.12) ($F(2, 304) = 53.25$, $p < .001$, partial $\eta^2 = .26$). However, not as predicted, the positive condition and the "no emotion" condition (M = 3.52; SD = .89) were not perceived to be significantly different from each other. Additionally, for the use of negative feelings being used in the message, as predicted, significant differences emerged between the negative emotion condition (M = 4.00; SD = .93) and the positive emotion condition (M = 2.91; SD = 1.04) ($F(2, 304) = 34.07$, $p < .001$, partial $\eta^2 = .18$). But, not as predicted, the positive emotion condition was not seen to be significantly different than the "no emotion" condition (M = 3.14, SD = 1.02) for this item. Finally, for the use of "no feelings" being used in the message, as predicted, the "no emotion" condition (M = 2.23, SD = .96) was seen as significantly different than the negative emotion condition (M = 1.80, SD = .92) ($F(2, 304) = 5.27$, $p < .05$, partial $\eta^2 = .03$). Not as predicted, the "no emotion" condition was not significantly different than the positive condition (M = 2.01, SD = .97) for the use of "no feelings," and the negative and positive conditions were not seen to be significantly different from each other.

The lack of differences between conditions for these items can be attributed to the positivity heuristic present for most individuals (Sears, 1983), which can influence the lack of a "no emotion" condition. In addition the low mean scores evidenced in response to the use of "no emotions" in the sample indicates that participants have a tendency to

attribute positive emotions, especially when the information pertains to an individual (Sears, 1983).

Additional questions assessed significant differences across the emotions of happy, sad, hopeful, fear, relief and anger to understand if emotion manipulations per condition were detected by participants. A total of 307 participants answered all of these questions. *Happy.* As predicted, significant difference were seen about mentioning "happy" in the message, such as those in the positive emotion condition (M = 3.34; SD = 1.12) were significantly more likely to see "happy" than those in the negative emotion condition (M = 1.87; SD = .97) and the "no emotion" condition (M = 2.74; SD = .99) ($F(2, 304) = 52.84$, $p < .001$, partial $\eta^2 = .26$). *Sad.* As predicted, significant differences were seen about mentioning "sad" in the message, such as those in the negative emotion condition (M = 3.88; SD = 1.18) were significantly more likely to recognize "sad" than those in the positive emotion (M = 2.38; SD = .95) and "no emotion" condition (M = 2.73, SD = .94) ($F(2, 304) = 60.44$, $p < .001$, partial $\eta^2 = .29$). Not as predicted, those in the positive emotion condition and "no emotion" condition did not differ on seeing "sad" in the message. *Hopeful.* As predicted, significant differences were seen about mentioning "hopeful" in the message, such as those in the positive emotion condition (M = 4.20; SD = .72) were more likely to recognize "hopeful" in the message than those in the negative emotion condition (M = 3.00; SD = 1.10) ($F(2, 304) = 53.07$, $p < .001$, partial $\eta^2 = .26$). Not as predicted, those in the positive emotion condition and "no emotion" condition (M = 3.96; SD = .79) did not differ on seeing "hopeful" in the message. *Fear.* As predicted, significant differences were seen about mentioning "fear" in the message, such as those in the negative emotion condition (M = 4.03; SD = 1.00)

were more likely to see "fear" than those in the positive condition (M = 2.87; SD = 1.02) and "no emotion" condition (M = 3.05; SD = .91) (F(2, 304) = 41.97, p < .001, partial η^2 = .22). Not as predicted, those in the positive emotion and "no emotion" conditions did not differ on detecting "fear" in the message. *Relief.* As predicted, significant differences were seen about the use of "relief" in the message, such that those in the positive emotion condition (M = 3.73; SD = .98) were significantly more likely to see "relief" than those in both the negative emotion condition (M = 2.20; SD = .10) and "no emotion" (M = 3.01; SD = .93) condition (F(2, 304) = 63.25, p < .001, partial η^2 = .29). *Anger.* As predicted, significant differences were seen about mentioning "anger" in the message, such as those in the negative emotion condition (M = 3.65; SD =1.31) were more likely to recognize "anger" than those in the positive (M = 1.74; SD = .76) or "no emotion" condition (M = 2.01; SD = .81) (F(2, 304) = 111.35, p < .001, partial η^2 = .42). Not as predicted, the positive emotion and "no emotion" condition were not significantly different than each other. Again, the lack of differences seen between the positive and "no emotion" conditions can be attributed to a positivity bias among participants (Sears, 1983).

Dependent Variables

Cognitive responses. To measure cognitive responses to the narrative evidence, participants were asked to provide their first initial thoughts about the message. Consistent with Dillard et al. (1996) and Dillard and Peck (2001), participants were provided nine spaces to record their initial impressions and responses after reading one of the messages as a free-response. A total of 307 participants completed this portion of the post-test. All responses were transcribed verbatim into single document for analyses and participant numbers were assigned to statements to protect confidentiality of the data. An

initial read-through of the responses indicated that many participants wrote more than one thought per box, and several statements were run-on sentences. To best capture separate thoughts among participants, thought units were created per sentence to separate out compound/complex sentences (Hatfield & Weider-Hatfield, 1978). Following Pfau et al. (2001) on the use of thought listing in counter-argument studies, only statements were unitized and questions were excluded. For example, a subject wrote, "I guess I should start drinking more milk and get some exercises to keep me healthy." This statement would be separated into two units of "I guess I should start drinking more milk," and "and get some exercises to keep me healthy." All the statements were unitized in this manner. Two researchers trained in unitization were used to unitize the data. Unitizing 10% of the data, 97% agreement was obtained. Discrepancies were resolved, and unitizing another 10% of data, agreement was established at 99%. The remaining data was then unitized. This resulted in a total of 1,499 thought units.

Following Dillard and Peck (2001), thought units were separated along the lines of cognitive and emotion responses. Responses that included feeling terms listed by Shaver, Schwartz, Kirson and O'Connor (1987) were used as an example of when to identify the statement as an "emotion response" vs. "cognitive response." For example, the statement, "This made me worry," was categorized as an emotion response. The same researchers that unitized the data also separated the thought units into cognitive and emotion responses. The entire data set for emotion words using the Shaver et al. (1987) list and created a second document of emotion response thought units. Another coder read through both documents for consistency, and 100% agreement was obtained.

Following Dillard and Peck (2001), a total of 279 emotive statements of the overall thought units were set aside for analyses.

A coding scheme was created to code the cognitive data to create a dominant cognitive response index. Following Dillard and Peck (2001) and Chen, Shechter and Chaiken (1991), cognitive responses were coded as *supportive, not-supportive,* or *neutral. Supportive* statements reflected evaluation by the participants, suggesting agreement with the message content. Example statements include, "It's important that people know everyone can get the condition," "I do try to get about 15 minutes of sunlight 3-4 times a week," and "I should go to Career Services." *Not-supportive* statements reflected evaluation by the participants, suggesting disagreement with the message content. Example statements include, "It would have thought weight-bearing exercises put a strain on fragile bones," and "It's not diabetes or cancer." *Neutral* statements included statements irrelevant to the message content, or posed problems with the grammar and overall writing style of the message. Example statements are, "I'm hungry," "This is bad grammar," and "I don't know."

Reading through the statements, it was decided that those statements that did not provide an evaluation about the message content, but recounted the information in the message correctly or incorrectly, were not to be included in analyses. These statements were coded as *comprehension statements.* Example statements that reflect content from the message indicating something was learned (e.g., "I didn't know soy helped your bones," and "Vitamin D, porous bones,"). Several decision rules were created to ensure consistency of coding. For example, it was decided that any statement that could be coded as *supportive* or *not supportive* versus a *comprehension statement*, should be coded

as *supportive* or *not supportive* as it was theoretically more interesting to understand if participants moved beyond comprehension of the message content towards reflection and elaboration. Out of a total of 1,220 cognitive responses from the overall thought units, there was an average of 3.96 (*SD* = 2.28) cognitive responses per participant. Of these 1,220 cognitive responses, 702 (58%) were coded as *supportive*, 279 (22.00%) as a *comprehension statement,* 165 (14%) as *not-supportive*, and 74 (.06%) as *neutral.* Following Dillard and Peck (2001), a dominant cognitive index was created which subtracted the number of *not-supportive* statements from *supportive* statements, which resulted in an index ranging from -6 to 9 cognitive thought units (*M* = 1.74; *SD* = 2.15).

Coding cognitive responses. Four Communication Arts and Sciences undergraduate research assistants (RAs) were obtained to code the data into categories for 1 credit (40 hours total of work). All RAs passed the Institutional Review Board (IRB) quiz, and had not previously participated in the study. The researcher first met with all undergraduate RAs for two hours to discuss the coding procedure for the cognitive response units. The researcher provided the coders a synopsis of information from the messages to aid in assessing participant comprehension and evaluation statements. Coders were not given the messages verbatim to help reduce bias with coding. During the meeting, example statements and decision rules were discussed. It was also instructed to take time with coding to reduce fatigue and to not code according to personal opinions. At the end of the meeting, the researcher provided all four RAs with 5% of the cognitive response data to code. This was done to determine the highest inter-rater reliability between all four coders to further code the cognitive responses. Cohen's kappa was used

to assess inter-rater reliability as it takes chance into account when using dichotomous data (Cohen, 1960).

Two coders demonstrated good reliability with a Cohen's kappa of .80 on 5% of the cognitive response data. The other two coders were then removed from the cognitive response coding task, returned all information relating to the cognitive response coding, and were met with separately to discuss a separate project to earn their RA hours. To code the remaining cognitive responses, the two RAs met with the researcher for one hour to discuss discrepancies from the initial 5% of data. They were then provided another 10% of the data to code independently. From this subsequent 10% of data, reliability dropped to .62 between the coders. The researcher met with the coders to discuss differences for two hours; it was determined that one coder was coding all statements in one sitting and the other coder was not following decision rules. After resolving these issues, the researcher re-established reliability at .77 among the coders with 5% of the data, and provided another 10% of the data to the coders to code independently. To reduce coder fatigue and maintain consistency across the coding project, the researcher followed this procedure of meeting after coding 10% of the data to resolve discrepancies with the coders, and maintain consistency until all the data was coded. The average reliability was good at Cohen's kappa = .77 across all coding, and one document was created between the coders to analyze the cognitive responses.

Discrete emotions. To further assess emotional responses to the narrative evidence, the Dillard and Shen (2007) measures were used to examine discrete emotions along a five-point scale of "0 = None of this emotion" to "4 = A great deal of this emotion." Emotions included surprise, anger, fear, guilt, happiness, sadness and

contentment. For the purposes of this study, the emotions of relief and hope were added. A total of 307 participants answered the discrete emotion questions.

Examining the items to measure the nine discrete emotions showed several had skewness *t*-values greater than +/- 1.96, ranging from 2.84 to 17.73. Also, the items of "Surprised," "Optimistic" and "Hopeful" showed bimodal distributions. As with the pilot data, variances were examined among the items. The item "dismal" for the latent variable "sadness" showed a $\sigma^2 = .39$. Eliminating this item, however, would retain only one item "dreary" to represent sadness. It was thus decided to retain "dismal" in analyses. Similar to the pilot data, all items were transformed using a square root transformation to correct for skewness (Pallant, 2007). The resulting transformed variables were along a scale of 0 to 2 and showed skewness *t*-values improved to .33 to 11.38. The bimodal items of "surprised," "optimistic" and "hopeful" were re-categorized to change the values of responses ranging between 1 to 1.14 to be 1.20. The resulting re-categorization showed a normal distribution of these items. A confirmatory factor analysis was performed on these nine latent variables showing good model fit (*df* = 239, Satorra-Bentler $\chi^2 = 580.69$, RMSEA = .07, CFA = .95, SRMR = .08). The resulting composite variables were computed along a scale of 0 to 2: surprise (e.g., surprised, startled, astonished, $\alpha = .78$; *M* = .82; *SD* = .57); anger (e.g., irritated, angry, annoyed, aggravated; $\alpha = .79$; *M* = .36; *SD* = .45); fear (e.g., fearful, afraid, scared; $\alpha = .91$; *M* = .81; *SD* = .64); sadness (e.g., dreary, dismal; $\alpha = .61$; *M* = .35; *SD* = .46); guilt (e.g., guilty, ashamed; $\alpha = .76$; *M* = .34; *SD* = .52); happy (e.g., cheerful, joyful; $\alpha = .82$; *M* = .45; *SD* = .55); contentment (e.g., contented, peaceful, mellow, tranquil; $\alpha = .79$; *M* = .73; *SD* = .54); relief (e.g., assisted, helped; $\alpha = .61$; *M* = 1.00; *SD* = .57); and hope (e.g., anticipation, optimistic, hopeful; α

= .77; *M* = 1.01; *SD* = .58). It was decided to drop the variable of "surprise" in analyses, as Lazarus (1991) debates on whether it is a positive or negative emotion, and the lack of significant correlation surprise has with other dependent variables of interest.

Perceived evidence quality. Perceived evidence quality was assessed using a modified version of the Parrott et al. (2005) measures. A total of 307 participants answered four 5-point semantic differential pairs with the stem, "I think the information in the message is" across (a) inaccurate (accurate) (b) well-explained (unclear); (c) confusing (understandable); and (d) supported (unsupported). Items with the responses of well-explained (unclear) and supported (unsupported) were re-coded. The measure previously showed a Cronbach alpha of .83. Frequency distributions revealed that all items showed negative skewness *t*-values ranging from -3.92 to -13.58. Since this measure was taken at post message exposure, it was deemed appropriate to see skewness in the items. The item, "I think the information is: unclear (well-explained)" showed bimodal tendencies. To fix the bimodality of the item, the participant responses to the values of two and three were re-coded to be the mean of these two values (2.50). This was done to keep the same response scale of 1 to 5 as the other items (*M* = 3.97; *SD* = 1.16). A maximum likelihood exploratory factor analyses was performed with these four items of perceived evidence quality (KMO = .75) and indicated the measure is uni-dimensional. A confirmatory factor analyses showed good model fit (*df* = 2, Satorra-Bentler χ^2 = 4.34, RMSEA = .06, CFA = .99, SRMR = .03). A composite variable of perceived evidence quality showed a reliability of α = .80 (*M* = 4.03; *SD* = .87)

Comprehension. Comprehension was examined via recommended pilot data results that are based upon Parrott et al. (2005). Participants were asked twelve questions

with the heading, "According the message," about the role of personal behaviors, family history, calcium, vitamin D weight-bearing exercises, and friends' beliefs on healthy behaviors to prevent osteoporosis along a five-point semantic differential scale of unimportant (important) and relevant (irrelevant). Items with relevant (irrelevant) responses were re-coded. A total of 303 participants answered *all* the comprehension questions. All items showed *t*-values skewed at greater than +/- 1.96 ranging from -2.74 to -13.64, but with no bimodality. Given that this is a post-test measure of comprehension, it was deemed acceptable and transformations were not performed. A maximum likelihood exploratory factor analysis was performed (KMO = .87), which indicated three factors for comprehension. Factor 1 (Relevance) included five items asking about the role of personal behaviors, family history, calcium, vitamin D and weight-bearing exercises being relevant (irrelevant) to prevent osteoporosis ($\alpha = .96$). Factor 2 (Friends) included two items asking if friends think healthy behaviors to prevent osteoporosis is important (unimportant) or relevant (irrelevant) ($\alpha = .85$). Factor 3 (Importance) included five items asking about the role of personal behaviors, family history, calcium, vitamin D and weight-bearing exercises being important (unimportant) to prevent osteoporosis ($\alpha = .94$). A confirmatory factor analysis with the three factors indicated that the item "According to the message, friends think healthy behaviors to prevent one's risk of osteoporosis is: Relevant to Irrelevant," with Factor 2 (Friends) had negative error variance, and the model had an poor model fit ($df = 51$, Satorra-Bentler $\chi^2 = 250.17$, RMSEA = .11, CFA = .93, SRMR = .08). Removing the Factor 2 (Friends) showed an adequate model fit ($df = 34$, Satorra-Bentler $\chi^2 = 186.50$, RMSEA = .12, CFA = .93, SRMR = .05). A Satorra-Bentler χ^2 difference test indicated that the two factor

model was a better model fit than the three factor model fit at an alpha of .05 (Satorra-Bentler χ^2 difference = 57. 87, *df* = 17, χ^2 critical value = 27.58). The resulting composite measure of comprehension was computed showing good reliability with ten items (α = .96; *M* = 4.21; *SD* = .97).

Perceived message effectiveness. Consistent with Parrott et al. (2005) and Dillard et al., (2007), perceived message effectiveness was measured along a semantic five point differential items of: "I think the message I just read is: (a) not persuasive (persuasive), (b) effective (ineffective), (c) not convincing (convincing), and (d) compelling (not compelling). Items with the responses of effective (ineffective) and compelling (not compelling) were re-coded. Dillard et al. (2007) found a reliability of α = .93 with previous research using this measure. A total of 307 participants answered the perceived message effectiveness measures. Frequency distribution of the items reveals negative skewness *t*-values ranging from -2.69 to -5.93 for the items, but no bimodality of the items. A KMO of .80 indicated a maximum likelihood exploratory factor analyses to be appropriate for these items, which indicated uni-dimensionality of the measure. A confirmatory factor analyses demonstrated good model fit (*df* = 2, Satorra-Bentler χ^2 = 3.84, RMSEA = .06, CFA = .99, SRMR = .02). A composite variable of perceived message effectiveness showed a reliability of α = .85 (*M* = 3.62; *SD* = .88)

Message processing. Following Griffin et al. (2002), close-ended measures asked participants to indicate their message processing according to the Heuristic-Systematic Model. Four items measured heuristic processing, and five items measured systematic processing along a five-point Likert scale from "1 = Strongly disagree" to "5 = Strongly agree." The four items to measure heuristic processing are: "When I see or her

information about this topic, I rarely spend time thinking about it," "If I have to act on this matter, the advice of one expert is good enough for me," "When I see or hear information about this topic, I focus only a few key points," and "There is more information about this topic that I personally need." The five items to measure systematic processing are: "After I encounter information about this topic, I am likely to stop and think about it, "If I need to act on this matter, the more viewpoints I get the better," "It is important for me to interpret information about this topic in a way that applies directly to my life," "After thinking about this topic, I have a broader understanding," and "When I encounter information on this topic, I read or listen to most of it, even though I may not agree with its perspective." Previous results have found four items to construct heuristic processing (omega = .68) and five items to construct systematic processing (omega = .69) Griffen et al., 2002). None of the items are to be re-coded.

Several analyses were undertaken to create a reliable measure of heuristic and systematic processing from these variables. Initial frequencies indicated all but one of the heuristic processing items, and all but one of the systematic processing items were skewed at the *t*-value of +/- 1.96 (skewness ranged from -6.42 to 4.95). The heuristic processing item, "When I see or hear information about this topic, I rarely spend much time thinking about it," was not skewed, but showed bimodal tendencies. Based on histograms, items were first transformed with a reflect and square root transformation (Pallant, 2007). This reduced skewness for all but two items, and ridded bimodality. A square root transformation was conducted, which produced greater skewness (*t*-values ranged from .19 to -10.88). It was thus decided to maintain the reflect and square root transformation of the items.

As initial reliability of the four heuristic processing and five systematic processing scale showed poor reliability, .20 and .58 respectively, an examination of the items was taken. It was decided to eliminate the heuristic processing item, "If I have to act on this matter, the advice of one expert is good enough for me," and the systematic processing item, "When I encounter information about this topic, I read or listen to most of it, even though I may not agree with its perspective." It was deemed that both of these items were not relevant to the content of the messages. A maximum exploratory factor analysis (KMO = .66) with the remaining three items to measure heuristic processing and four items to measure systematic processing showed a cross-loading of the heuristic processing item, "There is more information about this topic than I personally need," onto the systematic processing factor. The remaining heuristic processing items of "When I encounter information about this topic, I focus only on a few key points," and "When I see or hear information about this topic, I rarely spend much time thinking about it" did not load onto the same factor, and only have a reliability of $\alpha = .20$. The reliability of the systematic processing items, dropping the heuristic processing item of "There is more information about this topic than I personally need," which had loaded onto the factor was $\alpha = .60$. Analyses were re-done, eliminating the invented attention-control group, with an $n = 230$, to see if the invented narrative evidence about interviewing was influencing the results. But, analyses showed similar results across exploratory factor analyses and reliability estimates with this reduced sample size.

Furthermore, a confirmatory factor analyses of all transformed heuristic processing items and systematic processing items with the two latent factors of heuristic processing and systematic processing showed a good model fit ($df = 13$, Satorra-Bentler

χ^2 = 25.11, RMSEA = .06, CFA = .93, SRMR = .05), but *t*-values for the heuristic processing items were not significant. Additional attempts to achieve reliability with the two scales using omega were not fruitful (less than .20). As a result, one transformed heuristic processing item was selected for analyses having a range of 0 to 2: "When I see or hear information about this topic, I rarely spend much time thinking about it," (*M* = 1.71; *SD* = .27), due it being the highest loading item in both previous exploratory and confirmatory factor analyses. A confirmatory factor analysis on the remaining four systematic processing transformed variables with a range of 0 to 2 showed a good model fit (*df* = 2, Satorra-Bentler χ^2 = .39, RMSEA = .01, CFA = .99, SRMR = .01), with a reliability of α = .59 (*M* = 1.44; *SD* = .18). The remaining four systematic processing items are: "After I encounter information about this topic, I am likely to stop and think about it," "If I need to act on this matter, the more viewpoints I get the better," "It is important for me to interpret information about this topic in a way that applies directly to my life," and "After thinking about this topic, I have a broader understanding."

Behavioral intentions. Consistent with the Pennsylvania Osteoporosis Program recommendations on healthy behaviors to prevent osteoporosis, behavioral intention items were created that asked about participant's intentions to incorporate calcium, vitamin D, and weight-bearing exercises as part of their diet and daily activities. Questions asked "I intend to make calcium a part of my lifestyle," "I intend to make vitamin D a part of my lifestyle," and "I plan to include weight-bearing exercises as a part of my daily activities." Responses were asked along a five-point Likert scale of "1 = Strongly Disagree" to "5 = Strongly Agree." A total of 307 participants responded to the behavioral intention items. Frequency distributions show all items display negative

skewness *t*-values ranging from -6.63 to -7.74. As this measure was taken at post message exposure, it was expected to see skewness values along the items. No bimodality was seen for the measures. A maximum likelihood exploratory factor analyses revealed a KMO = .65, indicating that factor analyses may be problematic, yet showed all items loaded onto the same factor and the measure is uni-dimensional. Confirmatory factor analyses indicated a perfect model fit, with the measure having three items and a justified model (*df* = 0). The resulting composite variable of behavioral intentions showed reliability at α = .78 (*M* = 4.19; *SD* = .68).

Behavior/dietary recall. As a way to understand post-message behavior, participants were asked to sign-up for a 24 hour USDA dietary recall 48 to 72 hours after the questionnaire portion of the study. A total of 254 young women participated in the dietary recall, representing 82.47% of the overall sample. One of five trained interviewers administered the 24-hour dietary recall to each participant in a one-on-one, in-person interview. All 24-hour dietary recalls were coded by one registered dietitian to eliminate inter-rater variability among recalls. Data from each 24-hour dietary recall were entered into The Food Process® SQL nutrient analysis software for windows (version 10.3.0, 2008, ESHA Research, Salem, OR) and analyzed for calcium (mg/day) and vitamin D (mcg/day) intakes. Women were also asked if they were taking a vitamin supplement. Two specific dietary behaviors following Dietary Reference Intake (DRI) values set forth by the Institute of Medicine for women of ages included in this study are used to measure post-message behavior. Vitamin D, measured in micrograms (mcg), has an Adequate Intake (AI) of 5.00 and calcium, measured in milligrams (mg), has an DRI of 1000. There are 1000 micrograms in 1 milligram. Participants consumed between zero and 45.33 mcg

of vitamin D (*M* = 4.93; *SD* = 5.53), and consumed between 77.55 and 2970.40 mg of calcium (*M* = 955.48; *SD* = 520.26). Taking the vitamin D consumption and dividing it by the AI of 5.00 mcg for vitamin D, this translates that participants consumed between 0 to 906.67 percent (*M* = 98.49; *SD* = 110.51) of their recommended daily allowance for vitamin D. For calcium, dividing actual calcium consumption by the AI of 1000 mg, the percentage of DRI followed for calcium ranged from 7.76 to 850.89 percent (*M* = 99.05; *SD* = 51.70) of calcium across all participants.

Due to this large range and to aid future analyses, the percentage of DRI for vitamin D consumption and calcium consumption was dichotomized into 0 = consuming less than 100% of the DRI, and 1 = consuming 100% or more of the DRI for each behavior for some substantive analyses. For the total sample of 254, this represents 104 (40.94%) participants consuming less than 100% DRI of calcium and 150 (59.06%) participants consuming 100% DRI or more of calcium. Of the 254 participants, 158 (62%) reported consuming less than 100% DRI of vitamin D and 96 (37.80%) stated consuming 100% or more of vitamin D DRI. When considering only those individuals that received osteoporosis narrative evidence, the sample size for the vitamin D and calcium consumption is 193. Of these 193 people, 110 (56.99%) consumed less than 100% of the calcium DRI and 83 (43.01%) consumed 100% or more of calcium DRI; 119 (61.66%) people stated having less than 100% of the vitamin D DRI and 74 (38.34%) met 100% or more of the vitamin D DRI.

Missing Data

Responses to the 24 hour dietary recall were tested using Little's Missing Completely at Random (MCAR) test to assess if missing data was completely at random

(Pallant, 2007). Participants did not complete the dietary recall for two reasons: 1) forgetting to attend their scheduled time (despite email reminders) and 2) participants were recruited and dietary recall RAs were unable to fill the timeslots for the participants. Results from Little's test were not significant, indicating the data is missing completely at random. Therefore, listwise deletion of cases was used for future analyses (McKnight, McKnight, Sidani, & Figueredo, 2007). Furthermore, the 82.47% response level for the 24-hour dietary recall was deemed appropriate as other research using a dietary recall report follow-up rates ranging from 60 to 70 percent (Buzzard et al., 1996; Su & Arab, 2000; Schatzkin et al., 2001). Additionally, one-way analysis of variance (ANOVA) with the independent measure of 24-hour dietary recall responders and non-responders across the primary dependent variables of interest were not significant, but significant difference did emerge for age [$F(1, 305) = 6.20$, $p < .05$, partial $\eta^2 = .02$] and education (χ^2 (5, n = 307) = 21.17, $p < .05$). The majority of non-responders (n = 53) are "Seniors" (n = 23; 43.40%), followed by "Juniors" (n = 18; 34.00%), "Sophomores" (n = 7; 13.20%) and then "Freshmen" (n = 5; 9.40%).

With the measurement of the independent and dependent variables of interest, the following chapters details the use of these variables to answer the hypotheses and research questions posed in this study. As this chapter outlined the method and results of both Phase 1 and Phase 2 of the study, the next chapter will provide results only for Phase 3, or the experimental study.

CHAPTER FIVE

RESULTS

Several data analysis strategies were used to test the two hypotheses and eleven research questions using the Statistical Package for the Social Sciences (SPSS) Version 16.0 and LISREL version 8.1. Several 4x3 analyses were computed to assess the influence of the narrative evidence type (i.e., firsthand, secondhand, official health organization, and invented attention-control) and emotions expressed (i.e., positive, negative, "no emotion" expressed) on dependent variables of interest. All significant omnibus results were followed by univariate tests. To further theory development, the relationships between sources of narrative evidence and emotions expressed in narrative evidence on message processing and behavioral outcomes of interest were examined with path analyses using structural equation modeling and logistic regressions.

Covariates

To begin, variables were examined for the possibility that the order of questions may have contributed to a systematic influence over the participant responses, as well as potential covariates for analyses. Thus, several independent sample *t*-tests were performed on the independent variables and dependent variables in the study for the two order of studies. Due to the number of comparisons and to avoid significance by chance alone, the significance level was set at $p < .01$. No significant differences emerged for order effects.

Covariates were added to analyses when significant relationships are determined via bivariate Pearson correlations. Covariates are independent variables measured pre-message exposure and have a significant relationship with the dependent variable;

additionally, covariates are not substantively associated with each other (Pallant, 2007). When examining the full sample size of 307, significant associations emerged only between health behaviors and behavioral intentions ($r = .32$, $p < .001$); preference for numerical information and behavioral intentions is barely significant ($r = .11$, $p = .05$). When reducing the data set to the firsthand, secondhand and official health organization narrative evidence ($N = 230$), associations are seen between narrative tendencies and systematic processing ($r = -.14$, $p < .05$), narrative tendencies and guilt ($r = .13$, $p < .05$), narrative tendencies and fear ($r = .13$, $p < .001$), and again health behaviors and behavioral intentions ($r = .33$, $p < .001$). Both with the full dataset and reduced data set, only the independent variables of narrative tendencies and health behaviors have significant associations (r less than .18, $p < .05$).

Research Questions and Hypotheses

Existing Osteoporosis Communication

Research Question One

Research question one asked about the positive and negative emotions being communicated in the firsthand and secondhand narratives by young women. Formative research interviews with 17 women were conducted to answer this research question. Interview transcripts using thematic analyses and constant comparison (Strauss and Corbin, 1990) revealed positive emotions of happiness, relief and hope, and negative emotions of anger, sadness and fear being communicated when talking about experiences with osteoporosis. This research question was answered within the Method section detailing Phase 1 of the overall study, and was used to develop the messages used in Phases 2 and 3 of the study.

Research Question Two

Research question two asked how many young women know of a family history of osteoporosis such as learning of a family history diagnosis and engaged in family discussions about a family member's osteoporosis diagnosis. To answer this research question, participants answered three specific questions: 1) their knowledge of a family history of osteoporosis; 2) if they have engaged in a discussion about osteoporosis with the diagnosed family member; and 3) if they have engaged in family discussion about osteoporosis with a family member about another family member's osteoporosis. Responses to these questions were detailed in the Method section describing Phase 3 items. Altogether, responses indicate that less than 4% (n = 11) of young women are aware of having a family history of osteoporosis and engaged in a family discussion about a family member's diagnosis of the disease. Approximately 80% of the participants (n = 246) replied as either "no" to family history of osteoporosis, or "don't know" about family history, or "no" to family discussion about a family member's osteoporosis, while only 16% (n = 50) of participants indicated "yes" to family history of osteoporosis or "yes" to discussions about a family member's diagnosis of the disease.

Outcomes of Narrative Evidence

To answer the research questions concerning differences between narrative evidence types and narrative evidence outcomes, several 4 (narrative evidence type: firsthand, secondhand, official health organization, invented attention-control) x 3 (emotion expressed: positive, negative, "no emotion") omnibus multivariate analyses were conducted to understand differences between manipulated conditions on dependent variables of interest. To ease reporting, the dependent variables are broken down into

narrative evidence type outcomes and emotion outcomes. Dependent variables for multivariate analyses were established with Pearson correlations of .50 to .80 (Cohen, 1988). Tables 5.1 and 5.2 represent the means and standard deviations for the dependent variables of interest across the four narrative evidence type conditions, and emotion type conditions.

Table 5.1 *Means and Standard Deviations for Narrative Evidence Type*

Variables	Firsthand (n = 77)	Second (n = 77)	Health (n = 76)	Control (n = 77)
		Outcomes of Narrative Evidence (Range: 0 to 2)		
Systematic	1.45 (.19)	1.42 (.17)	1.44 (.18)	1.46 (.19)
Heuristic	$1.71\ (.28)_{ab}$	$1.67\ (.27)_{a}$	$1.65\ (.26)_{a}$	$1.81\ (.25)_{b}$
		Outcomes of Narrative Evidence (Range: 1 to 5)		
Comp.	$4.61\ (.57)_{a}$	$4.64\ (.47)_{a}$	$4.58\ (.51)_{a}$	$3.02\ (.25)_{b}$
Evid. Qual.	$4.10\ (.85)_{a}$	$4.08\ (.72)_{a}$	$4.26\ (.80)_{a}$	$3.66\ (.98)_{b}$
Mess. Eff.	$3.60\ (.96)_{ab}$	$3.77\ (.84)_{a}$	$3.83\ (.72)_{a}$	$3.29\ (.91)_{b}$
Beh. Intent.	$4.18\ (.72)_{ab}$	$4.19\ (.63)_{ab}$	$4.42\ (.61)_{a}$	$3.97\ (.69)_{b}$
		Emotions (Range: 0 to 2)		
Hope	.97 (.58)	1.03(.61)	1.00 (.53)	1.03 (.63)
Happy	$.35\ (.53)_{a}$	$.47\ (.52)_{ab}$	$.34\ (.43)_{a}$	$.64\ (.66)_{b}$
Relief	$.84\ (.59)_{b}$	$.94\ (.55)_{b}$	$1.06\ (.48)_{ab}$	$1.18\ (.60)_{a}$

Table 5.1 continued.

Variables	Firsthand (n = 77)	Second (n = 77)	Health (n = 76)	Control (n = 77)
		Emotions (Range: 0 to 2)		
Contentment	.66 (.54)$_{a}$	.79 (.56)$_{ab}$	.61 (.50)$_{ab}$	.84 (.54)$_{b}$
Anger	.38 (.46)	.41 (.45)	.26 (.37)	.40 (.49)
Sadness	.37 (.46)$_{abc}$	.51 (.52)$_{a}$	.26 (.42)$_{bc}$	.25 (.40)$_{b}$
Guilt	.31 (.48)$_{ab}$	.49 (.63)$_{a}$	.34 (.51)$_{ab}$	.20 (.40)$_{b}$
Fear	.87 (.64)$_{a}$	.97 (.59)$_{a}$	.89 (.59)$_{a}$	.51 (.66)$_{b}$
		Cognitive Statements (Range: -6 to 9)		
Dominant	1.71 (2.38)	2.05 (2.32)	1.42 (1.81)	1.77 (.56)
		Behaviors (Range: 0 to 906.67% DRI)		
Calcium*	109.70 (62.44)	103.53 (103.90)	92.92 (49.50)	87.82 (42.80)
Vitamin D*	105.56 (103.70)	103.39 (116.30)	88.24 (87.59)	94.68 (130.65)

Note: Means with different subscripts differ significantly at $p < .05$ by the Bonferroni comparison test.

* Sample size for calcium and vitamin D are reduced. Calcium and vitamin D sample sizes: Firsthand Narrative, n = 69; Secondhand Narrative, n = 67; Health Organization Narrative, n = 56; Attention-Control Narrative, n = 61.

Table 5.2 *Means and Standard Deviations for Emotion Conditions*

Variables	Positive (n = 104)	Negative (n = 103)	"No emotion" (n = 100)
	Outcomes of Narrative Evidence (Range 0 to 2)		
Systematic	1.44 (.18)	1.44 (.17)	1.44 (.02)
Heuristic	1.69 (.26)	1.76 (.26)	1.69 (.03)
	Outcomes of Narrative Evidence (Range 1 to 5)		
Comp.	4.24 (.89)	4.18 (1.00)	4.23 (1.00)
Evidence Qual.	4.13 (.80)	3.99 (.87)	3.95 (.94)
Mess. Eff.	3.65 (.88)	3.63 (.93)	3.58 (.85)
Beh. Intent.	4.13 (.62)	4.19 (.74)	4.24 (.67)
	Emotions (Range 0 to 2)		
Hope	$1.09\ (.55)_{a}$	$.81\ (.60)_{b}$	$1.10\ (.56)_{a}$
Happy	$.51\ (.57)_{a}$	$.33\ (.51)_{b}$	$.50\ (.56)_{a}$
Relief	$1.07\ (.57)_{b}$	$.87\ (.57)_{a}$	$1.07\ (.55)_{b}$
Contentment	$.86\ (.53)_{a}$	$.56\ (.53)_{b}$	$.77\ (.56)_{a}$
Anger	$.25\ (.37)_{b}$	$.50\ (.51)_{a}$	$.34\ (.42)_{b}$
Sadness	$.27\ (.43)_{b}$	$.42\ (.50)_{a}$	$.36\ (.45)_{ab}$
Guilt	.26 (.48)	.35 (.51)	.39 (.57)
Fear	$.64\ (.58)_{b}$	$.94\ (.66)_{a}$	$.84\ (.65)_{ab}$
	Cognitive Statements (Range -6 to 9)		
Dominant	4.10 (.49)	1.70 (1.88)	2.03 (2.22)

Table 5.2 continued.

Variables	Positive (n = 104)	Negative (n = 103)	"No emotion" (n = 100)
	Behaviors (Range 0 to 906.67% DRI)		
Calcium*	94.31 (50.32)	100.28 (49.10)	102.98 (100.12)
Vitamin D*	93.16 (94.26)	84.81 (91.10)	117.61 (139.11)

Note: Means with different subscripts differ significantly at $p < .05$ by the Bonferroni comparison test.

*Sample size for calcium and vitamin D are reduced. Sample size for calcium and vitamin D: Positive Narrative, n = 90; Negative Narrative, n = 81; "No emotion" Narrative, n = 83.

Research Question Three

To answer this research question asking for differences in systematic and heuristic processing after reading a narrative evidence type and emotion condition, a 4x3 between groups analysis of co-variance (ANCOVA) of narrative evidence condition and emotion condition across the dependent variable of systematic processing, with the covariate of narrative tendencies revealed no significant main effects (see means in Table 5.2 and 5.3 above) for narrative evidence condition, $F(3, 294) = 1.05$, $p = .37$, partial $\eta^2 = .01$, and no significant main effects for emotion condition, $F(2, 294) = .11$, $p = .90$, partial $\eta^2 = .00$. There were no significant interaction effects.

A 4x3 between groups analysis of variance (ANOVA) of narrative evidence condition and emotion condition across the dependent variable of heuristic processing revealed main effect for narrative evidence condition, $F(3, 295) = 5.31$, $p < .05$, partial $\eta^2 = .05$. See Table 5.1 and 5.2. There was no significant main effect for the emotion condition, and no interaction effect.

Research Question Four

One of the central questions prompting this research study was to understand differences among narrative evidence types about osteoporosis across several outcomes of interest when studying evidence. As result, different narrative evidence types were tested: a firsthand osteoporosis narrative, a secondhand osteoporosis narrative, an official health organization osteoporosis narrative, and a comparison narrative using an attention-control narrative. The following are multivariate and univariate analyses testing narrative evidence outcomes. See Tables 5.1. and 5.2.

Cognitive statements. A 4x3 between groups analysis of variance (ANOVA) of narrative evidence type condition and emotion condition across the dependent variable of dominant cognitive statements revealed no main effect for narrative condition, $F(3, 295) = 1.16$, $p = .33$, partial $\eta^2 = .01$, and no main effect for emotion condition, $F(2, 295) = 1.55$, $p = .21$, partial $\eta^2 = .01$. There were no significant interaction effects.

Comprehension. A 4x3 between groups analysis of variance (ANOVA) of narrative evidence type condition and emotion condition across the dependent variable of comprehension showed a main effect for narrative evidence type $F(3, 295) = 104.24$, $p < .001$, partial $\eta^2 = .52$. Post-hoc Bonferroni mean test differences revealed the mean score for firsthand narrative evidence ($M = 4.61$; $SD = .57$), secondhand narrative evidence ($M = 4.64$; $SD = .47$) and official health organization narrative evidence ($M = 4.58$; $SD = .51$) were significantly higher on comprehension than the mean score for the invented attention-control narrative ($M = 3.02$; $SD = .25$). There was no significant main effect for emotion conditions and no significant interaction effects.

Perceived evidence quality and message effectiveness. A 4x3 multivariate analysis (MANOVA) of narrative evidence type condition and emotion condition across the dependent variables of perceived evidence quality and message effectiveness (r = .56, n = 307, $p < .001$) revealed a main effect for narrative evidence condition, $F(6,588) = 4.43$, $p < .001$, Wilk's Lambda = .92, partial $\eta^2 = .04$. Univariate tests show significant differences for perceived evidence quality, $F(3, 295) = 7.05$, $p < .001$, partial $\eta^2 = .07$ and message effectiveness $F(3, 295) = 5.96$, $p < .05$, partial $\eta^2 = .06$. All narrative types were perceived to be higher in evidence quality when compared to the invented attention control narrative evidence. The secondhand and official health organization narrative evidence were perceived to be higher in message effectiveness than the invented attention control; firsthand did not vary from any of the others. There were no main effects for emotion condition and no interaction effects. See Tables 5.1 and 5.2.

Behavioral intentions. A 4x3 between-groups ANCOVA of narrative evidence type condition and emotion condition across the dependent variable of behavioral intentions, with the covariates of pre-test health behaviors and preference for numerical information, revealed a main effect for narrative evidence condition, $F(3, 293) = 5.66$, $p < .05$, partial $\eta^2 = .06$. The only significant covariate was pre-test health behavior, $F(1, 293) = 33.38$, $p < .001$, partial $\eta^2 = .10$. There was no main effect for emotion condition and no significant interaction effect. Post-hoc comparisons using Bonferroni mean test differences revealed those reading an official health organization narrative evidence (M = 4.42; SD = .61) had higher behavioral intentions than the invented attention-control narrative evidence (M = 3.97; SD = .69). There were no main effects for emotion condition and no interaction effects.

Behaviors: Calcium and Vitamin D. To see if significant differences emerged between narrative evidence type and emotion condition on 24-hour dietary recall intake, a 4x3 analysis of variance (ANOVA) of narrative evidence condition and emotion condition was performed for the dependent variable of percentage of calcium DRI, and a 4x3 analysis of covariance (ANCOVA) with narrative evidence type and emotion condition, with the covariate of pre-test health behaviors, was performed for the dependent variable of percentage of vitamin D DRI. The percentage of calcium and vitamin D DRI consumed were retained as continuous measures for these analyses.

For percentage of calcium DRI, no significant main effects were detected for narrative evidence type $F(3, 242) = 1.37$, $p = .25$, partial $\eta^2 = .02$ and emotion condition $F(2, 242) = .35$, $p = .71$, partial $\eta^2 = .00$ for percentage calcium DRI. There were no interaction effects. For percentage of vitamin D DRI, no significant main effects were found for narrative evidence type, $F(3, 241) = .55$, $p = .65$, partial $\eta^2 = .00$ and emotion condition, $F(2, 241) = 1.49$, $p = .23$, partial $\eta^2 = .01$. The covariate of pre-test health behaviors was significant, $F(1, 241) = 10.98$, $p < .05$, partial $\eta^2 = .04$. There were no interaction effects.

Research Question Five

As part of this research study, it was also important to understand if different emotions were aroused across the narrative evidence types (i.e., firsthand, secondhand, official health organization, and attention-control) and emotion conditions (i.e., positive, negative, "no emotion"). As a result, different narrative evidence containing either positive, negative or "no emotion" statements were tested to understand the role of

emotions in narrative evidence. The following are multivariate and univariate analyses testing narrative evidence emotion outcomes.

Happiness, hope, contentment, and relief. Due to the strength of bivariate correlations among the positive emotions, a 4x3 multivariate analysis of variance (MANOVA) of narrative evidence condition and emotion condition across the positive emotions of hope, happiness, contentment and relief revealed a main effect for the narrative evidence condition, $F(12, 723) = 3.22$, Wilk's Lambda = .88, $p < .001$, partial $\eta^2 = .04$, with univariate tests indicating significant effects on the dependent measures of happy, $F(3, 295) = 5.18$, $p < .05$, partial $\eta^2 = .05$; contentment , $F(3, 295) = 3.44$, $p < .05$, partial $\eta^2 = .03$; and relief, $F(3, 295) = 5.56$, $p < .05$, partial $\eta^2 = .05$. No significant differences were found for narrative evidence condition on hope. Main effect differences were also seen for the emotion condition, $F(8, 295) = 3.50$, $p < .05$, Wilk's Lambda = .91, partial $\eta^2 = .05$. Univariate tests showed significant differences for happy, $F(2, 295) = 3.48$, $p < .05$, partial $\eta^2 = .02$; contentment, $F(2, 295) = 9.39$, $p < .001$, partial $\eta^2 = .06$; relief, $F(2, 295) = 4.57$, $p < .05$, partial $\eta^2 = .03$; and hope, $F(2, 295) = 8.91$, $p < .001$, partial $\eta^2 = .06$. No interaction effects were significant. See Tables 5.1 and 5.2.

Fear and guilt. A 4x3 multivariate analysis of covariance (MANCOVA) of narrative evidence condition and emotion condition across the negative emotions of fear and guilt ($r = .51$, $n = 302$, $p < .001$) with the covariate of narrative tendencies, revealed a main effect for the narrative evidence condition, $F(6, 586) = 5.08$, $p < .001$, Wilk's Lambda = .90, partial $\eta^2 = .05$, and a main effect for the emotion condition, $F(4, 586) = 3.61$, $p < .001$, Wilk's Lambda = .95, partial $\eta^2 = .02$. For narrative evidence condition, univariate tests indicated significant effects for fear, $F(3, 294) = 8.67$, $p < .001$, partial η^2

= .08 and guilt, $F(3, 294) = 4.41$, $p < .05$, partial $\eta^2 = .04$. For emotion condition, with univariate tests indicating significant effects for fear, $F(2, 294) = 6.40$, $p < .05$, partial $\eta^2 = .04$. There were no significant effects for emotion condition on guilt. No interaction effects were significant. See Tables 5.1 and 5.2.

Anger. A 4x3 analysis of variance (ANOVA) of narrative evidence condition and emotion condition across anger found significant main effect emerged for emotion condition and the dependent variable of anger $F(2, 295) = 9.04$, $p < .001$, partial $\eta^2 = .06$. There were no significant main effects for narrative evidence and no significant interaction effects on the dependent variable of anger. See Tables 5.1 and 5.2.

Sadness. A 4x3 analysis of variance (ANOVA) of narrative evidence condition and emotion condition showed a significant main effect for narrative evidence type and the dependent variable of sadness $F(3, 295) = 5.30$, $p < .05$, partial $\eta^2 = .05$. A main effect was significant for emotion condition across the dependent variable of sadness $F(2, 295) = 3.00$, $p = .05$, partial $\eta^2 = .02$. There were no significant interaction effects. See Tables 5.1 and 5.2.

With this understanding of differences between the narrative evidence type and emotion conditions on the dependent variables of interest, analyses then focused on accounting for the relationships between these variables and the dependent variables of perceived message effectiveness and behavioral intentions. Thus, this next section of analyses focuses on bivariate correlations and path analyses.

Theoretical Processing of Narrative Evidence toward Behavioral Intentions

Cognitive processing of narrative evidence and the role of emotion in this processing was a key consideration of this study towards understanding how young

women may intend to partake in bone healthy behaviors. Results from previous analyses testing differences between narrative evidence types (i.e., firsthand, secondhand, official health organization and invented attention-control) reveal that differences do emerge between osteoporosis narratives and the invented attention-control group regarding narrative evidence and emotion outcomes. Results specifically indicate that the osteoporosis messages using narrative evidence were perceived differently than the invented attention-control message using narrative evidence. To examine the relationships between motivations and abilities to process narrative evidence (i.e., firsthand, secondhand, official health organization), further analyses were undertaken without the invented attention-control group (N = 230).

The relationships between motivations and abilities relating to behavioral intentions and bone healthy behaviors were first examined via bivariate correlations. Bivariate correlations were followed by path models detailing the mediating relationship between these variables. Table 5.3 shows the bivariate correlations between the independent and dependent variables. As the previous chapter outlined, the range of responses for systematic processing, heuristic processing and discrete emotions is 0 to 2, due to transformation methods; the range of the outcome behaviors of comprehension, perceived evidence quality, perceived message effectiveness, and behavioral intentions is 1 to 5. Table 5.4 shows the bivariate correlations between the independent and dependent variables with the percentage of calcium and vitamin D DRI consumption for young women receiving osteoporosis narrative evidence (n = 193). The two behaviors of calcium and vitamin D are measured as the percentage of DRI stated as being consumed during the 24-hour dietary recall at post-test and ranges from 0 to 906.67%.

Table 5.3

Correlation of Independent and Dependent Variables

Variable	PNI	Health Behs.	Narr. Tend.	Dom. Cog.	Heur. Process.	Syst. Process.	Comp.	Mess. Effect.	Evid. Qual.	Beh. Intent.
PNI	---									
Health Behs.	.01	---								
Narr. Tend.	-.01	.16*	---							
Dom. Cog.	.04	-.05	-.08	---						
Heur. Process.	-.01	.07	.05	.07	---					
Syst. Process.	-.01	-.09	-.14*	-.09	-.17*	---				
Comp.	.06	.04	.08	-.04	.10	-.15*	---			
Mess. Effect.	.02	.04	-.05	.33**	.13	-.23**	.14*	---		
Evid. Qual.	.13	.02	-.03	.18**	-.01	-.14*	.20**	.53**	---	
Beh. Intent.	.09	.33**	.11	.14**	.11	-.23**	.11	.23**	.14*	---

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

Table 5.3 continued.

Correlation of Independent and Dependent Variables

Variable	Dom. Cog.	Heur. Process.	Syst. Process.	Comp.	Mess. Effect.	Evid. Qual.	Beh. Intent.	Happy	Hope	Relief	Content.
Dom. Cog.	---										
Heur. Process.	.07	---									
Systematic	-.09	-.17*	---								
Comp.	-.04	.10	-.15*	---							
Mess. Effect.	.33**	.13	-.23*	.14*	---						
Evid. Qual.	.18**	-.01	-.14*	.20**	.53**	---					
Beh. Intent.	.14*	.11	-.23**	.11	.23**	.14*	---				
Happy	.09	.01	-.07	-.13*	-.00	-.10	.06	---			
Hope	.18**	.09	-.31**	-.04	.19**	-.01	.18**	.51**	---		
Relief	.04	-.01	-.23**	-.06	.17*	.01	.06	.43**	.50**	---	
Contentment	.03	-.10	.01	-.11	-.08	-.08	-.09	.62**	.44**	.35**	---

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

Table 5.3 continued.

Correlation of Independent and Dependent Variables

Variable	Dom. Cog.	Heur. Process.	Syst. Process.	Comp.	Mess. Effect.	Evid. Qual.	Beh. Intent.	Anger	Sadness	Guilt	Fear
Dom. Cog.	---										
Heur. Process.	.07	---									
Syst. Process.	-.09	-.17*	---								
Comp.	-.04	.10	-.15*	---							
Mess. Effect.	.33**	.13	-.23*	.14*	---						
Evid. Qual.	.18**	-.01	-.14*	.20**	.53**	---					
Beh. Intent.	.14*	.11	-.23**	.11	.23**	.14*	---				
Anger	-.19**	.02	-.01	-.10	-.31**	-.23**	-.14*	---			
Sadness	-.04	.01	-.04	-.06	-.12	-.11	-.14*	.49**	---		
Guilt	.10	.04	-.07	.01	.00	.03	-.10	.39**	.41**	---	
Fear	.25**	.12	-.22**	-.03	.23**	.08	.13	.23**	.33**	.47**	---

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

Table 5.3 continued.

Correlation of Independent Variables and Dependent Variables

Variable	PNI	Health Behs.	Narr. Tend.	Happy	Hope	Relief	Content.	Anger	Sadness	Guilt	Fear
PNI	---										
Health Behs.	.01	---									
Narr. Tend.	-.01	.16*	---								
Happy	.04	.07	.02	---							
Hope	.04	.08	.01	.51**	---						
Relief	.01	.00	-.03	.43**	.50**	---					
Contentment	.05	-.00	-.09	.62**	.44**	.35**	---				
Anger	-.11	.03	.03	.20**	.12	.10	.19**	---			
Sadness	-.04	-.02	.01	.31**	.24**	.30**	.34**	.49**	---		
Guilt	-.03	-.10	.13*	.26**	.22**	.27**	.17**	.39**	.41**	---	
Fear	-.02	.02	.13*	.15**	.38**	.33**	-.01	.23**	.33**	.47**	---

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

Table 5.4

Correlation of Calcium and Vitamin D with Independent and Dependent Variables

Variable	Calcium	Vit. D	Syst. Process.	Heur. Process.	Dom. Cog.	Comp.	Evid. Qual.	Mess. Eff.	Beh. Intent.
Calcium	---								
Vit. D	.38**	---							
Syst. Process	-.04	-.07	---						
Heur. Process.	-.09	.03	-.23**	---					
Dom. Cog.	.100	.03	-.09	.03	---				
Comp.	.01	-.03	-.20**	.08	-.04	---			
Evid. Qual.	.03	.03	-.15*	-.04	.22**	.22**	---		
Mess. Eff.	.02	.02	-.26**	.12	.34**	.13	.51**	---	
Beh. Intent.	.03	.26**	-.25**	.08	.13	.13	.13	.22**	---

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

Table 5.4 continued.

Variable	Calcium	Vit. D	PNI	Narr. Tend.	Pre-Health	Happy	Hope	Relief	Content.	Anger	Sadness	Guilt	Fear
Calcium	---	.38**	.09	-.08	-.00	-.07	-.16*	-.08	-.08	.07	.01	-.03	.03
Vit. D		---	.04	-.12	.21**	.09	.06	.08	.09	.01	-.02	-.06	.02

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

Research Question Six

This research question focused on understanding the theoretical model of processing narrative evidence by asking how preference for numerical information relates to systematic and heuristic processing. To answer this research question, a bivariate correlation was formed with continuous measurements of preference for numerical information, heuristic and systematic processing. Results indicate that preference for numerical information is not significantly related to systematic processing (n = 230, r = -.01, p = .90) and is not significantly related to heuristic processing (n = 230, r = -.01, p = .94). See Table 5.3. This variable was thus not included in further analyses relating to the processing of narrative evidence.

Hypothesis One

Hypothesis one predicted that high levels of preference for numerical information would be correlated with lower levels of narrative tendencies. A bivariate correlation was performed using the continuous measures of preference for numerical information and narrative tendencies. Hypothesis one was not supported. High levels of preference for numerical information were not significantly associated with lower levels of narrative tendencies (n = 230, r = -.01, p = .89). See Table 5.3.

Research Question Seven

Research question seven asked how narrative tendencies would be associated with systematic processing and heuristic processing of osteoporosis narrative evidence. Bivariate correlations between the continuous measure of narrative tendencies, heuristic processing and systematic processing were used to answer this research question. Results indicate that increases in narrative tendencies are associated with decreases in systematic

processing (n = 230, r = -.14, p < .05), and the relationship between narrative tendencies and heuristic processing is not significant (n = 230, r = .05, p = .47). See Table 5.3.

Building Theory of Narrative Evidence Processing

To answer hypothesis two and research questions eight, nine and ten, bivariate correlations and path analyses were conducted. Path analyses using structural equation modeling were used to shed further light on the processing of osteoporosis related content. Specifically, path analyses were conducted to understand relationships between the mediating variables of comprehension, perceived evidence quality and dominant cognitive thoughts on the outcomes of perceived message effectiveness and behavioral intentions. To assess model fit for path analyses, Hu and Bentler (1999) indices (e.g., CFI > .95; SRMR < .08; RMSEA < .06) were followed. More than one model fit indices are reported as model chi-square values are sensitive to sample size and not a consistent reliable indicator for model estimations (Kline, 2005). Following Kline (2005) guidelines, paths were removed separately to best represent changes within the model.

Hypothesis Two

This hypothesis posited that increases in comprehension, perceived evidence quality and perceived message effectiveness will be positively related increases in behavioral intentions. Bivariate correlation was performed using the continuous measures of comprehension, perceived evidence quality, perceived message effectiveness and behavioral intentions. As seen in Table 5.3, this hypothesis is partly supported. Comprehension is positively associated with behavioral intentions, but it is not a significant relationship (n = 230, r = .11, p = .11). However, both perceived evidence

quality (n = 230, r = .14, p < .05) and perceived message effectiveness (n = 230, r = .23, p < .01) exhibit positive and significant associations with behavioral intentions.

Systematic Model of Processing: Research Question Eight

To explore how heuristic and systematic processing related to narrative evidence, two models were tested. To begin, a model was tested using only systematic processing, an examination of processing evidence without accounting for heuristic processing. Then, a model using both systematic and heuristic processing was conducted. Bivariate correlations were examined to understand relationships; the significant relationship between narrative tendencies and systematic processing warranted its inclusion. As the pre-test health behaviors and preference for numerical information were not significantly associated with mediators, they were not included in the path analyses. This model thus proposes that narrative tendencies influence systematic processing, which in turn influences comprehension, perceived evidence quality, and dominant cognitive thought statements. Comprehension, perceived evidence quality and dominant cognitive thought statements, however, are proposed to influence perceptions of message effectiveness based on the bivariate correlations. Also, systematic processing is proposed to have a direct influence on perceived message effectiveness. Table 5.3 includes the negative bivariate correlations found between systematic processing, perceived message effectiveness, perceived evidence quality and behavioral intentions.

This overall model is recursive and identified (Rigdon, 1995), and meets Kline (2005) criteria of 10:1 ratio of subjects to parameters with an N = 230 to represent osteoporosis narrative evidence types. As per Kline (2005) advice on model fit, each path is removed one at a time. As stated earlier, several model indicators are reported as model

chi-square values can be found to be significant due to sample size; thus, it is not considered a consistent reliable indicator for model estimations and other fit indices are reported (Kline, 2005). Several iterations were done to determine the most parsimonious model and explanation of mediation between processing and message effectiveness.

Model 1. Model fit indices suggested the proposed model was an adequate model fit ($\chi^2 = 19.06$, $df = 7$, $p = .01$, RMSEA = .09, SRMR = .07, CFI = .89). Looking at the standardized estimates, narrative tendencies are a significant and negative influence on systematic processing ($\beta = -.14$, $p < .05$). Systematic processing also significantly and negatively predicts comprehension ($\beta = -.15$, $p < .05$) and perceived evidence quality ($\beta = -.14$, $p < .05$). Yet, systematic processing does not significantly predict dominant cognitive thought statements ($\beta = -.09$). In turn, only systematic processing ($\beta = -.14$, $p < .05$), perceived evidence quality ($\beta = .47$, $p < .05$) and dominant cognitive thought statements ($\beta = .24$, $p < .05$) predict perceived message effectiveness. Comprehension is not a significant predictor of perceived message effectiveness ($\beta = .05$). Examining the structural equations, it shows that .01 to 33% of the variance is explained by this model. The reduced form equations, which account for the presence of mediators, indicate that less than 2% of the variance is explained.

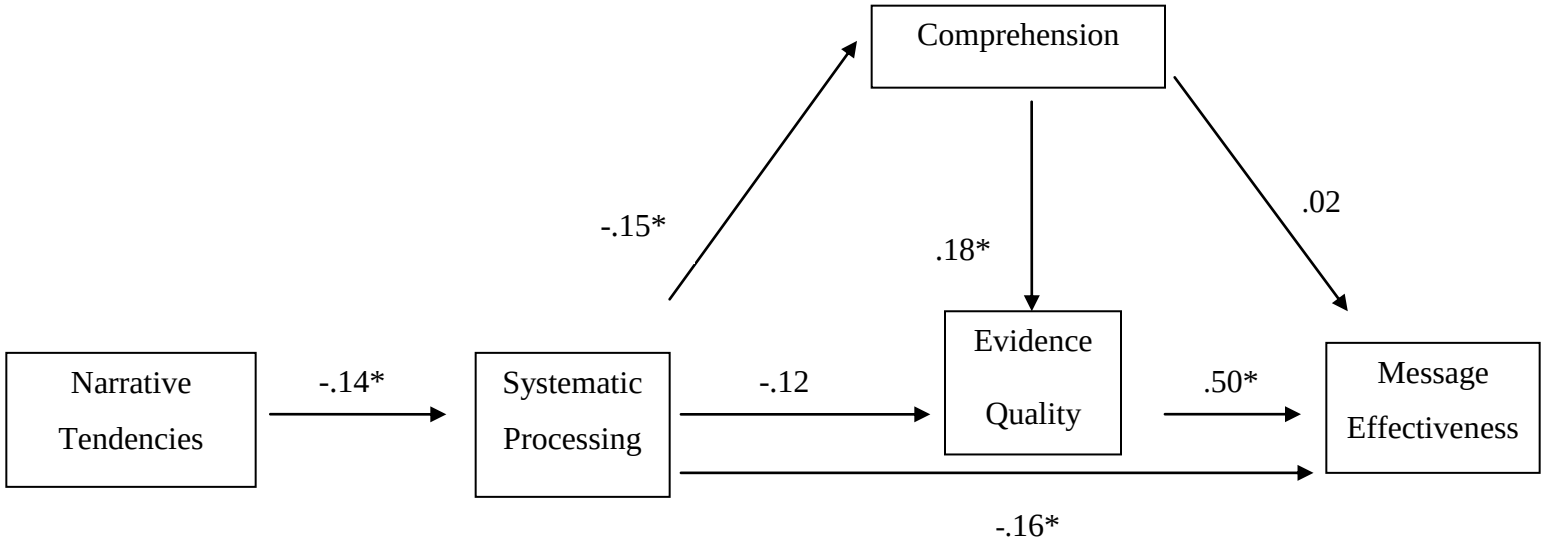
Model 2. Modification indices from Model 1 suggested adding a direct path from comprehension to perceived evidence quality to improve the model fit. This is also theoretically valid, as understanding information may occur prior to judging the quality of the information. Thus, this path was added and the model was re-run. Model fit indices indicate this is a good model fit ($\chi^2 = 12.58$, $df = 6$, $p = .05$, RMSEA = .07, SRMR = .05, CFI = .95). The additional path from comprehension to perceived evidence quality was

significant (β = .18, $p < .05$). All other paths did not change in significance and direction, except the path from systematic to evidence quality is no longer significant (β = -.12). The structural equations for this model suggest that between .01 and 33% of the variance is explained with these equations. With the presence of mediators, the reduced form equations suggest that less than 2% of the variance is explained. A Normal Theory Chi-Square comparison test indicated that this model was significantly different from the original model (at α = .05, $df = 1$, critical value of 3.84, TRd = 6.48 > 3.84). Thus, the path from comprehension to perceived evidence quality was retained.

Model 3. Examining the variables and relationships between paths, results indicate that dominant cognitive thought statements is not a potential mediator between systematic processing and message effectiveness. Systematic processing does not significantly predict dominant cognitive thought statements. This variable was thus removed and the model re-run. Model fit indices indicate this is a good model fit ($\chi^2 = 2.67$, $df = 3$, $p = .44$, RMSEA = .00, SRMR = .03, CFI = 1.00). Examining the standardized estimates, the path between perceived evidence quality and perceived message effectiveness increased (β = .50, $p < .05$), the path from systematic to perceived message effectiveness increased (β = -.16, $p < .05$), and the path from comprehension to perceived message effectiveness decreased (β = .02, $p > .05$). All other values and significance of paths did not change. The structural equations for this model suggest that between 2 to 30% of the variance is explained. The reduced form equations, which accounts for the presence of mediators, indicate that between 0 to 2% of the variance is explained. A Normal Theory Chi-Square comparison test indicated that this model was significantly different from the original model (at α = .05, $df = 3$, critical value of 7.82,

TRd = 9.91 > 7.82). Thus, the model without dominant cognitive thought statements is a better model fit.

Additional analyses were conducted to understand if removing the non-significant path from comprehension to perceived message effectiveness ($\beta = .02$, $p > .05$) would improve the model fit indices. Model fit indices did not improve substantially ($\chi^2 = 2.69$, $df = 4$, $p = .61$, RMSEA = .00, SRMR = .03, CFI = 1.00), and a Normal Theory Chi-square comparison test did not indicate removing the non-significant path warranted inclusion (at $\alpha = .05$, $df = 1$, critical value of 3.84, TRd = .02 < 3.84). Thus, the final model retains the non-significant path from comprehension to perceived message effectiveness, affording important theoretical insights to be considered in the discussion. See Figure 5.1 for the final model fit and Table 5.5 for the standardized direct, indirect and total effects.



Fit Indices: $\chi^2 = 2.67$, $p = .44$, $df = 3$, RMSEA = .00, SRMR = .03, CFI = 1.00

* $p < .05$

Figure 5.1 *Processing of Narrative Evidence with Systematic Processing*

Table 5.5 *Standardized Direct, Indirect and Total Effects of Systematic Processing*

	Narrative	Systematic	Comp.	Evidence Quality
Systematic				
Direct	-.14	---	---	---
Indirect	---	---	---	---
Total	-.14	---	---	---
Comprehension				
Direct	---	-.15	---	---
Indirect	.02	---	---	---
Total	.02	-.15	---	---
Evid. Qual.				
Direct	---	-.12	.18	---
Indirect	.02	-.02	---	---
Total	.02	-.14	.18	---
Mess. Effect.				
Direct	---	-.16	.02	.50
Indirect	.03	-.07	.09	---
Total	.03	-.23	.11	.50

Dual Processing: Research Question Eight. This second model predicted evaluations of perceived message effectiveness of osteoporosis narrative evidence occurs through systematically processing the evidence, which in turn negatively influences comprehension, perceived evidence quality and dominant cognitive thought statements after reading the evidence. As HSM (Chaiken et al., 1989) argues that both heuristic and systematic processing can occur simultaneously, and narrative tendencies is negatively related to systematic processing, both variables of narrative tendencies and heuristic processing are included as predictors of systematic processing. The one item measure of

heuristic processing is a noted limitation of this model. Again, this model also sought to understand how dominant cognitive thought statements, comprehension and perceived evidence quality may mediate processing and perceived message effectiveness. The error variance between narrative tendencies and heuristic processing was allowed to co-vary. Similar to the model assessing systematic processing only, this model does not include the pre-test health behaviors and preference for numerical tendencies. The data set of N = 230 to represent the osteoporosis narrative evidence types does meet the Kline (2005) criteria of a 10:1 ratio of subjects to variables for path analyses to be acceptable. Hu and Bentler (1999) indices (e.g., CFI > .95; SRMR < .08; RMSEA < .06) were followed for assessing model fits for path analyses. Chi-square model fit is also reported, but as *p*-values are sensitive to sample size, other fit indices are recommended (Kline, 2005). This model is identified because it is recursive and meets the block-recursive rule (Rigdon, 1995). As per Kline (2005) recommendations, each path was removed separately.

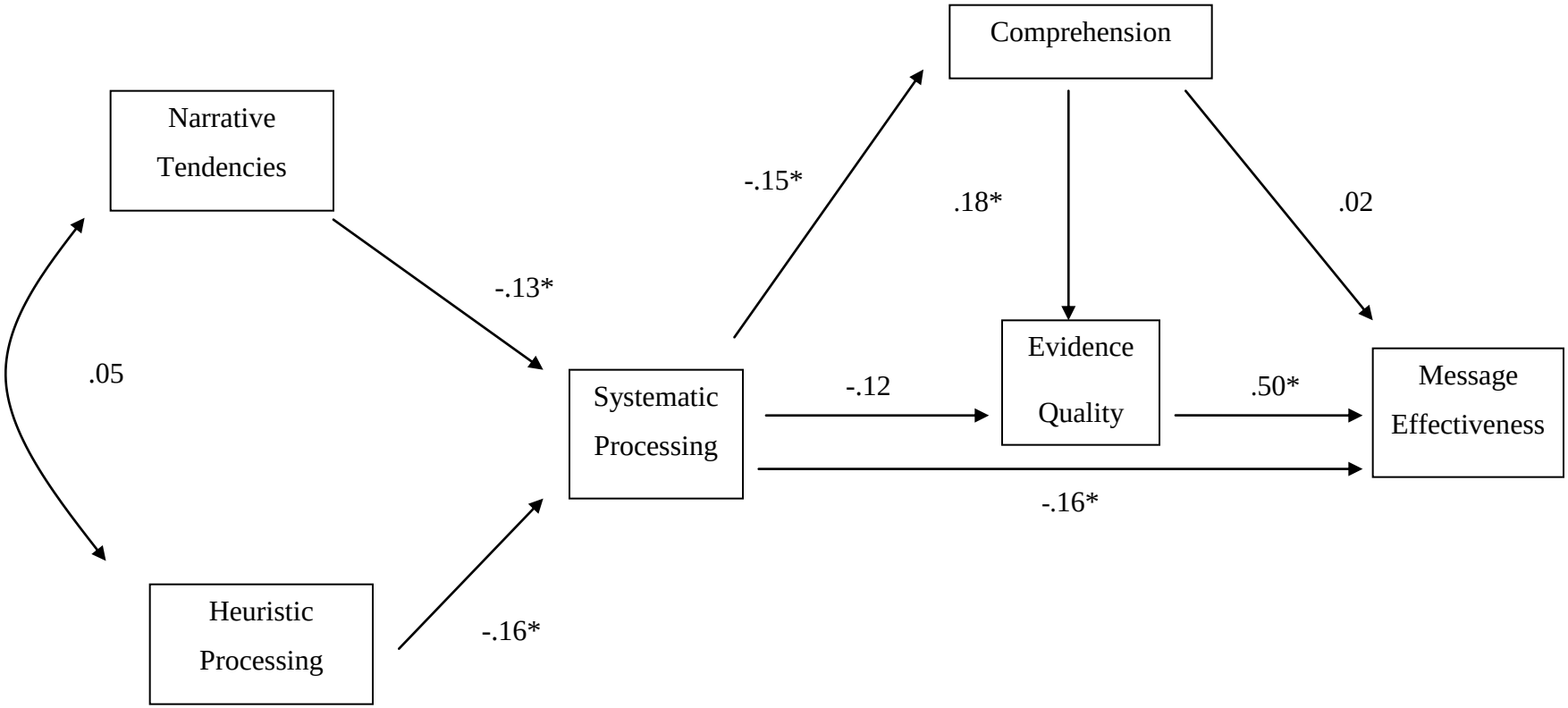
Model 1. The fit indices indicate an adequate model fit for this model (χ^2 = 24.51, df = 11, p = .01, RMSEA = .07, SRMR = .06, CFI = .89). Examining the standardized coefficients for this path model show that the majority of the paths were significant. The exogenous variables of narrative tendencies (β = -.13, p < .05) and heuristic processing (β = -.16, p < .05) are significant negative predictors systematic processing, but do not significantly co-vary (β = .05). Systematic processing in turn, negatively predicts comprehension (β = -.15, p < .05), negatively predicts perceived evidence quality (β = -.14, p < .05), and negatively predicts perceptions of message effectiveness (β = -.14, p < .05) of osteoporosis narrative evidence types. Systematic processing, however, did not significantly predict dominant cognitive thought statements (β = -.09) after reading

osteoporosis narrative evidence. Yet, both perceived evidence quality ($\beta = .47$, $p < .05$) and dominant cognitive thought statements ($\beta = .24$, $p < .05$) positively predict perceived message effectiveness evaluations of osteoporosis narrative evidence types. Comprehension did not significantly predict perceived message effectiveness ($\beta = .03$). The structural equations indicated that 1 to 33% of the variance is explained in these equations. Because of the mediators within the model, the reduced form equations show that less than 4% of the variance is explained.

Model 2. Modification indices from Model 1 suggested adding a direct path from comprehension to evidence quality to improve the model fit. This was deemed theoretically valid as well; the path was added and analyses were re-run. Adding a path from comprehension to evidence quality to the model was positive and significant ($\beta = .18$, $p < .05$). Model fit indices suggested this was a good model fit ($\chi^2 = 18.33$, $df = 10$, $p = .05$, RMSEA = .06, SRMR = .05, CFI = .94). Examining the other structural equations, though, finds that the relationship between systematic processing and perceived evidence quality becomes non-significant with this additional path ($\beta = -.12$, $p < .05$) and the relationship between systematic processing and perceived message effectiveness increases ($\beta = -.16$, $p < .05$). Analyzing the structural equations, results show that 1% to 33% of the variance is explained in these equations. Reduced form equations indicated that that 1 to 4% of the variance is explained. A Normal Theory Chi-Square comparison test indicated that this model was significantly different from the original model (at $\alpha = .05$, $df = 1$, critical value of 3.84, TRd = 6.18 > 3.84). Thus, the path from comprehension to perceived evidence quality was retained.

Model 3. Examining the model, results indicate that dominant cognitive thought statements do not present as a mediation between systematic processing and message effectiveness. The variable was removed, and the model re-run. Analyses show this to be a good model fit ($\chi^2 = 8.47$, $df = 6$, $p = .21$, RMSEA = .04, SRMR = .04, CFI = .98). Results from the standardized estimates suggest that the only change in value was from perceived evidence quality and perceived message effectiveness from $\beta = .47$ to $\beta = .50$ ($p < .05$), and the non-significant relationship from comprehension to message effectiveness decreased from $\beta = .03$ to $\beta = .02$ ($p > .05$). All other path values and significance remained as before. Looking at the structural equations, 2 to 30% of the variance is explained. The reduced form equations suggest that 0 to 4% of the variance is explained when accounting for the presence of mediators. A Normal Theory Chi-Square comparison test indicated that this model was significantly different from Model 2 (at $\alpha = .05$, $df = 4$, critical value of 9.49, TRd = 9.86 > 9.49). Thus, the removal of dominant cognitive thought index is kept within this model.

An additional path analysis was performed to understand if removing the non-significant relationship between comprehension and perceived message effectiveness improved the model fit. Model fit indices did not substantively improve ($\chi^2 = 8.55$, $df = 7$, $p = .29$, RMSEA = .03, SRMR = .04, CFI = .99). A Normal Theory Chi-square difference test did not indicate that this significantly improved the model (at $\alpha = .05$, $df = 1$, critical value of 3.84, TRd = .02 < 3.84). Thus, the path from comprehension to perceived message effectiveness is retained. See Figure 5.2 for the final model. Table 5.6 provides the standardized direct, indirect and total effects of this model.



Fit Indices: $\chi^2 = 8.47$, $p = .21$, $df = 6$, RMSEA = .04, SRMR = .04, CFI = .98; * $p < .05$

Figure 5.2 *Processing of Narrative Evidence with Heuristic and Systematic Processing*

Table 5.6. *Standardized Direct, Indirect and Total Effects of Heuristic and Systematic Processing*

	Narrative	Heuristic	Systematic	Comp.	Evid. Qual.
Systematic					
Direct	-.13	-.16	---	---	---
Indirect	---	---	---	---	---
Total	-.13	-.16	---	---	---
Comprehension					
Direct	---	---	-.15	---	---
Indirect	.02	.02	---	---	---
Total	.02	.02	-.15	---	---
Evid. Qual.					
Direct	---	---	-.12	.18	---
Indirect	.02	.02	-.02	---	---
Total	.02	.02	-.14	.18	---
Mess. Effect.					
Direct	---	---	-.16	.02	.50
Indirect	.03	.04	-.07	.09	---
Total	.03	.04	-.23	.11	.50

Comparison of systematic and dual processing models. The final models from systematic processing only and systematic with heuristic processing were compared. A Normal Theory Chi-Square comparison test was performed with $df = 4$ and χ^2 critical value of 9.49. The difference value, TRd = 5.88, is less than the critical value 9.49, suggesting that both models are not significantly different than each other. This cognitive only approach of understanding the processing of narrative evidence, however, does not incorporate the role of emotion to fully explain the processing of osteoporosis narratives.

Next steps thus focus on the incorporation of emotions to fully explain the processing of narrative evidence and provide a more complete picture of processing.

Emotions and Narrative Processing: Research Questions Nine and Ten

To understand the role of emotions within the processing of osteoporosis narratives, it was necessary to consider if receiving an osteoporosis narrative with positive emotion statements or negative emotions statements influenced processing of osteoporosis narrative evidence. These research questions were answered by examining the bivariate correlations among the continuous measures of discrete emotions, heuristic processing, systematic processing, dominant cognitive thought statements, perceived message effectiveness, and path analyses outlining these relationships. Previous narrative evidence type and emotion condition differences across discrete emotions were also assessed. See Tables 5.1, 5.2 and 5.3.

Answering research question nine, it is revealed that no discrete emotion is significantly associated with the heuristic processing measure. Examining the relationships between discrete emotions and systematic processing, significant associations emerge with hope ($n = 230$, $r = -.31$, $p < .001$), relief ($n = 230$, $r = -.23$, $p < .001$), and fear ($n = 230$, $r = -.22$, $p < .01$). Also, fear and hope exhibit a significant and moderate positive relationship ($n = 230$, $r = .38$, $p < .001$).

To begin answering research question ten, bivariate correlations were examined between discrete emotions, dominant cognitive thought units, comprehension, perceived evidence quality, perceived message effectiveness and behavioral intentions. See Table 5.3. When looking at dominant cognitive thought statements, significant relationships emerge between hope ($n = 230$, $r = .18$, $p < .01$), anger ($n = 230$, $r = -.19$, $p < .01$) and

fear (n = 230, r = .25, p < .001). The same emotions exhibit significant associations between perceived message effectiveness, as well as relief (n = 230, r = .17, p < .05). Only happiness was significantly associated with comprehension (n = 230, r = -.13, p < .05), and only anger significantly associated with perceived evidence quality (n = 230, r = .23, p < .001). When examining the relationships between behavioral intentions and discrete emotions, hope (n = 230, r = .18, p < .01), anger (n = 230, r = -.14, p < .05), and sadness (n = 230, r = -.14, p < .05) had significant associations.

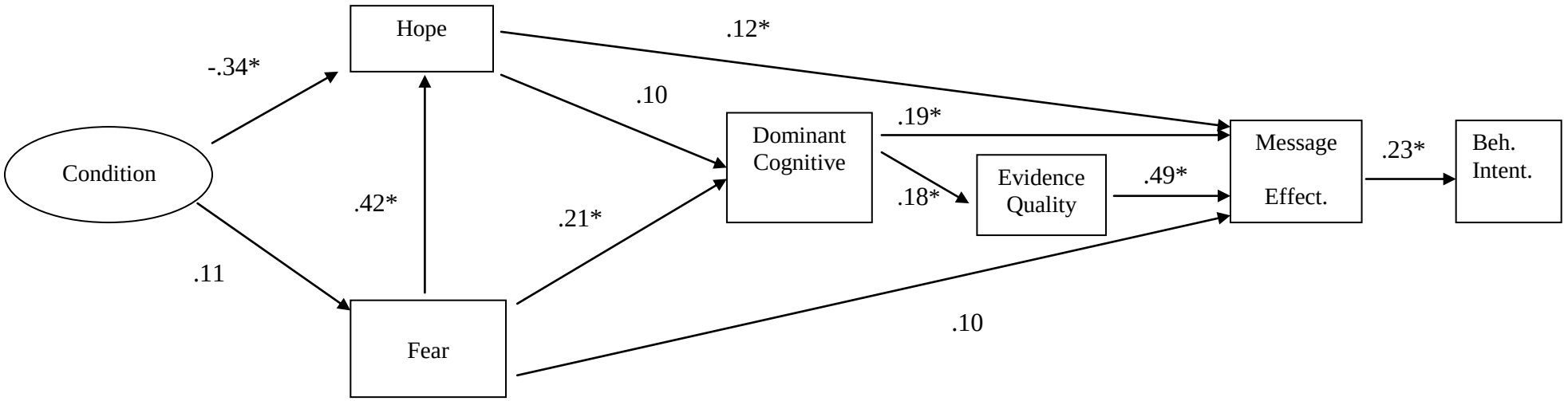
Model 1. After examining these previous narrative evidence type and emotion condition discrete emotion differences and the bivariate correlations among discrete emotions and outcomes, a proposed theoretical model was tested such that the emotions of hope and fear were examined for their influence on the processing of osteoporosis narrative evidence across dominant cognitive thought statements, perceived evidence quality, perceived message effectiveness and behavioral intentions. The previous analyses demonstrated that the positive and "no emotion" condition do not differ on many of the discrete emotion outcomes, and thus a dummy exogenous variable of 0 = positive and "no emotion" and 1 = negative for emotion condition was created. Specifically, different levels of hope and fear would be aroused after reading positive and "no emotion" vs. negative osteoporosis narrative evidence. The bivariate correlations show a positive association between hope and fear; it is predicted that high levels of fear would be associated with high levels of hope. In turn, it was proposed these emotions would directly influence dominant cognitive thought statements; dominant cognitive thought statements would have a direct influence on both perceived evidence quality and perceived message effectiveness. Perceptions of evidence quality would also predict

perceptions of message effectiveness, and finally, perceived message effectiveness would predict behavioral intentions. Furthermore, the emotions of hope and fear would be allowed to have a direct and positive path to perceived message effectiveness based on the bivariate correlations exhibited. This model is recursive and is identified (Rigdon, 1995). The data set of $N = 230$ does meet the Kline (2005) criteria of a 10:1 ratio of subjects to variables for path analyses to be acceptable. Hu and Bentler (1999) indices (e.g., CFI > .95; SRMR < .08; RMSEA < .06) were followed for assessing model fits for path analyses, in addition to chi-square assessments.

The fit indices indicate a good model fit ($\chi^2 = 9.66$, $df = 10$, $p = .47$, RMSEA = .00, SRMR = .04, CFI = 1.00). Examining the standardized coefficients for this path model show that the majority of the paths were significant. The exogenous variable of emotion condition shows that the negative condition negatively predicts hope, and the positive and "no emotion" condition positively predicts hope ($\beta = -.34$, $p < .05$). The condition did not predict fear ($\beta = .11$), but fear positively predicts hope ($\beta = .42$, $p < .05$). Hope does not significantly predict dominant cognitive thought statements ($\beta = .10$), but does positively predict message effectiveness ($\beta = .12$). Fear positively predicts dominant cognitive thought statements ($\beta = .21$, $p < .05$). Yet, fear does not significantly predict perceived message effectiveness ($\beta = .10$). In turn, dominant cognitive thought statements have a positive and significant relationship to perceived evidence quality ($\beta = .18$, $p < .05$), and perceived message effectiveness ($\beta = .19$, $p < .05$). Perceived evidence quality does predict perceived message effectiveness ($\beta = .49$, $p < .05$) and perceived message effectiveness does positively predict behavioral intentions ($\beta = .23$, $p < .05$). The structural equations for this model indicate that between 3 to 37% of the variance is

accounted for in these equations. Because of the presence of mediators, the reduced form equations were examined and show that less than between 0 and 9% of the variance is explained.

Additional analyses were run to see if removing the non-significant path from hope to dominant cognitive thought statements improved model fit. The path was removed and the model re-run. Model fit indices remained relatively similar ($\chi^2 = 12.19$, $df = 11$, $p = .35$, RMSEA = .02, SRMR = .04, CFI = .99) A Normal Theory Chi-square Difference suggested that deleting this path did not improve model fit (at $\alpha = .05$, $df = 1$, critical value = 3.84, Trd 2.53 < 3.84). Thus, the path from hope to dominant cognitive thought statements was retained. See Figure 5.3 and Table 5.7 for the final model.



Fit indices: $\chi^2 = 9.66$, $p = .47$, $df = 10$, RMSEA = .00, SRMR = .04, CFI = 1.00; * $p < .05$

Condition: 0 = positive and "no emotion" and 1 = negative

Figure 5.3 *Emotions and Processing of Narrative Evidence*

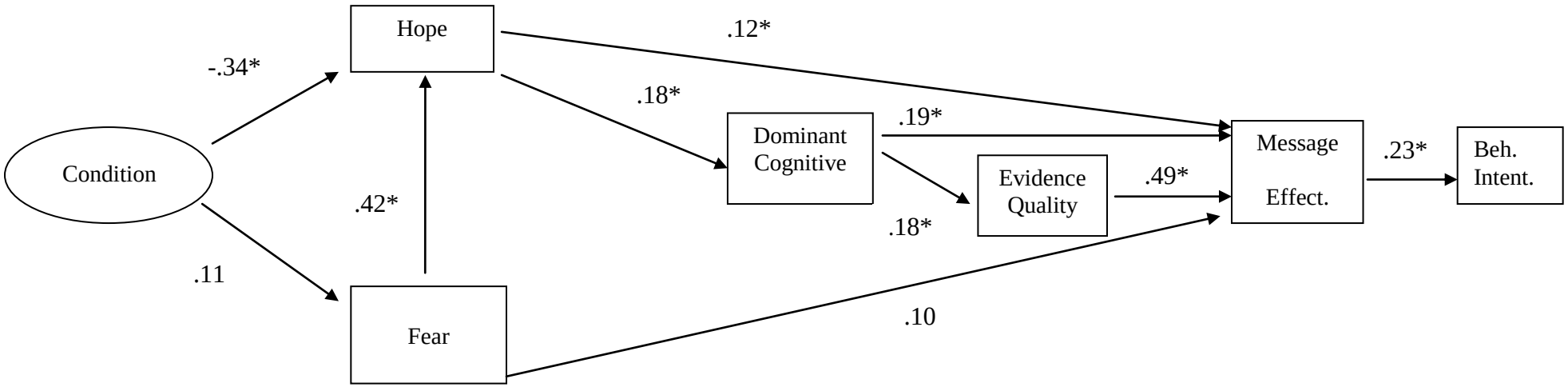
Table 5.7. *Standardized Direct, Indirect and Total Effects of Processing and Emotions*

	Emotion Narrative	Hope	Fear	Dom. Cog.	Evid. Qual.	Mess. Effect.
Hope						
Direct	-.34	---	---	---	---	---
Indirect	---	---	---	---	---	---
Total	-.34	---	.42	---	---	---
Fear						
Direct	.11	---	---	---	---	---
Indirect	---	---	---	---	---	---
Total	.11	---	---	---	---	---
Dominant						
Direct	---	.10	.21	---	---	---
Indirect	---	---	.04	---	---	---
Total	-.01	.10	.25	---	---	---
Evid. Quality						
Direct	---	---	---	.18	---	---
Indirect	-.00	.02	.05	---	---	---
Total	-.00	.02	.05	.18	---	---
Mess. Effect.						
Direct	---	.12	.10	.19	.49	---
Indirect	-.03	.02	.12	.09	---	---
Total	-.03	.15	.22	.28	.49	---
Beh. Intentions						
Direct	---	---	---	---	---	.23
Indirect	-.01	.03	.05	.06	.11	---
Total	-.01	.03	.05	.06	.11	.23

Model 2. The previous model for emotion and processing of narrative evidence highlights the ability for each emotion to have distinct influences on dominant cognitive thought statements. Previous chapters illustrate however that the emotion of fear can be alleviated through the experience of hope as a way to cope with the danger felt (Lazaurus, 2001). Thus, it is important to see how processing may occur when fear is allowed to be alleviated only through the emotion of hope and influence perceptions of message effectiveness without providing an avenue to reduce fear through dominant cognitive thought statements. The following model thus proposes that emotion condition will predict fear and hope, and fear will positively predict levels of hope. In turn, hope will predict dominant cognitive thought statements, and these statements will produce perceived evidence quality and perceived message effectiveness. Perceived evidence quality will also mediate the relationship between dominant cognitive thought statements and perceived message effectiveness. Perceived message effectiveness will predict behavioral intentions. In addition, hope and fear will be allowed to have a direct influence on perceived message effectiveness.

The fit indices indicate a good model fit ($\chi^2 = 13.36$, $df = 11$, $p = .07$, RMSEA = .05, SRMR = .05, CFI = .96). Examining the standardized coefficients for this path model shows that the majority of the paths were significant. As with the previous emotion model, the exogenous variable of emotion condition shows that the negative condition negatively predicts hope, and the positive and "no emotion" condition positively predicts hope ($\beta = -.34$, $p < .05$). The condition did not predict fear ($\beta = .11$), but fear positively predicts hope ($\beta = .42$, $p < .05$). However, unlike the earlier model, hope doe significantly predict dominant cognitive thought statements ($\beta = .18$, $p < .05$). Fear does not

significantly predict perceived message effectiveness (β = .10). In turn, dominant cognitive thought statements have a positive and significant relationship to perceived evidence quality (β = .18, $p < .05$), and perceived message effectiveness (β = .19, $p < .05$). Perceived evidence quality does predict perceived message effectiveness (β = .49, $p < .05$) and perceived message effectiveness does positively predict behavioral intentions (β = .23, $p < .05$). The structural equations for this model indicate that between 1 to 46% of the variance is accounted for in these equations. Because of the presence of mediators, the reduced form equations were examined and show that less than between 0 and 9% of the variance is explained. See Figure 5.4 and Table 5.8 for final model and estimations.



Fit indices: χ^2 = 13.36, p = .07, df =11, RMSEA = .05, SRMR = .05, CFI = .96; * p < .05

Condition: 0 = positive and "no emotion" and 1 = negative

Figure 5.4 *Emotions and Processing of Narrative Evidence, Fear to Hope*

Table 5.8 *Standardized Direct, Indirect and Total Effects of Processing and Emotions for Fear and Hope*

	Emotion Narrative	Hope	Fear	Dom. Cog.	Evid. Qual.	Mess. Effect.
Hope						
Direct	-.34	---	.42	---	---	---
Indirect	---	---	---	---	---	---
Total	-.34	---	.42	---	---	---
Fear						
Direct	.11	---	---	---	---	---
Indirect	---	---	---	---	---	---
Total	.11	---	---	---	---	---
Dominant						
Direct	--	.18	---	---	---	---
Indirect	-.06	---	.08	---	---	---
Total	-.06	.18	.08	---	---	---
Evid. Quality						
Direct	---	---	---	.18	---	---
Indirect	-.01	.03	.01	---	---	---
Total	-.01	.03	.01	.18	---	---
Mess. Effect.						
Direct	---	.12	.10	.19	.49	---
Indirect	-.04	.05	.07	.09	---	---
Total	-.04	.17	.17	.28	.49	---
Beh. Intentions						
Direct	---	---	---	---	---	.23
Indirect	-.01	.04	.04	.06	.11	---
Total	-.01	.04	.04	.06	.11	.23

Osteoporosis Behavior Outcomes: Calcium and Vitamin D Consumption

Research Question Eleven

Research question eleven asked if heuristic processing, systematic processing, discrete emotions, comprehension, dominant cognitive statements, perceived evidence quality, perceived message effectiveness or behavioral intentions predict the consumption of calcium and vitamin D among young women. The previous chapter detailed how calcium and vitamin D are assessed during the 24-hour dietary recall, and are measured as the percentage of dietary reference intake (DRI) per behavior. Because the distribution of the behaviors produced a wide percentage range (0 to 906.67 for vitamin D and 7.76 to 850.89 for calcium) as noted previously, the decision was made to create two groups for comparisons based on the constructs addressed in this research. The behaviors were dichotomized into 0 = consuming less than 100% of the DRI for each behavior and 1 = consuming 100% or more of the DRI for each research behavior. The sample size for these analyses is 254 across all narrative evidence types, and 193 when reducing the data to only the osteoporosis specific narrative evidence types. While differences did not emerge between dietary recall respondents and non-respondents across dependent variables of interest, missing subjects does occur across the narrative evidence type and emotion conditions which may influence the regression analyses (i.e., 22 subjects are missing from the negative emotion condition).

Independent sample *t*-tests were used to identify possible similarities and differences for women: (a) consuming less than 100% calcium DRI at post-test; (b) consuming 100% or more calcium DRI at post-test; (c) consuming less than 100% vitamin D DRI at post-test; and (d) consuming 100% or more vitamin D at post-test.

Adjusted odds ratios represent the estimated increase in odds of women consuming less than 100% or 100% and more of calcium and vitamin D DRI. For example, a value of 1.26 for the odds of pre-test health behaviors would mean that pre-test health behaviors is associated with a 26% increased likelihood to consume 100% or more of calcium DRI relative to those who consumed less than 100% calcium DRI at post-test.

Logistic regressions report the overall model *F*-statistic indicating that the model was able to distinguish between the dependent variable groups. The Cox & Snell R Square and Nagelkerke R Square values reported provide an indication of the amount of variation explained in the model (minimum value of 1 to an maximum value of approximately 1) (Pallant, 2007). In addition, the classification ability of the model is reported to show how well the model predicted the correct category (Pallant, 2007). The tables for the logistic regressions display the 95% confidence interval and *p*-values associated with each adjusted odds ratio. Listwise deletion was used and significance was set at $p < .05$. Because bivariate correlations in Table 5.4 showed a significant correlation between health behaviors and vitamin D DRI consumption, chi-square analyses were then performed to further illustrate the relationship between this predictor and outcomes. Similar to previous analyses outlined earlier, results are conducted for the full sample of 24-hour dietary recall respondents ($N = 254$), and those who received an osteoporosis specific narrative evidence ($n = 193$).

To begin, it was necessary to understand if the narrative evidence and emotion condition exposure was associated with percentage levels of DRI for calcium and vitamin D consumption taken a post-test. Chi-square analyses were performed for narrative evidence condition and emotion condition and the percentages of calcium and vitamin D

DRI. The nominal variables of less than 100% DRI versus 100% or more DRI for each behavior, the variable of 0 = firsthand, secondhand and official health organization narrative and 1 = attention-control narrative evidence, and the variable of 0 = positive and "no emotions" condition and 1 = negative emotion condition were used. Results indicated that the percentage of calcium and vitamin D DRI was not associated with narrative evidence condition χ^2 (1, n = 254) = 1.41, p = .30 and not associated with emotion condition χ^2 (1, n = 254) = .10, p = .88.

Calcium DRI. To understand if individual motivations and abilities, narrative outcome variables and behavioral intentions influence the percentage of calcium DRI, several independent sample *t*-tests were conducted across the variables of preference for numerical information, narrative tendencies, pre-test health behaviors, discrete emotions (i.e., hope, happiness, relief, contentment, sadness, guilt, fear and anger), systematic and heuristic processing, dominant cognitive thought statements, comprehension, perceived evidence quality, perceived message effectiveness, and behavioral intentions.

For all 254 dietary recall respondents, results indicated significant differences emerged between groups for hope, $t(252) = 2.48$, $p < .05$, relief $t(252) = 2.06$, $p < .05$, and pre-test health behaviors $t(252) = -3.07$, $p < .01$. For hope, those engaging in less than 100% calcium DRI at post-test (M = 1.07; SD = .55) experienced *more* hope than those engaging in 100% or more calcium DRI consumption (M = .88; SD = .63). For relief, those reporting low levels of percent of calcium DRI at post-test (M = 1.05; SD = .56) were more likely to experience relief than those reporting high levels of percent of calcium DRI (M = .90; SD = .57) at post-test. However, with pre-test health behaviors, those reporting 100% or more of the calcium DRI reported higher pre-test health

behaviors (M = 4.37; SD = 1.67) than those reporting less than 100% of calcium DRI at post-test (M = 3.71; SD = 1.66).

Reducing the sample size to participants that received only a firsthand, secondhand or official health organization osteoporosis narrative evidence (n = 193) completed the 24-hour dietary recall shows similar results. For those receiving an osteoporosis narrative, significant differences emerged among individuals consuming less than 100% versus 100% and more of the calcium DRI for pre-test health behaviors $t(191) = -2.41$, $p < .05$. Individuals that consumed 100% or more of the calcium DRI (M = 4.31; SD = 1.71) reported higher levels of pre-test health behaviors compared to those reporting less than 100% calcium DRI at post-test (M = 3.73; SD = 1.62). These significant differences were used in logistic regression models to understand if pre-test health behaviors, hope and relief are associated with calcium use.

Predictors of percentage of calcium DRI. Logistic regressions were performed to evaluate if the significant predictors emerging from previous analyses are associated with the outcome of percentage of calcium DRI consumed at post-test. Two regressions are performed with the entire data set of 254 and a reduced data set of 193 to account for associations for outcomes when young women read only osteoporosis narrative evidence. For the first regression, Step 1 entered the continuous variable of pre-test health behavior; Step 2 entered the dummy variable of 0 = firsthand, secondhand and official health organization narrative evidence and 1 = invented attention-control narrative evidence; Step 3 entered the continuous measurement of discrete emotions of hope and relief. The full model including all the predictors was statistically significant, χ^2 (3, n = 254) = 18.70, $p < .01$, indicating that the model was able to distinguish between young women

that reported less than 100% of calcium DRI at post-test compared to women that reported consuming 100% or more of calcium DRI at post-test. The model as a whole explained .71 (Cox and Snell R square) and .96 (Nagelkerke R square) of the variance and correctly classified 64.60% of cases. Results show pre-test health behaviors with an adjusted odds ratio of 1.29 ($p < .001$) and hope with an adjusted odds ratio of .58 ($p < .05$) as significant predictors. Thus, for young women, pre-test health behaviors were related to 29% increased likelihood to consume 100% or more of calcium DRI at post-test. As indicated with an adjusted odds ratio less than 1.00, feeling hope was related to an increased likelihood to consume *less* than 100% of calcium DRI at post-test. See Table 5.9.

Table 5.9 *Logistic Regression Model Predicting Calcium Use with All Narrative Evidence Types*

Predictor Variables	B	*p*-value	Adj. OR	95% C.I.
Pre-test Health Behaviors	.26	.00	1.29	1.10 - 1.52
Narrative Evidence Type*	-.38	.24	.68	.36 - 1.29
Hope	-.55	.04	.58	.35 - .97
Relief	-.14	.61	.87	.51 – 1.49

Note. *Narrative Evidence Type coded that 0 = firsthand/secondhand/official health organization and 1 = invented attention-control.

For the second logistic regression, the data set was reduced to 193 to represent all young women that read osteoporosis specific narrative evidence. Step 1 entered the continuous measure of pre-test health behaviors, Step 2 entered the emotion condition of 0 = positive and "no emotion" stated and 1 = negative emotions stated, and Step 3 entered the continuous measurement of hope and relief. The full model was statistically

significant, χ^2 (4, n = 193) = 11.60, $p < .05$, indicating that the model was able to distinguish between young women that reported less than 100% of calcium DRI at post-test compared to women that reported consuming 100% or more of calcium DRI at post-test. The model as a whole explained .06 (Cox and Snell R square) and .08 (Nagelkerke R square) of the variance and correctly classified 62.20% of cases. The only significant predictor was pre-test health behaviors with an adjusted odds ratio of 1.26 ($p < .05$). Again, this means for young women reading only osteoporosis narrative evidence, pre-test health behaviors were related to 26% increased likelihood to consume 100% or more calcium DRI at post-test. See Table 5.10.

Table 5.10 *Logistic Regression Model Predicting Calcium Use with Osteoporosis Specific Narrative Evidence Types*

Predictor Variables	B	*p*-value	Adj. OR	95% C.I.
Pre-test Health Behaviors	.23	.01	1.26	1.05-1.51
Emotion Condition*	.35	.30	1.41	.74 – 2.72
Hope	-.37	.23	.69	.38 – 1.27
Relief	-.20	.53	.82	.45 – 1.52

Note. *Emotion condition coded that 0 = positive and "no emotion" condition and 1 = negative emotion condition.

Pre-test health behaviors and post-test calcium DRI. As pre-test health behaviors is suggested to be a significant difference and predictor for the percentage of calcium DRI at post-test for both the independent sample *t*-tests and logistic regressions, chi-square analyses were performed to understand if individuals engaging in low pre-test behaviors were associated with consuming 100% or more of the calcium DRI at post-test. Chi-square analyses were performed with a mean (3.93) split of high and low pre-test

health behaviors across the percentage of calcium DRI dichotomized variable. For the entire data set of post-test health behaviors (N = 254), results indicated that a significant association between pre-test health behaviors and post-test calcium consumption χ^2 (1, n = 254) = 4.74, $p < .05$. Analyses show that 33 (13%) of young women that reported low pre-test health behaviors are associated with those reporting consuming 100% or more of the dietary reference intake for calcium. Reducing the sample size to osteoporosis specific narrative evidence, however, does not illustrate a significant association χ^2 (1, n = 193) = 1.94, p = .18.

Vitamin D. To understand differences and predictors of the percentage of vitamin D DRI at post-test, several independent sample *t*-tests were performed with the individual motivations and abilities, narrative evidence outcomes, processing variables and discrete emotions. Analyzing the entire sample of 254 participants in the 24-hour dietary recall finds that significant differences emerge for pre-test health behaviors, $t(252) = -2.53$, $p < .05$, heuristic processing, $t(252) = -2.31$, $p < .05$, and behavioral intentions, $t(252) = -3.62$, $p < .01$. For pre-test health behaviors, results show that those reporting 100% or more of vitamin D DRI (M = 4.32; SD = 1.69) have higher pre-test health behaviors than those reporting less than 100% of vitamin D DRI (M = 3.77; SD = 1.67) at post-test. For heuristic processing, results indicate that individuals having 100% or more of vitamin D DRI at post-test (M = 1.76; SD = .28) reported more heuristic processing than those reporting having less than 100% of vitamin D DRI (M = 1.68; SD = .27). Results also show that individuals who consumed 100% or more of vitamin D DRI (M = 4.40; SD = .59) reported higher levels of behavioral intentions than those that consumed less than 100% of vitamin D DRI at post-test (M = 4.11; SD = .70).

Narrowing the number of 24-hour dietary recall respondents to those receiving osteoporosis narrative evidence (n = 193), indicates similar results to the larger sample. Independent sample t-tests show that significant differences emerge for those consuming 100% or more of vitamin D DRI and those who consumed less than 100% of vitamin D DRI for pre-test health behaviors, $t(191) = -2.54$, $p < .05$, and behavioral intentions, $t(191) = -3.06$, $p < .01$. Results suggest that for participants reading an osteoporosis narrative evidence, those consuming 100% or more of the vitamin DRI (M = 4.36; SD = 1.68) report higher pre-test health behaviors than those consuming less than 100% of vitamin D DRI at post-test (M = 3.74; SD = 1.65), and individuals having 100% or more of vitamin D DRI at post-test also report higher behavioral intentions (M = 4.44; SD = .58) compared to those who consumed less than 100% of vitamin D DRI at post-test (M = 4.16; SD = .69).

Predictors of percentage of vitamin D DRI. Two logistic regressions were performed to evaluate if the significant predictors emerging from previous independent sample t-test analyses are associated with the outcome of percentage of vitamin D DRI consumed at post-test. For the first regression, Step 1 entered the continuous variable of pre-test health behavior; Step 2 entered the dummy variable of 0 = firsthand, secondhand and official health organization narrative evidence and 1 = invented attention-control narrative evidence; Step 3 entered the continuous measurement of discrete emotions of heuristic processing and behavioral intentions. The full model including all the predictors was statistically significant, χ^2 (4, n = 254) = 18.75, $p < .01$, indicating that the model was able to distinguish between young women that reported less than 100% of vitamin D DRI at post-test compared to women that reported consuming 100% or more of vitamin D

DRI at post-test. The model as a whole explained .71 (Cox and Snell R square) and .97 (Nagelkerke R square) of the variance and correctly classified 63.40% of cases. As Table 5.11 illustrates, for young women, heuristic processing (OR = 2.85; $p < .05$) and behavioral intentions (OR = 1.77; $p < .05$) were related to an increased likelihood to consume 100% or more vitamin D DRI at post-test. Thus, heuristic processing and behavioral intentions were associated with a 185% and 77% (respectively) increased likelihood of consuming 100% or more vitamin D at post-test.

Table 5.11 *Logistic Regression Model Predicting Vitamin D Use with All Narrative Evidence Types*

Predictor Variables	B	*p*-value	Adj. OR	95% C.I.
Pre-test Health Behaviors	.13	.14	1.13	.96 – 1.34
Narrative Evidence Type*	-.12	.73	.89	.47 – 1.69
Heuristic Processing	1.05	.04	2.85	1.05 – 7.71
Behavioral Intentions	.57	.01	1.77	1.12 – 2.78

Note. *Narrative Evidence Type coded that 0 = firsthand/secondhand/official health organization and 1 = invented attention-control.

The second regression reduced the data set to 193 to represent the young women that received osteoporosis narrative evidence only. Per independent sample *t*-test analyses, Step 1 entered the continuous measure of pre-test health behavior, Step 2 the emotion condition exposure where 0 = positive and "no emotion" conditions and 1 = negative emotion condition, and Step 3 entered the continuous measurement of heuristic processing and behavioral intentions. The full model including all the predictors was statistically significant, χ^2 (4, $n = 254$) = 13.68, $p < .01$, indicating that the model was able to distinguish between young women that reported less than 100% of vitamin D DRI at post-test compared to women that reported consuming 100% or more of vitamin D

DRI at post-test. The model as a whole explained .68 (Cox and Snell R square) and .93 (Nagelkerke R square) of the variance and correctly classified 63.20% of cases. Results indicate that for young women reading osteoporosis narrative evidence, behavioral intentions (OR = 1.74; $p < .05$) is related to a 74% increased likelihood to consume 100% or more vitamin D DRI at post-test. See Table 5.12.

Table 5.12 *Logistic Regression Model Predicting Vitamin D Use with Osteoporosis Specific Narrative Evidence Type*

Predictor Variables	B	*p*-value	Adj. OR	95% C.I.
Pre-test Health Behaviors	.16	.11	1.17	.97 – 1.42
Emotion Condition*	-.31	.36	.73	.38 – 1.42
Heuristic Processing	.72	.20	2.06	.68 – 6.27
Behavioral Intentions	.56	.04	1.74	1.03 – 2.94

Note. *Emotion condition coded that 0 = positive and "no emotion" condition and 1 = negative emotion condition.

Pre-test health behaviors and post-test vitamin D DRI. Although the variable of pre-test health behavior did not emerge as a significant association with the logistic regressions for percentage of vitamin D DRI, Table 5.4 shows a significant correlation between pre-test health behaviors and percentage of vitamin D consumption for women who received osteoporosis narrative evidence ($r = .21$, $n = 193$, $p < .001$). Thus, to better understand the association between pre-test health behaviors and post-test vitamin D consumption, chi-square analyses were performed. Analyzing the entire 254 sample, results imply a significant association, χ^2 (1, $n = 254$) = 4.67, $p < .05$, and indicate 30 (11.81%) young women who reported low health behaviors at pre-test, also reported consuming 100% or more of vitamin D at post-test. Reducing this sample size to the young women who only received osteoporosis narrative evidence also finds a significant

association, χ^2 (1, n = 193) = 4.68, $p < .05$. Results indicate that low pre-test health behaviors is associated with consuming 100% or more of vitamin D DRI for 22 (11.40%) of the 193 young women who participated in the dietary recall.

In summary, this chapter provides results that highlight differences between narrative evidence types and emotion conditions toward important outcomes of perceived message effectiveness, behavioral intentions and osteoporosis prevention behaviors. The following chapter highlights the relevance and implications of these results towards theoretically understanding narrative evidence in communication, and how to promote osteoporosis prevention to young women.

CHAPTER SIX

DISCUSSSION

The overall purpose of this study was threefold. First, this research sought to elaborate upon previous research studying narrative evidence, and to offer new insights into the implications of using different narrative evidence types and the role of emotions within narrative evidence to enhance osteoporosis prevention messages to young women. Second, this research study offered a new understanding of the theoretical processing of narrative evidence, and how emotions can influence the processing of such evidence. Finally, this research offered ways to understand if narrative evidence can influence the uptake of bone healthy behaviors among young women.

The growing prevalence of this disease among women, and the associated costs for caring for those with osteoporosis (NOF, 2005), warrants health communicators to begin assessing ways to communicate prevention to young women about osteoporosis. Young women were a focus for this study as early lifestyle habits can help prevent this disease later in life and the disease is more prevalent in women than men (Surgeon General, 2004). Additionally, the college age women is reaching the last stages of age to achieve peak bone mass, and thus a critical opportunity to communicate prevention habits to help avoid diagnosis later in life. As a result, the use of college age students within this study was appropriate for this health issue. Findings indicate that narrative evidence indeed may be a way to convey osteoporosis content to young women, and that the emotional responses to narrative evidence can influence the processing, behavioral intentions and behaviors to prevent the disease. As a result, this study offers several theoretical as well as practical implications and directions for future research concerning

scholar's understanding of narrative evidence, and the use of narrative evidence for health communication. This chapter discusses what the findings of this research study imply for communication and health communication scholars and practitioners, and the limitations of this study to guide future research.

Narrative Evidence in Communication Science

A substantial part of this research study sought to learn differences across various outcomes of interest for narrative evidence when systematically operationalizing separate narrative evidence types across the health context of osteoporosis. Previous research on the use of narrative evidence compared to statistical evidence (Allen & Priess, 1997; Kopfman et al., 1998) has offered that statistical evidence may be considered more persuasive. The specific cognitive narrative outcomes selected for this research study included systematic and heuristic processing, dominant cognitive thought statements, comprehension, perceived evidence quality, perceived message effectiveness and behavioral intentions based upon prior research on evidence (Kopfman et al., 1998; Parrott et al., 2005; Reynolds & Reynolds, 2002). It was argued throughout this research endeavor that scholars are not accurately assessing the uniqueness of narrative evidence in communication, and thus there has been a gap in the literature for understanding the true persuasive potential for narrative evidence in communication endeavors. Specifically, that scholars are ignoring the different types of narratives that may be used as evidence (Schank & Berman, 2002), as well as the specific traits of narratives (Fisher, 1987; Ochs & Capps, 1996). Results do argue significant differences emerge for narrative evidence types and that scholars should begin to examine the uniqueness of narrative evidence.

In particular, the results suggest that narrative evidence should not be considered as being processed in the same way as statistical evidence, and that narrative evidence can be both systematically *and* heuristically processed by young women. As stated earlier, the HSM (Chaiken et al., 1989) was selected as the theoretical framework for this study to afford an understanding of the processing of narrative evidence towards behavioral intentions. The HSM posits that individuals can process information both heuristically and systematically, in a simultaneous manner. Specifically, individuals can process messages containing "cues" (e.g., message length, source credibility, emotions), as well as carefully attend to the message based on their personal motivations and abilities (Chaiken et al., 1989). This is important within communication research as learning the processing of evidence can aid the development of messages towards specific behavioral intentions and behaviors. As previous research suggested narrative evidence promoted heuristic processing and statistical evidence promoted systematic processing (Kopfman et al., 1998), it was necessary to test this assumption comparing different narrative evidence types and not a blanket narrative vs. statistical evidence design. To begin understanding the cognitive processing of osteoporosis narrative evidence, it was important to identify what motivations and abilities may lead towards processing.

Motivations and Abilities towards Dual Processing of Narrative Evidence

The two variables of preference for numerical information and narrative tendencies used as motivations and abilities in this study showed surprising relationships to illuminate the "n of one" (Baesler & Burgoon, 1994) associated narrative evidence. Importantly, results indicate that the desire for numbers and desire for narratives are not

necessarily polar opposites within individuals. The composite mean scores for these variables suggest that narrative tendencies may be higher than preference for numerical information among young women, but results do not support that these tendencies reside on either ends of a continuum within individuals. The argument that the need for numbers is what may attract individuals to statistical evidence and deter from narrative evidence because it lacks numbers is now questioned. The lack of significant association with preference for numerical information parallels other research where preference for numerical information did not differ across cultures in susceptibility to anecdotal, statistical, causal and expert evidence (Hornikx & Hoeken, 2007).

Consequently, communication scholars should engage in a perspective to understand that both types of tendencies may co-exist within individuals. Considering the abundance of information shared in quantitative forms, it should not be surprising that individuals may use both numbers and personal experiences to make decisions towards health behaviors and this impacted the relationships exhibited. It is possible that preference for numerical information may not be the most appropriate measure of a motivation to process heuristically. Thus, future research may need to re-examine the desire for numbers and whether or not it is *understanding* numbers, or numeracy, that should be accounted for as an ability that may hinder processing narrative evidence and not a preference for numerical information. This variable has been used in other research testing evidence (Parrott et al., 2005) and has exhibited influence towards evidence persuasiveness. It is quite possible that understanding numbers, or lack of understanding numbers, may contribute more towards a motivation to systematically process narrative evidence that a preference for numerical information.

In fact, perhaps the most intriguing results of this study for communication scholars are when probing the relationships of narrative tendencies towards heuristic and systematic processing, and how the resulting relationships influenced the comprehension and perceived evidence quality towards perceived message effectiveness. Results suggest that narrative tendencies can be negatively influencing the processing of evidence, which can then be contributing to the negative relationship between systematic processing and comprehension of narrative evidence. Thus, systematic processing is negatively linked to the positive outcomes of comprehension, perceived evidence quality and perceived message effectiveness.

The overall pattern suggests that narrative tendencies can reduce the likelihood that someone will process information systematically, and when individuals do process systematically, it can impair their comprehension of the narrative evidence. This is critical because results show that *if* individuals are able to comprehend the evidence, then the evidence quality is perceived to be good and leads to greater perceptions of finding the entire message to be good. This then echoes previous research that as part of comprehending narratives, individuals must position themselves within the story (Busselle & Bilandzic, 2008). Thus, there was a level of engagement in the stories, evidenced by the manipulation checks, that shows that for those able to systematically process a narrative evidence type, they were able to positively judge it.

In other words, understanding the information conveyed and the role of various risk factors and prevention behaviors for a disease are estimated prior to judging the information to be of quality and if one can understand the information, then it is judged to be of quality. The familiar form of narrative evidence ("n of one") may again be an aid or

heuristic cue towards understanding the evidence, as it is a familiar form that women can use to enhance comprehension. In turn, these assessments of finding the information of quality can contribute to find the overall message effective. Yet, the results also suggest that hindrance of judgments of the persuasiveness of narrative evidence occur because individuals may realize that the narrative evidence is nothing like they have read or seen before and thus the cue of "n of one" may cause the discounting of the narrative evidence and impair judgments of the evidence. The results suggest that it is perceived evidence quality that mediates the relationship between comprehension and perceived message effectiveness, and comprehension is not directly connected to perceptions of message effectiveness. This implies that in order for individuals to find narrative evidence to be effective, it must be *first* comprehended before it is judged of to be of quality in order for it to be considered effective.

These relationships between systematic processing and comprehension can be contributed a reflection of today's society that both personal experiences and quantifiable information are used when making a health decision. Also, this demonstrates that sometimes it is *multiple* personal experiences, or multiple "n of one" that could contribute to a health decision, especially if the topic is not familiar. For instance, when moving to new town, individuals ask for multiple experiences and recommendations from others about doctors, dry cleaners and such and pool together these several experiences to make a decision. Often when sharing stories is it is hearing about many that aids in our comprehension of a disease (Sunwolf et al., 2008). As a result, exposure to only one type of narrative evidence may be limiting the credibility of narrative evidence and negatively influencing systematic processing. Therefore, it may be worthwhile to provide young

women with multiple narratives about experiences to provide a full scope of experiences and better assess the systematic processing of narrative evidence. Thus, the "n of one" perception associated with narrative evidence needs to be further explored as results indicate that it can influence both heuristic and systematic processing.

Consequently, understanding the relationships between the individual motivations and abilities towards systematic and heuristic processing importantly highlights that these processing variables are unique within communication science. It becomes essential then to examine the nuances with these variables for young women after reading osteoporosis narrative evidence, and how they are being assessed.

The Dual Processing of Narrative Evidence

The dual processing of narrative evidence is clear from the results across various analyses. Young women processed the osteoporosis narrative evidence and attention-control narrative evidence as well as the positive, negative and "no emotion" conditions similarly, and that narrative evidence *was* processed systematically across all conditions. It suggests that this "n of one," which has been argued as a hindrance for narrative evidence to be processed systematically, was <u>not</u> an overwhelming detriment towards carefully attending to the content. It supports some arguments that the "n of one" is an actual benefit of narratives (Cox & Cox, 2001).

This finding is a new addition to the literature on systematic and heuristic processing when recognizing the way that these variables were assessed. The results show that heuristic and systematic processing perhaps should be considered as separate variables and not along the same continuum. In particular, previous research has often assessed systematic processing along a continuum of more or less processing, which has

resulted in perhaps inadequate realizations of the processing of evidence among individuals (Petty & Cacioppo, 1986). Thus, research has only studied heuristic processing in terms of a lack of systematic processing. The separate variables used to assess systematic and heuristic processing provide a more comprehensive approach to understanding the processing of narrative evidence and offer that communication scholars should not measure heuristic processing as being less than systematic processing. In other words, both processing styles should be considered. As a result, this study can begin a line of research for communication scholars towards understanding how to best represent processing of evidence in messages and to further examine measurement of processing along different variables.

The opportunity for communication research scholars is even more interesting considering mean scores indicated that the narrative evidence types were processed more heuristically than systematically, thus also suggesting that narrative evidence can be heuristically processed based on this "n of one." Thus, this project offers that communication scholars would be wrong to then suggest that narrative evidence is only to be processed systematically or only processed heuristically. Specifically, the results indicate that *both* types of processing styles may be occurring. This is logical; the term "cognitive misers" illustrates that individuals do not like to engage in mental effort, and thus rely thus rely upon heuristic cues when the topic is not highly motivating (Bodenhausen, Macrae & Sherman, 1999).

Altogether then, the cognitive map provided with these variables and the relationships to and from systematic and heuristic processing suggest that as young women systematically and carefully attended to the narrative evidence, the more they

realized that this is an “n of one” and not entirely generalizable (Baeslar & Burgoon, 1994). The official health organization narrative is the only narrative evidence type that most moves away from this being an “n of one” and thus can sometimes make systematic look more likely to occur. In this narrative evidence type, it follows the organization’s way of communicating the disease, rather than the personal experiences and uniqueness that are argued in firsthand and secondhand narratives (Ochs & Capps, 1997). The manipulation check where women found the health organization narrative evidence to rely on the use of numbers compared to other narrative evidence types attests to this argument. Thus, while narrative evidence may trigger systematic processing, which the results from both 4x3 analyses and path analyses suggest, the more processing that is prompted, the less credible the message based on a personal experience appeared to be.

The theoretical importance of “n of one” is amplified when taking into account the use of personal experiences within health communication research and endeavors. The personal experiences felt and shared with others have a unique coping potential for many (Sunwolf et al., 2008) as well as a way to help aid others in comprehending their risk and prevention for a particular health issue. This research project thus offers not only theoretical considerations within communication science, but also contributions in the studies of health communication.

Narrative Evidence within Health Communication Research and Practice

Both theoretically and practically, this research offers several implications for health communication practitioners creating and disseminating osteoporosis health messages. Most importantly, this research endeavor highlights the careful attention and

systematic manner in operationalizing narrative evidence, and the need to engage in formative research to design narrative evidence to help ensure identification and engagement within narrative evidence. In particular, this research provides that it is important for scholars and practitioners to ensure that the characteristics and structure of narratives when used as narrative evidence is assessed and to recognize that there are different types of narratives that can be used as narrative evidence. This is of utmost importance when considering the role of emotions in narrative evidence.

One of the key arguments made throughout this study was the role of emotions within narrative evidence, and how emotions can be a part of health communication efforts. The vividness, imagery and identification (Oatley, 2002) and engagement (Kreuter et et al., 2007; Slater & Rouner, 2002) with narrative evidence and personal experiences are tied to many health issues (Sunwolf et al., 2008), and the telling of narratives has been found to be a potential influence on behaviors in cancer contexts (Kreuter et al., 2007). This research study thus offers a window into exploring more about the role of emotions within narrative both from a theoretical standpoint and a practical view to aid health communication efforts for osteoporosis.

The Role of Emotions in Processing of Narrative Evidence

The results from this study clearly show emotions do in fact matter when considering a health issue such as osteoporosis. Throughout the phases of this research project, young women expressed different emotions in association with osteoporosis. For instance, different emotions were communicated by those at risk and diagnosed with osteoporosis, not to mention the various emotions felt in response to osteoporosis information, and the relationship emotions have towards behavioral intentions of health

behaviors. Thus, osteoporosis is a disease that may prompt research into several type of emotional appeals that can prompt behavioral intentions. This is an important link for health communication scholars as previous research show a moderate and positive correlation between behavioral intentions and actual behaviors (Hale, Householder, Greene, 2002). As the uptake of health behaviors is the ultimate outcome and goal of much of health communication research and practice, learning what may contribute to behavioral intentions and behaviors is of the utmost importance (Larkey & Hecht, in press). The results illustrate that emotions may serve a key function towards these outcomes.

Influence of Multiple Emotions and Narrative Evidence

While fear appeals have been used extensively in health communication (Witte & Allen, 2000), this research suggests that health communication scholars and practitioners may want to research other types of appeals within the context of osteoporosis. This is critical as each emotion is considered to have different core relational themes and action tendencies (Lazarus, 1991; 2001) that may lend themselves towards behavioral intentions. The experience of different emotions is significant when thinking about the types of narrative evidence that may be used by health communication scholars, and if these emotional responses can be a hindrance or prompt towards behavioral intentions.

Interestingly, when thinking about the emotions in response to the narrative evidence types used in this study, more relief and less sadness was experienced after reading official health organization narrative evidence, compared to firsthand narrative evidence. This is interesting to take into account, as the official story is one that does not express an individual's own experience with an illness (Schank & Berman, 2002). The

core relational theme associated with relief involves the emotion of finding a distressing condition has changed for the better or gone away, whereas sadness is feeling some sort of loss (Lazarus, 1991; 2001). The finding suggests that firsthand narrative evidence detailing a person's experience may evoke less relief because the osteoporosis diagnosis has not gone away; the condition may have improved, but as the person is living with the disease, it is still present. Thus, young women reading the firsthand narrative evidence did have the full experience of relief compared to young women reading official health organization narrative evidence. Additionally, sadness may not be as evident after reading an official health organization narrative evidence because there is no one person or object that can be the source of loss. This is important for health communication scholars and efforts – the emotional responses do suggest that young women can experience different levels of emotions across the types of narrative evidence and these vary according to the narrative evidence read. This proposes some critical implications about what emotions do health communications arouse in individuals, and if these emotions are the intended or unintended responses.

Intended and Unintended Effects with Emotions

The need to consider intended or unintended emotional responses to the narrative evidence is illustrated in this research study when thinking about the emotional content worded either negatively or positively. The results show that manipulating the emotional content within the narrative evidence can evoke higher or lower levels of associated negative or positive emotions. For instance, young women reading negatively worded narrative evidence responded with higher levels of sadness, anger and fear, and lower levels of hope, relief and contentment, compared to women in reading a positive and "no

emotion" narrative evidence. This presents powerful implications for health communication scholars. Findings suggest that despite different emotions being aroused along the continuum of positive and negative emotions it is possible that emotionally laden messages may evoke the specific emotional response that is being conveyed.

In many regards it is considered beneficial to have respondents experience higher levels of emotions as manipulated, as the action tendencies associated with emotions could result in advantageous behaviors for health outcomes. Yet, scholars need to be careful of the potential boomerang effect of these emotions being aroused. For instance, these findings signify that participants in the negative condition experienced higher levels of fear and anger. Health communication scholars need to be cognizant of the ethical implications of arousing these emotions which could result in denial or detrimental outcomes. One of the criticisms of fear appeals is that in arousing fear, it possible for individuals to follow the action tendency flight or fright (Lazarus, 1991; 2001). In other words, avoidance could occur as they flee from the source of the emotional appraisal. For anger, the action tendency is to "attack on the agent held to be blameworthy for the offense" (Lazarus, 2001, p. 226). In the same vein, those in the positive and "no emotion" condition experienced higher levels of hope. The action tendency associated with hope states that individuals acknowledge a problem, and feel a promise of a solution (Lazarus, 1991; 2001). Thus, health communication scholars must be cognizant of how this could relate to young women's ultimate behavioral intentions and behaviors concerning osteoporosis.

With hope, scholars must be wary of raising false hope and promises that can not be realized. In particular, extreme levels of hope may cause some individuals to forgo

realistic goals in favor of unrealistic ones (Nabi, 2002). It is acknowledged that while engaging osteoporosis prevention behaviors such as calcium, vitamin D, and weight-bearing exercises can prevent the disease, it is possible for individuals to be diagnosed with the disease as other risk factors due occur (NOF, 2005). Health communication scholars and practitioners must be aware of the potential implications towards prevention of a disease, and raising "false hopes." In regards to anger, it is possible for this emotion to be a tightly controlled feeling by individuals (i.e., control the feeling of attack), but it does not always lead to rational decisions (Lazarus, 1991; 2001). Health communication scholars must be careful when arousing anger that it would not be associated with attacking with *source* of the message, but rather the issue at hand. Thus, it is important to include a cautionary note when discussing the arousal of emotions in health messages and a need to take into account the different action tendencies associated with emotions. This becomes compounded when considering how the emotions and action tendencies associated with distinct emotions may influence how a message is attended to and processed, and ultimate behaviors. Altogether, these differences beg for health communication scholars to pay more attention to the way osteoporosis narrative evidence is processed, and the factors influencing this processing.

When considering the use of narrative evidence and emotions to influence processing, the results from this study do more than state that health communication scholars must pay attention to how the specific evidence may arouse intentional, or unintentional, emotions in the target audience that could influence outcomes. In essence, the results also imply that for young women the emotional content within narrative evidence and the response these women have the evidence can have a significant and

positive impact on the perceptions of the message and behavioral intentions to engage in health behaviors. This is critical for health communication scholars and adds predictive validity to the past research about narratives evoking emotions and the relationship between emotions, cognitions and behavioral intentions.

Specific Emotion Responses and Processing of Narrative Evidence

This study continues a line of research advocating that emotion words found within messages may evoke emotional responses, and it is these responses which may in turn prompt such cognitive responses such as comprehension and behavioral intentions (Dillard et al., 1996, Chaiken et al., 1989; Petty & Cacioppo, 1986). Specifically, results outlined in the previous chapter illustrate that emotions have a positive and direct influence on the dominant thought statements aroused by participants and that emotions can serve as heuristic for processing of narrative evidence. In particular, these results thus repeat previous research finding that emotions can offer biased systematic processing (Chaiken & Mahewsaran, 1994), and "affect may influence the valence of cognitions in response to a message" (Dillard et al., 1996, p .48). Indeed, the emotion words and emotional responses are in fact a form of heuristic cue for individuals that can prompt further outcomes (Chaiken et al., 1989) such as behavioral intentions. Thus, differences that emerged across narrative evidence type and emotion condition begin to demonstrate the role of specific emotions within narrative evidence processing, namely fear and hope.

Fear and Hope towards Processing of Narrative Evidence

The results offer that emotions are a precursor towards the cognitive outcomes that mediate behavioral intentions. The previous chapter illustrates relationship between fear and hope and how this relationship affords a unique perspective on understanding

how the experience of multiple emotions can influence cogitations toward behavioral intentions. This research is one of a few research endeavors studying the effects of hope and offers an empirical validation that hope and fear are positively linked emotions. According to Lazarus (2001), the experience of hope is felt in relation to a prior assessment of fear. Lazarus (2001) offers that in order to alleviate fear, individuals engage in activities to reduce or flee the experience of fear. What Lazarus's (2001) definition offers, and this study empirically shows, is that in order to fully measure hope, fear also needs to be assessed. Thus, in order for young women to truly experience hope they need to at first acknowledge a sense of loss and experience a level of fear. This is important for health communication studies when continuing to study the use of various emotional appeals to evoke behavioral intentions and behaviors to prevent health issues.

Specifically, the results from this study imply that for young women reading osteoporosis narrative evidence, feeling fear is positively related to feeling hope and also positively related to writing thought statements about the evidence read. For this study, dominant thought statements in response to messages were used to assess the relationship between emotions and behavioral intentions due to previous research finding that emotions can serve as heuristic and contribute to biased systematic processing which can influence the cognitive responses written after message exposure (Chaiken & Mahewsaran, 1994; Dillard et al., 1996). Petty, Gleicher, Baker (1991) found that under conditions of high involvement there was a direct link of affect to cognitions, and under conditions of low involvement affect directly contributed to attitude perceptions. Specifically, that for people with low involvement, affect can be a heuristic that contributes to message effects (Dillard et al., 1996; Petty et al., 1991).

This study thus indicates that the experience of fear does need to be alleviated and that for young women, and the path analyses show that this can be accomplished in two manners. Specifically, the experience of fear is leading to experiencing hope to serve as a coping mechanism of fear (Lazarus, 2001), and this experience is enhanced because the positive evidence provided also elicits feelings of hope. Thus, hope has the opportunity to directly impact perceptions of message effectiveness. As a result, this study offers a replication of previous findings that emotion can be a heuristic directly towards message effects, in such that hope directly influenced perceived message effectiveness. This research also found, though, fear can directly influence dominant thought statements, which influenced perceptions of perceived message effectiveness and behavioral intentions. In other words, this research supports that emotions, specifically fear and hope, can serve as a heuristic that positively leads to cognitive responses and behavioral intentions and echoes previous research that emotions can support the biased systematic processing hypothesis from HSM perspective (Chaiken et al., 1989; Chaiken & Maheswaran, 1994). This is logical when considering the context of osteoporosis and the type of information that is being communicated to young women about the disease and that young women may be appraising uncertainty in relation to what they are reading.

Uncertainty with osteoporosis. Osteoporosis may be uncertain and new to young women reading the narrative evidence. Focus groups with young women found them to be aware of bone health, but not quite certain about what causes the disease and how to prevent it (Volkman, in progress). The uncertainty is thus related to the experience of hope and fear. As the previous chapter detailed, these results suggest that women receiving positive and "no emotion" osteoporosis narrative evidence, compared to

negative osteoporosis narrative evidence, appraised higher levels of hope. For these young women, after reading a positively worded experience where the narrator expressed a belief in things being better, higher levels of hope were experienced. These young women experienced a desire "for a better situation than what currently exists" (Nabi, 2002, p. 297), where hope "applies to any situation in which something is desired but the prospects are uncertain" (Lazarus, 2001, p. 282).

Along the same vein of Uncertainty Management Theory (UMT) (Bradac, 2001; Brashers, 2001), young women could have appraised uncertainty about osteoporosis where this was seen as an opportunity and subsequently felt hope and optimism (Brashers, 2001; Volkman & Silk, 2008). UMT would then predict that young women would avoid information that could potentially decrease this feeling (Volkman & Silk, 2008). Consequently, hope did not directly predict dominant thought statements because young women maybe did not want to engage in thoughts that could potentially decrease their level of hope. Thus, the results further support that experiencing hope may cause you to see the "promise" or the light at the end of the tunnel, thus you may ignore things that could potentially be distracting. But, results indicate that hope had a direct and positive relationship with perceived message effectiveness. In other words, young women experienced hope, and the message provided to them allowed them to sustain their level of hope, and thus they found that the message was effective.

When examining the relationship with fear, in the framework of UMT, fear can be aroused when uncertainty is appraised as a danger and result in behaviors to reduce their uncertainty (Brashers, 2001; Volkman & Silk, 2008). Thus, experience of fear became a predictor of dominant cognitive thought statements as young women sought to engage in

a behavior that reduced their fear, and in turn this influenced finding the message to be effective when fear was not restricted to only be alleviated through hope. This reflects the properties of fear towards cognitive outcomes and that fear can produce an increased awareness of your environment, and therefore it leads to more careful planning and attention to surrounding environmental factors. This echoes previous research finding that fear can positively increase systematic processing (Zuckerman & Chaiken, 1998). Again using the UMT (Brahsers, 2001) framework, the message could have been perceived as effective because it provided the young women with osteoporosis content that allowed them to cognitively process and provided information to help prompt their need to engage in an activity to reduce their uncertainty and fear. This offers that emotional responses to osteoporosis narrative evidence can manipulate the processing that occurs.

Yet, the situation changes when understanding the full relationship of hope as argued by Lazarus (2001) for allowing fear to predict hope and the reduction of fear to only be alleviated through the feeling of hope. Lazarus (2001) points out that "we dispel negative emotional tendencies with hope" (p. 283), and so a negative experience is needed in order to feel hope. When this relationship is allowed to occur, the previous chapter again depicts that fear is not is directly related to perceived message effectiveness but now the experience of hope is positively predicting dominant cognitive thought statements. Thus, when fully measuring hope as an emotion where fear is allowed to predict hope, is the time when individuals will engage in positive activities such as thought statements. This indicates that hope and the subsequent thought statements are a way to alleviate the experience of fear. As a result, the thought statements led to

perceptions of evidence quality, and perceptions of message effectiveness. These relationships suggest then that the positively worded condition produced hope, and the experience of fear to generate hope, gave young women enough of a cognitive "jump" to write thought statements to continue the escape of fear but simultaneously maintain their level of hope. Borrowing from UMT (Brashers, 2001), results then imply that young women felt *both* a danger and opportunity in regards to osteoporosis and the manipulated condition allowed young women to maintain their level of hope.

Summary of Narrative Evidence Use in Communication Science and Health Communication

Altogether, this research study provides empirical support that both systematic and heuristic processing can and does occur when processing narrative evidence. More importantly, this research suggests that both heuristic processing and systematic processing are needed to best explain how osteoporosis narrative evidence is processed. This simultaneous evaluation of heuristic and systematic processing supports the HSM argument that individuals seek cues within messages and also that individuals can attend to messages carefully (Chaiken et al., 1989). Furthermore, the study illustrates that the heuristics that serve as cues within these modes of processing can be emotions and adds further support to the arousal of more than one emotion after reading a health message. The emotions aroused, particularly fear and hope, can both directly and indirectly influence the perceptions of message effectiveness and behavioral intentions. In particular, this supports a biased systematic processing approach hypothesized by HSM (Todorov et al., 2002). Results indicate that the "n of one" characteristic of narrative evidence is both a cue towards processing and comprehension of narrative evidence, but

this can also be a hindrance towards the systematic processing that occurs as young women recognize that this is not generalizable to the population. Future research should incorporate several types of narrative evidence exposure to young women about osteoporosis to understand if multiple perspectives can positively enhance systematic processing.

This research study suggested that emotions may be needed in order to fully understand how processing of narrative evidence occurs. The strong presence of hope as an emotional response and its direct relationship with perceived message effectiveness demonstrates the influence of emotions on the processing of narrative evidence. In addition, this research empirically supports the positive relationship between fear and hope and shows that fear can have a direct relationship to hope. The results illustrate that hope can lead to appraisals of the environment, when fear is allowed to predict feelings of hope, and these appraisals positively predict mediators toward behavioral intentions.

With this theoretical understanding of narrative evidence in communication science and health communication research, it is important to then discuss how this influences actual behaviors associated with osteoporosis prevention. This research study afforded a unique opportunity to assess osteoporosis prevention behaviors that will be able to guide future research and outreach efforts.

Behaviors of Calcium and Vitamin D within Osteoporosis Communication Efforts

The importance of understanding narrative evidence within communication and health communication becomes imperative when considering the osteoporosis messages communicated to young women about preventing this disease. As the previous chapters

detailed, the rising number of individuals, particularly women, to be diagnosed with osteoporosis warrants a closer examination on the communication of this disease. There is a gender and developmental aspect to this disease, as it is four times more likely to occur in women than men and prevention efforts started earlier in life can help prevent diagnosis later in life (Surgeon General, 2004). Thus, it is important for health communication scholars to begin to understand how messages conveying osteoporosis health risk messages can be perceived and perhaps attended to, and ultimately influence osteoporosis health prevention behaviors in young women.

Existing Osteoporosis Communication

Previous research indicates that young women have heard of osteoporosis, but that there is a lack of understanding about the disease (Kasper et al., 2001). Messages about calcium intake have permeated communication channels since the Got Milk® and 3-a-Day® campaigns, which implicitly discussed bone health. Yet, "osteoporosis" is rarely mentioned. As a result, communication scholars and health communication scholars need to know what young women do perceive about osteoporosis to guide future research about communicating this disease to young women. The overall trend in the results provided for this study suggest that the use of narrative evidence and the emotional content within this evidence, as well as emotional responses, may be one avenue for osteoporosis public health practitioners to follow.

Specifically, this research suggests that the emotional component tied to osteoporosis is not something to only consider in relation for health communication scholars to acknowledge as a part of narrative evidence, but also that emotions are an important connection to the disease. As mentioned in the preceding chapters and earlier

in this chapter, this research study clearly shows that young women experience different emotions in relation to osteoporosis. Interestingly, when asked to recall situations, conversations and events related to osteoporosis young women being interviewed expressed a range of emotions along the continuum of research identifying positive and negative emotions (Lazarus, 2001). For instance, young women expressed fear over being diagnosed with the disease, or being afraid for a loved one with the disease, or hopefulness that recommended behaviors will prevent the disease. Their perspectives offered that different emotions are indeed expressed in relation to osteoporosis, and this disease is not inherently a "negative" or "positive" disease to be portrayed. In other words, this validates the need to include different types of emotions within the narrative evidence, as well as see if portraying this disease in a more positive or negative manner can influence subsequent perceptions of the evidence and desires to engage in prevention behaviors.

Increasing Family Communication and Awareness of Osteoporosis

Such a use of different appeals becomes increasingly even more important when considering that many young women are unaware of this disease and lack communication with family members about a family history of this disease. Responses to questions about knowledge of a family member with osteoporosis, or family discussions about a family member's diagnosis revealed that young women are *not* engaging in conversations about osteoporosis. In fact, results indicate that only 11 young women from this sample are aware of a family history of osteoporosis and have spoken to family members about the disease. This presents both a challenge and an opportunity for health communication practitioners, and the creation of messages to encourage family discussions about health

and to include osteoporosis as a disease within these discussions. It is a challenge as family health history of osteoporosis and broken bones are considered risk factor of osteoporosis (NOF, 2005), and there is a growing need for individuals to learn family health history to prevent diseases (Guttmacher et al., 2004). Thus, the specific challenge is that there could be more individuals at risk for the disease, yet this is unknown until conversations and communication occurs. It therefore becomes important for health communication endeavors to help families build the communication skills necessary to engage in these conversations. Additionally, some of the motivation and personal relevance of an osteoporosis message for young women may be lost because they do not know their family history. Therefore, a chance for an audience to attend to osteoporosis narrative evidence because they are aware of the disease and it potentially affecting them is not realized. This is important as the level of identification with a narrative could be influenced by the personal relationship with the person diagnosed, and listening to their experiences. It challenges health communication scholars to continue to think of additional motivations and ways to make osteoporosis personally relevant for young women, as well as to how to build family communication skills to engage in these discussions about family health history. Osteoporosis is thus another warranted area for health communication research to include among the push for knowing family health history as becoming a critical communication skill, and thus giving families tools to help share this family health information.

It then remains for health communication and public health scholars to understand what opportunities are needed to help young women gain knowledge and awareness of their family health history of osteoporosis. This disease is often diagnosed in women pre-

and post-menopausal years (Surgeon General, 2004), so perhaps health communication scholars need to examine the start of communication activities about osteoporosis from a developmental standpoint. Specifically, from a developmental perspective, there may be an opportunity for scholars to begin to understand how grandparents, parents and young women can begin to engage in these discussions and communicate family health diagnoses and diseases and to build communication skills among families when discussing health. It may be fruitful to engage in research encouraging elders to discuss family health history with young women instead of focusing on young women asking elders. It is also possible that health communication efforts need to focus on helping grandparents and parents develop the communication skills to converse about the disease to help generate these discussions. As part of a generatitivity focus, "[grandparents may] feel a sense of responsibility toward the younger generation," (Pecchioni et al., 2006 p. 453) which could be the prompt needed to engage in such discussions. Research associates this responsibility, as well as motivation and desire, to share personal information as part of a social value among older adults (Pratt, Norris, Arnold, & Filyer, 1999). Research suggests older adults value sharing their knowledge and information and are attuned to sharing this with younger adults (Pratt et al., 1999), including health and personal life narratives.

Additionally, for some young women a grandparent or parent is the family member diagnosed or associated with osteoporosis in their minds (Volkman, in progress). Consequently, for young women this disease may be associated with older adults and older family members, and osteoporosis communication efforts may need to capitalize on these efforts. Thus, scholars may need to examine how to promote grandparents and

parents to discuss their osteoporosis risk and diagnoses with young women to improve knowledge about family health history of the disease. In turn, this may assist the motivation and desire to attend to health messages about osteoporosis for young women. Thus, it is important for future health communication endeavors to focus on the family communication skills training needed to help improve these discussions.

Osteoporosis Communication towards Prevention

The behaviors demonstrated in this research study illustrate why there is a need to further develop effective messages towards osteoporosis prevention needed. The behaviors assessed in this study illustrate what communication science has offered – that exposure to one message has little direct effect on behavior. The behaviors recommended are related to habits built over the lifespan, and can be influenced by availability of resources and opportunity (e.g., supplements, fresh foods, etc.). Great care is thus needed in how to encourage the uptake and maintenance of osteoporosis behaviors.

Segmenting Behavior Outcomes

The study indicates that many young women did consume 100% or more of the dietary reference intake of calcium and vitamin D in the previous 24 hours. While narrative evidence and emotion condition were not associated with percentage of calcium and vitamin D DRI consumption, unique differences emerge in associating when young women may be more likely to meet the recommended daily allotment of calcium and vitamin D that offer opportunities for health communication and osteoporosis public health efforts to pursue. Results imply that segmentation of efforts may be the best way for osteoporosis and health communication scholars to move forward in advancing

prevention messages. In other words, it is important to profile audiences to each behavior separately, and build communication efforts off of these differences.

For instance, pre-test health behaviors were a strong association for consuming 100% or more DRI of calcium for young women. This suggests that osteoporosis messages may need to move from a prevention health message to a maintenance health message for some young women. Messages may then need to be from multiple perspectives. For instance, it may be important for osteoporosis public health and health communication efforts to perhaps segment campaigns and outreach to young women that already live healthy lifestyles as way to encourage maintenance of these behaviors. Consequently, these messages must not dissuade young women from engaging in these behaviors; obviously, it is important to encourage the maintenance of health behaviors in young women. Fortunately, these results indicate that the narrative evidence provided to young women did not dramatically dissuade many individuals engaging in health behaviors prior to the 24-hour dietary recall. In fact, results suggest there were a small percentage of young women that engaged in less than optimal health behaviors at pre-test *did* meet the percentage DRI for calcium and vitamin D at post-test. Thus, it may be possible to motivate the uptake of some bone healthy behaviors. While the results can only offer association and not causation, it does offer some promising opportunities for osteoporosis public health efforts. Specifically, it suggests that osteoporosis health communication campaigns should investigate ways to include both prevention and maintenance strategies for young women to help maximize healthy behaviors already started and develop campaigns including this multi-method component. Many osteoporosis public health messages do not segment audiences in this manner, instead

focusing on demographic differences such as age for the development of outreach endeavors (Chang, 2006). The results from this study suggest that osteoporosis and health communication scholars and practitioners may need to further segment audiences in order to reach the full potential of preventing this disease.

The need for further segmentation of osteoporosis outreach efforts is evidenced in the unique relationships that predict calcium and vitamin D behaviors. Perhaps most importantly, the study implies that these behaviors, while correlated, are indeed separate behaviors in the minds of young women. Thus, messages about these behaviors would best be suited address these differences. Results imply that theoretically it is necessary for young women to experience hope in order to process the messages and lead to behavioral intentions of bone healthy behaviors. Yet, those women who did not meet the recommended DRI for calcium reported higher levels of hope after reading narrative evidence. This could suggest that while narrative evidence and messages may evoke hope, scholars should be cautioned in recognizing the limitations of what emotions and behavioral intentions can lead to actual behaviors.

For instance, osteoporosis and health communication efforts must be cognizant, that for young women, osteoporosis remains a disease that largely happens later in life. While the narrative evidence in this study highlights young women their age diagnosed with the disease, or mothers diagnosed, the reality is that this disease is often thought of as "later." Therefore, hopefulness for a promised future may be difficult for young women to appreciate and thus carry forward to their health behaviors. The experience of hope and a promise of a shortcoming or falling being overcome and achieved as outlined in the narrative evidence may be recognized. The truth is that the practicality of seeing

that promised realized may be difficult for young women as they engage in calcium behavior for preventing osteoporosis. The "promise" is not quickly being achieved, and this could be dissuading young women to engage in the behavior. The actual behaviors documented in this research study reflect this social reality that many osteoporosis public health efforts will need to consider.

The argument for further segmentation towards efforts to promote bone healthy behaviors is even more important considering that vitamin D can be both consumed and absorbed by young women through sunlight exposure in order to reach the percentage of dietary reference intake. Thus, it is possible for young women to achieve the necessary intake for vitamin D simply through outdoor exposure, rather than ingesting foods rich in vitamin D. The tendency campaigns to lump vitamin D and calcium towards osteoporosis prevention may need to be re-considered as the results imply that these behaviors are not predicted by the same variables.

In particular, young women that consumed 100% or more of vitamin D DRI are more likely to heuristically process narrative evidence and have higher behavioral intentions to do so. Theoretically and practically, this offers much for public health and health communication scholars to consider in relation to osteoporosis communication. Importantly, this shows that heuristic processing can be associated with behaviors. This echoes previous research finding that attending to peripheral cues and heuristically processing can cause a quick behavior change (Petty & Cacioppo, 1986). In regards to vitamin D, this may be logical as the message "get outdoors and be active" permeates many public health campaigns and thus could serve as a cue for young women. The results suggest that the "n of one" that is associated with narrative evidence may not be a

detriment to persuasiveness of narrative evidence when considering vitamin D behaviors, as it is related to a specific behavior being advocated within narrative evidence. This offers for consideration then that messages may want to evoke heuristic processing as it can lead to the specific behavior. Public health and health communication scholars should be cautioned though that behaviors invoked by heuristic processing may be subject to change again (Petty & Cacioppo, 1986), and thus multiple and repeated efforts to discuss osteoporosis and vitamin D behaviors may be warranted.

Developing Osteoporosis Narrative Evidence

The need to improve osteoporosis message content to young women is further evident in their responses to the osteoporosis specific narrative evidence offered in this study. Their lack of understanding and familiarity with the diseases and osteoporosis risks made any osteoporosis narrative seem similar, and differences emerged only for the attention-control group. Thus, young women viewed any osteoporosis narrative evidence in the same vein or manner. Thus, while it was expected to see differences emerge between firsthand and secondhand narrative evidence compared to official health organization narrative evidence, the results show that young women found the official health organization narrative to be judged equally as the other personal experiences. This reflects the reality that for many young women they know so little of the disease that a message recounting facts, with no personal experiences or unique nuances, was considered persuasive.

In other words, the results suggest that it is possible for a topic such as osteoporosis, which may be considered a novel topic for young women, a firsthand, secondhand and official health organization are *all* considered credible sources for

information, regardless of what type of emotion is conveyed. This logic is related to the reality that today's society has become reliant upon both personal experiences and information conveyed by a health organization for learning risk factors and prevention behaviors for a particular disease and illness. Within these sources, emotions can or cannot be conveyed. Focus groups with young women indicated that these women will look to family sources (e.g., mom, aunt, grandparent) as well as health organizations (e.g., WebMD, health centers) for information and guidance about health a variety of health issues (Volkman, in progress). These results then support that narrative evidence can aid comprehension, and perceived be of quality and effectiveness regarding a health topic, regardless of personal experiences being shared or not.

While this may be encouraging for public health endeavors now, this begs the question of how long an official health organization message about osteoporosis will be considered persuasive. As time continues and more public health efforts about osteoporosis grow, then it is possible that these messages may be perceived ineffective as the knowledge and familiarity with the disease expands. Young women are aware of brochures about osteoporosis and ignore them because they are written for older women (Volkman, in progress). Even thought these results show that an official health organization message is similar to the other narrative evidence types, it would be negligent to assume that only one should be used in outreach efforts. It is very possible for young women to eventually dismiss these messages targeted to them, and ignore them as they have other messages. Health communication and osteoporosis scholars must continue to work together to consider new ways to reach young women about osteoporosis prevention. Thus, health communication scholars and public health officials

must continue to work together to advance osteoporosis messages that will be considered engaging for young women.

Summary of Narrative Evidence for Osteoporosis Communication

Taken together, the results suggest that single campaign advocating prevention efforts to young women may be too simplistic and that specific audience segmentations regarding audience's current health behaviors and outcomes of calcium and vitamin D are needed in order to achieve the best results. Osteoporosis and public health practitioners should work with health communication scholars on how to best segment and tailor messages to reach young women about osteoporosis behaviors. The results imply that osteoporosis may not only be a prevention message, but also a maintenance message for some young women. The results from this study indicate that although narrative evidence is considered in the same manner, it should be acknowledged that additional research should take into consideration that different predictors are associated with calcium and vitamin D. With these thoughts in mind, it is necessary to consider next steps with this entire line of research.

Limitations and Future Research

As part of offering future research and next steps within narrative evidence and osteoporosis communication, it is important to acknowledge limitations within this study on the use of narrative evidence types for osteoporosis health prevention, and understanding the role of emotion within narrative evidence. The following recognizes the limitations with this study and provides a plan for future research.

Limitations

The limitations within this study include the narrative evidence types used within the study, the measurement of items, and procedures used. Corrections to these areas of the project would undoubtedly improve results.

Narrative Evidence Types

To begin, the narrative evidence types were developed extensively upon the formative research conducted for a target audience at a specific university location. This led to inclusion of statements to enhance the identification (Oatley, 2002) with the narrative evidence by including locations and concerns that are specific to this population. This limits the generalizability of the findings to other populations. Also, while osteoporosis does affect more women of White/Caucasian descent than other races (NOF, 2005), a replication of this study is warranted among other races and ethnicities such as Asian cultures which are also exhibit prevalence of osteoporosis (NOF, 2005). Previous literature has argued that the level of engagement individuals can have with narratives can be a function of the cultural imbeddedness (Larkey & Hecht, in press). Consequently, the firsthand and secondhand experiences shared by women in Phase 1 of the study may be different across diverse populations, which would influence the development of narrative evidence types across Phase 2 and Phase 3 of the study. In order to develop future studies and research on narrative evidence, it would be crucial for scholars and practitioners to engage in extensive formative research efforts again to achieve the levels of engagement, interest and identification with the evidence.

It is also of importance to study variations of experiences within each narrative evidence type. This study only accounted for one experience within each type of

narrative. Future research will need to consider which experience may be more persuasive within each narrative evidence type. This may cause the secondhand narrative evidence to not be about a daughter discussing a mother's diagnosis, but perhaps a grandmother's diagnosis or grandmother's story told to her daughter or grand-daughter. As each experience is unique (Ochs & Capps, 1996; Miller-Day, 2004), formative research is imperative when developing the narrative evidence. The limitation of the source of the narrative evidence may have caused the negative relationships exhibited between systematic processing and outcomes of narrative evidence. While the manipulation checks found that young women did identify and find the narrative evidence interesting and engaging, the viewpoint selected for this study does offer a limitation. Thus, it is theoretically important to not only test different types of narrative evidence, but also to vary the narratives within each type in future research.

In addition, additional research is warranted to examine the ability to clearly distinguish positive and no emotion narrative evidence. The results from the manipulation check procedures from Phase 3 of the research found that participants had difficulty distinguishing between a positive and "no emotion" narrative evidence. This may reflect the fact that the participants processed the positive emotion condition more heuristically, or that the positivity bias served as a heuristic for participants so that they attributed a "no emotion" condition as having positive emotions (Sears, 1983). Additionally, it was seen that the narrative condition did not predict the experience of fear; results indicated this was an almost significant relationship. Thus, when conducting additional formative research to understand stories and experiences with a disease, different positive emotions may be elicited that could prompt a clearer difference between positive and no emotion

conditions among participants, and perhaps aid more significant relationships between condition and fear.

Measurement

In addition to limitations with the narrative evidence types, there are several measurement issues that future research would need to address. Most notably, improvements on the items assessing systematic and heuristic processing are warranted. The Griffin et al. (2002) items used for this study presented moderate reliability within their study (omega = .68 and omega = .69), but did not exhibit strong reliability or validity within this study. The systematic scale only demonstrated moderate reliability, and the heuristic scale was reduced to one item for analyses. Ideally, this would be altered in future studies to best assess the concepts of systematic and heuristic processing. Thus, the implications of systematic and heuristic processing need to be cautioned and future research replicating this study should include different measures to better account for systematic and heuristic processing.

The preference for numerical information (PNI) measures also exhibited problems with skewness and bi-modality that required extensive transformation processes. The original 20 item scale was reduced for this sample. Interestingly, the PNI measure was previously tested among students in more math and business oriented classrooms, rather than a broad range of majors (Viswananthan, 1993). This sample exhibited a low level of PNI, but does represent a generalizable sample of undergraduate courses. The participants in this study were from a variety of business, communication, psychology, art and nutrition majors. As a result, the low level of PNI perhaps indicates that it is low among the population, and perhaps it is not preference for numbers that can influence

attention to narrative evidence, but rather a measure of numeracy should be considered. Numeracy is a skill associated with the ability to use basic probability and quantitative concepts (Parrott et al., 2005). It may be more appropriate to assess if the ability to understand is more a motivation or ability to process narrative evidence. Individuals may enjoy and prefer numbers, but this study did not grasp if they understand numbers. The ability to understand health information presented in quantitative forms may be a significant predictor of whether or not narrative evidence is more persuasive.

Moreover, this was one of the first few empirical studies using the narrative tendency measure (Newman, 2005). This scale may need to be adapted to understand the nuances that individuals have towards narratives, and perhaps a specific scale developed toward preferences for narrative evidence when making health decisions is needed. Additionally, the items within the scale highlight that young women may prefer multiple stories; the exposure to one type of story may have limited their narrative tendencies. As a result, the negative relationship between narrative tendencies and systematic processing could be a result of the measurement of the items. Thus, there is an opportunity to better measure these tendencies.

Other limitations within this study include the lack of measurement of specific weight-bearing exercises or other ways to absorb vitamin D during follow-up procedures. The 24-hour dietary recall employed did provide an assessment of calcium and vitamin D intake, but did not allow for measuring the absorption of vitamin D through sun exposure or engagement in weight-bearing exercises. The narrative evidence used within this study recommended sun exposure and weight bearing exercises, and the behavioral intention items did question intent towards weight-bearing exercises. Thus, this study lacks a full

assessment of the bone healthy behaviors advocated within the message. It would be important for future research to incorporate assessments of these behaviors to see if differences emerged for other outcomes. In addition, this study did not pre-test specific behavioral data that was assessed at post-test. Thus, direct causation is difficult to support with this study regarding behavioral outcomes. In addition, post-test behaviors were not examined at later time points to see if behaviors were enacted or sustained several days or weeks after message exposure.

Procedures

Furthermore, there were logistical problems that may have introduced bias within the study and reduced external validity. For instance, as with the pilot study in Phase 2, participants in the attention-control condition during Phase 3 were confused about their message in relation to health. The researcher ensured them that all messages are correct, and that they should follow the instructions provided. Construction around the campus and noisy heating systems provided a distraction during three time sessions. Additionally, potential problems that arose with the 24 hour dietary recalls included some RAs not providing participants with extra credit slips, or answering participant questions about the purpose of the study and facts about osteoporosis. These were corrected as soon as possible to avoid further confounding the study, or impeding the compensation for participants.

Logistic problems also arose when conducting dietary recalls after 5:00pm, as it was learned that Chandlee Lab locks at this time. This was remedied so that RAs met with participants at the entrance to the building and escorted them to 324 Chandlee Lab for all dietary recalls being conducted at 5:00pm or later. Finally, one RA did not check

the schedule for the day of dietary recalls, and this required another RA to double-up the number of recalls conducted. Future replications of this study should account for these logistical issues.

Despite these limitations within the research study, there are several new avenues for communication and health communication scholars to pursue when considering the results of this research study. The future research plan to be taken from this study would incorporate considerations into the theoretical use of narrative evidence, and also the practical outreach efforts that should be pursued to improve osteoporosis outcomes.

Directions for Future Research

The results from this study provide rich avenues for future research in communication science, health communication and osteoporosis communication. There are several different areas that a program of study in narrative evidence and osteoporosis communication can pursue with the foundation of this study. The following outlines such a plan for researchers and practitioners.

Communication Science and Health Communication

First, it would be of the utmost importance to continue a line of research understanding the persuasiveness of narrative evidence for communication science research. This is one of the first research studies to empirically test different narrative evidence types and the persuasiveness of narrative evidence types against each other. Much of previous research has simply focused on one form of narrative evidence and compared it against statistical evidence (Baeslar & Burgoon, 1994; Kopfman et al., 1998). It would be theoretically and practically interesting to begin advancing communication research into different narrative evidence types. In particular, firsthand

and secondhand narrative evidence types are only two of a variety of narrative evidence types that may be used with communication science and health communication. Additional perspectives from these types of narratives are warranted to improve the understanding of how narrative evidence is processed.

In this manner, it would also be useful to study how the use of *multiple* narrative evidence types may influence the processing and uptake of behaviors and allow individuals to be exposed to more than one type of narrative evidence in forming decisions. As it is a social reality that many different experiences can be used to form a health decision, it would be theoretically important to study the persuasiveness and outcomes associated when individuals are allowed to read and process a firsthand, secondhand and official health organization narrative evidence types at once. It is possible that more systematic processing many occur as individuals are exposed to more than one "n of one." Also, by exposing individuals to more than one narrative evidence type it may achieve having narrative tendencies fulfilled because individuals are able to read more than one narrative.

In addition, research is needed in specifically comparing different narrative evidence types to statistical evidence to build a more comprehensive picture of narrative evidence and statistical evidence processing and outcomes. Understanding the nuances and uniqueness of narrative evidence is only half the story when considering the use of evidence in messages and health messages; scholars must build upon this work to fully incorporate more evidence types. The limitation in previous research where only one narrative evidence type is compared to statistical evidence was not entirely fixed in this research study. This project only begins the line of research to be pursued. Scholars must

learn how firsthand, secondhand, and official narrative evidence compared to statistical evidence differs or remains the same when considering persuasiveness of evidence. Next steps should move towards this line of research.

Most importantly, this research study strived to provide a systematic manner in which to operationalize and construct narrative evidence. The following is thus recommended: Scholars wishing to create to narrative evidence should pay careful attention to the phrases and words used by individuals in their target audience, as well as attending to the content to convey about the issue, to help ensure a level of engagement and identification with the narrative evidence. For osteoporosis, the narrative evidence was communicating about the risks and prevention of the disease. Thus, it was important to include statements regarding susceptibility, severity and barriers towards engaging in bone healthy behaviors. As a result, this research suggests that future endeavors using narrative evidence should incorporate these considerations. Furthermore, when considering the role of emotions within narrative evidence, scholars must be careful regarding the use of specific emotion words that can arouse positive or negative emotions. Consequently, future research developing narrative evidence should consider: 1) specific content related to the issue; 2) engagement and identification with the narrative evidence; and 3) emotion words within the narrative evidence.

For health communication scholars interested in using narrative evidence in health messages, this research calls for additional investigation in the use of emotions both as a part of narrative evidence being used and as an outcome associated with the use of narrative evidence. This study found that the emotions of hope and fear had relationships both with the processing of narrative evidence, and hope had a direct relationship with

perceptions of message effectiveness. Yet, this research showed that more than one emotion can be aroused in response to narrative evidence. It is important for health communication scholars to further explore the relationship between emotions and processing, comprehension, evidence quality and behavioral intentions. In particular, past research has found anger to influence systematic processing and happiness to arouse heuristic processing (Pfau et al., 2001; 2009). While these emotions did not manifest themselves within path analyses for research projects, it would be important for health communications scholars to continue this line of research to begin fully exploring the potential of distinct emotions on the processing and behavioral outcomes associated with health messages. This research clearly shows that emotions have a role within health, and it is possible that several emotions need to be considered when advocating a health messages.

Osteoporosis Communication

Finally, future research must begin to better understand how to segment audiences for osteoporosis outreach and to specifically encourage more communication about osteoporosis. This includes profiling young women's attitudes and beliefs about each behavior separately, not just altogether. In particular, this study highlights the enormous void in young women understanding and learning their family health history. This is a critical. Scholars must begin advocating for osteoporosis to be a part of the list of diseases that are encouraged in family discussions about health. The risk factor of family health history of osteoporosis warrants such avenues be pursued (Surgeon General, 2004). It is suggested that health communication scholars perhaps look at a different standpoint for reaching young women about osteoporosis and consider approaching older

generations as a way to communication osteoporosis family history. As a result, the call for health communication scholars to continue researching and understanding ways to encourage discussions and a communication skill of family health history a family history continues to emerge as a health risk factor for many diseases.

The need for better segmentation of osteoporosis outreach is further augmented by the actual behaviors exhibited by young women. There is a need to provide young women with specific messages about calcium versus vitamin D, and perhaps begin exploring a prevention and maintenance two-prong approach for osteoporosis outreach efforts. The results clearly show that young women are engaging in these behaviors, but that outreach efforts and osteoporosis health messages need to reflect the distinct predictors of these behaviors that emerged in this study. It is clear that young women do not think about calcium or vitamin D similarly or the processing of osteoporosis messages with these behaviors advocated results in similar outcomes.

Furthermore, it is necessary when ascertaining behavioral change to include a pre-test of behavioral data prior to message exposure and use the same measures to examine post-test behavior to truly assess behavioral change. Future research will thus need to incorporate such pre-test measures regarding osteoporosis bone healthy behaviors, as well as include a more longitudinal design to assess behavior change. Measuring behaviors in close proximity to message exposure is limiting health communication researchers towards understanding if behavioral change occurred. Observing behaviors several weeks, through periodic follow-ups, after message exposure will enable researchers to know if the messages provided truly were incorporated into young

women's lives and prompted the incorporation of bone healthy behaviors into a habitual behavior.

Policy suggestions. One important outcome related to osteoporosis communication is that people may be asking for and receiving more bone density scans to understand their current bone mass index and risk for osteoporosis. Thus, health communication scholars and practitioners need to work with public health and policy officials to help improve policies and reimbursement for bone density scans. Depending upon insurance provider, a bone density scan costs approximately $200 for individuals, compared to $100-$3,000 for a fractured bone (www.changehealthcare.com, 2009) and the $18 billion dollars spent for caring for those with osteoporosis (Surgeon General, 2004). Thus, a bone density scan early in life that can provide individuals with health information and awareness of their own bone health is less of a cost compared to a fractured bone or treating osteoporosis. Health communication scholars must be able to work with policy officials and public health practitioners to help ensure that as individuals learn about osteoporosis and wish to learn their bone mass index, that they are provided the policies and economic ability to do so.

In sum, there are many important and critical directions for communication and health communications scholars to consider when understanding the role of narrative evidence in communication science and developing osteoporosis health messages. This research study only provides a starting point for scholars, and provides a call for understanding more about the use of evidence with health messages.

Conclusion

This research study advocated for communication and health communication scholars to find a better assessment of the use of narrative evidence within osteoporosis communication, and the nuances of emotions and processing associated with processing narrative evidence. Using the HSM (Chaiken et al., 1989; Todorov et al., 2002) as a theoretical guide, this study offers new implications on the simultaneous occurrence of systematic and heuristic processing of narrative evidence. Specifically, this research shows that emotions can serve as heuristics that can bias the systematic processing of narrative evidence, and provides new insights on the mediation of variables towards persuasive outcomes. In this study, the emotions of hope and fear emerged as significant positive influences on thought statements that are aroused after exposure to a message, and the perceptions of message effectiveness that participants evaluate after reading narrative evidence. In essence, it argues that perhaps a positive message may in fact be a hopeful message, as the relationships between hope and outcomes was significant.

For communication scientists and health communication scholars, this research study also shows that comprehension can mediate the relationship between systematic processing and perceived evidence quality, and that the "n of one" associated with narrative evidence (Baselar & Burgoon, 1994) not can serve as a heuristic cue. Thus, this study further validated the HSM (Chaiken et al., 1989) perspective on the concurrence of systematic and heuristic processing. It also offers for communication scholars empirical findings to *question* if the "n of one" associated with narrative evidence truly leads to heuristic processing only.

Specifically, for health communication scholars and practitioners, this is one of the first studies to provide evidence on the types of narrative evidence that may be used within health communication efforts about osteoporosis, and sheds new light on the persuasiveness of narrative evidence. It argues that the emotional component associated with narrative and the outcomes associated with narrative evidence types can predict message effectiveness and lead to behavioral intentions. Such results echo past research on the use of emotions in health messages, and offers new directions on how simultaneous emotions may be manifesting towards narrative evidence outcomes. The osteoporosis behaviors reported in the 24-hour recall associated with calcium and vitamin D highlight that emotions, processing and behavioral intentions predict these outcomes in different ways. Thus, outreach to promote these behaviors should be distinct and separate and further segmentation of young women towards engaging in these behaviors is warranted.

Practically, this research illustrates additional avenues for health communication scholars and practitioners to advocate the need for family discussions about history of this disease. The ability to improve family discussions about a health disease to help increase knowledge and awareness of a health issue is important in this day and age for improved medical encounters. Thus, this research highlights that osteoporosis a health issue that should be a part of these conversations. The lack of awareness of this disease is only being hindered by young women's ignorance of their own risks associated with it.

Altogether, this research study shows that there are many unique challenges for communication and health communication scholars and practitioners to help decrease the future diagnoses of osteoporosis. Theoretically, this study provides rich information and

empirical results to add to the continuing debate on the persuasiveness of narrative evidence in communication and health communication research. Practically, this study offers that the use of narrative evidence may provide the needed impetuous for young women to begin understanding the disease and behaviors associated with prevention of osteoporosis. Yet, as this research study shows, there are many more avenues to consider before reaching this worthwhile goal.

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APPENDIX A: POSITIVE FIRSTHAND NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was created from interviews done March 2008 – June 2008 with young women about osteoporosis.

"A Young Woman Living with Osteoporosis"

It's weird to talk about osteoporosis. I'm only 21 years old, a college student, and like a lot of women my age, I thought osteoporosis is only supposed to happen to older people? But, it's true, I have it. It's not so bad, it's just a part of who I am.

I guess I knew something was wrong after visiting a health fair at home. I got one of those heel scans when they test your bone density, and it came back pretty low. When I got to school the following semester, I broke my arm. So I went to the University Health Services on campus to get checked-out and told them about the heel scan as part of my health history. They also asked about my family's bones, and I told them I think my grandmom was diagnosed with osteoporosis. I mean, I try to get calcium, but it's hard since I'm lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. I mean I do walk around Penn State's campus. It's huge, right?! I'm happy, I'm smiling, I'm living my life. I didn't even really know what osteoporosis is. I just remember my grandmom having achy joints and breaking her hip. Now I know it was because her bones are soft and brittle, and they can easily break. It was hard for her to do some everyday things, but, it wasn't super bad. I wasn't really certain she even had it.

When I was in the office, the health practitioner started explaining the disease. Really, it's just when your bones become fragile, so you're more likely to break them

because of low bone mass. She said that this is the time now to help build the best bones possible during your mid-twenties, and she mentioned that family history can put you at risk. She wanted to run another bone density test, just to be safe. I really thought I was fine despite my grandmom, I mean, I'm young. I'm relatively active and do stuff at Penn State.

Well, when the test results came back, it showed that my bones weren't quite as strong as they should be for someone my age. I did have osteoporosis. In fact, the health practitioner said she had stronger bones than me. She was like in her 40s! Until it happens, you don't realize that this could actually happen to you. I really felt osteoporosis only happens to older women. Even if I had a family history, I thought I would have a long time before it could affect me. But, I was pretty hopeful about the disease and relieved that the health practitioner was so knowledgeable about what to do.

After the test results, I immediately thought okay, what can I do to fix this? The nurse practitioner launched into this laundry list of things to do. I'm hopeful these things will work to improve my bones. She asked about my exercise habits. I have to walk to class, so I told her I did that, but otherwise, I'm not a big gym person. She was like, good, that's important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that's fine, maybe try to take it up again, but, then she warned not to do too much – nothing beyond exercise for a healthy lifestyle. She also said that I should really try to get calcium and vitamin D into my diet as a part of a healthy lifestyle everyday. Since I'm lactose intolerant, she skipped over the whole eat dairy from milk and yogurt and cheese and stuff. At first, I was like great, I have to buy those expensive supplements. But, she

mentioned the generic ones would be okay just as long as I get enough calcium. She went on to say that Vitamin D is important because it helps the body absorb calcium. I didn't know, but you can really get Vitamin D from just being outside in the sun from walking to and from class. Which I was relieved, because I walk from Thomas to Willard at least twice a day for classes. And, then she told me that green, leafy vegetables have calcium, too. So, I'm like sounds like everything she's saying is just a part of a healthy lifestyle. Then she mentioned to limit the amount of soda I drink, since it can help contribute to weaker bones. She said none would be best. I drink a lot of soda, but otherwise I thought all her recommendations weren't really too hard to do. I was happy to know I could do this and hopeful for the future.

You know, it's been a while since then, and I really don't feel that osteoporosis is such a serious health problem that would totally undermine my health. Just like a lot of things, knowing that a few things can help me in the long run is really okay. I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. I try to be a little more aware of my surroundings so I don't break another bone and just prevent falls overall, like during the winter and walking around Penn State's campus. I know that doing some high intensity sports are really not in the cards for me, but that's okay. Right now, it's fine doing things that are going to benefit me in the long run. I have high hopes that things will continue this way, and I'm pretty happy with myself.

I'm really happy that my friends and family have been so supportive. My parents always encouraged a healthy lifestyle. (I guess those balanced meals at dinner are a good thing!) My friends aren't milk drinkers and never even thought of osteoporosis before my

diagnosis, but, they get what I'm doing to help make my bones stronger and are cool with everything. I'm relieved to have their help. Now they know that osteoporosis just doesn't happen to older people, and that what you do now really can affect your bones. And I mean, you don't realize how you use your bones for doing everything! I guess I get on their nerves sometimes because I'm always, hey, eat something with calcium or get a supplement to have calcium and Vitamin D. I'm also a fan of getting them to exercise, even just a little, but what can I say, I want them to be healthy.

When people find out that I have osteoporosis and I'm so young, I tell them that my life has been pretty good even since being diagnosed. Nothing has really changed, except now I do things to help make my bones stronger, and in a way, it feels good to be in control of my health. I trust that what I'm doing will help me in the long run and I don't mind talking to others about it. I'm happy that got diagnosed and I'm relieved to do things to improve by bones. I hopeful that I'll have a better chance of having healthy bones when I'm older. I'm cool with that.

APPENDIX B: NEGATIVE FIRSTHAND NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was created from interviews done March 2008 – June 2008 with young women about osteoporosis.

"A Young Woman Living with Osteoporosis"

It's weird to talk about osteoporosis. I'm only 21 years old a college student, and like a lot of women my age, I thought osteoporosis is only supposed to happen to older people, right? But, it's true, I have it. And, it's very scary and very sad.

I guess I knew something was wrong after I did a health fair at home. I got a heel scan when they test your bone density. It came back pretty low, so I was a little concerned. When I got back to school the following semester, I broke my arm. That seemed to me to be part of having low bone density on the heel scan. I went to the University Health Services on campus to get checked-out and told them about the heel scan when they asked about my health history. They asked about my family and their bones. I told them I think my grandmom was diagnosed with osteoporosis. I try to get calcium, but it's hard since I'm lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. I do walk around Penn State's campus. It's huge, right?! And I didn't even know what osteoporosis really was. I just know my grandmom's broken her hip twice. She can't even drive to visit people. I would hate to live like that. Now I know it was because she had low bone density meaning her bones are soft and brittle and can easily break.

When you're in the office and the health practitioner starts talking to you about osteoporosis, which in my mind was an older person's disease, it's really scary and sad. I actually started to get angry and frustrated about all of it. I don't want osteoporosis and I

can't control my family history. She started explaining the disease, and said it's when your bones become fragile, so you're more likely to break your bones because of low bone mass. She went on and said that this is the time now to help build the best bones possible during your mid-twenties. And, she mentioned that family history is an issue and can put you at risk. I was like, what? Are you kidding me? So, long story short, the health practitioner decided to run another bone density test, just to be safe. I remember being terrified. But, I also thought I was fine despite my grandmom. I mean, I'm young, I'm relatively active and do stuff at Penn State.

Well, when the test results came back, it showed that my bones weren't as strong as they should be for someone as young as I am. I did have osteoporosis. In fact, the health practitioner said she had stronger bones than me and she was like in her 40s! Those were the scariest words ever! I was so upset and angry and just all these things when she said that. I mean I never realized that this disease could actually be in reference to me. I really felt osteoporosis only happens to older women. Even if I had a family history, I thought I would have a long time before it could affect me. I was like, oh wow, how do you even fix this?

So like right after I was told I had osteoporosis, the health practitioner launched into this laundry list of things to do. She asked about my exercise habits. I mean, I have to walk to class, so I told her I did that, but otherwise, I'm not a big gym person. She was like, good, walking to class is important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that's fine, maybe try to take it up again, but, then she warned not to do too much – nothing beyond exercise for a healthy lifestyle. She also said that I should really try to

get calcium and vitamin D as a part of a healthy lifestyle everyday. Since I'm lactose intolerant, she skipped over the whole eat dairy from milk and yogurt and cheese and stuff. At first, I was like oh great, I have to buy those expensive supplements, but she mentioned the generic ones would be okay just as long as I get enough calcium. She went on to say that Vitamin D is important because it helps the body absorb all the calcium. I mean I didn't know you can really get Vitamin D from just being outside in the sun from walking to and from class. And, then she told me that green, leafy vegetables have calcium, too. I was telling myself okay, this won't hard, don't get upset, don't be sad, it'll be okay. Oh, then she mentioned to limit drinking soda, since it can contribute to weaker bones. She said none would be best. I like soda, so I was like great. When she was done, I remember thinking am I going to fall apart? And the tears started to fall. It's just so sad that now I have to pay attention to my bones on top of everything else in my life.

It's been a while since then, and I can honestly say I feel like osteoporosis has taken over my life and changed who I am. I mean, I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. And I just know that probably doing some high intensity sports are really not in the cards for me. I'm angry about that because I've always wanted to skydive and now I can't and I'm also now super alert of my surroundings to help avoid a fall. I get scared that during the winters at PSU they won't plow and I could fall. It's just sad to be so young and fear that not following doctor's orders could mean greater problems like my grandmom had.

My friends and family have been really supportive, but I know they worry. My parents always encouraged a healthy lifestyle, but they're scared I could end up like my

grandmother. My friends aren't huge like milk drinkers and never even thought of osteoporosis before my diagnosis. But, they get what I'm doing to help make my bones stronger and think it's important to do what I can to help my bones. I mean now they know that osteoporosis just doesn't happen to older people, and that what you do now really can affect your bones. I'm that person now that always reminds my friends to eat healthy, get calcium and to exercise. I don't mean to nag, but I just don't want them to be like me and have bone problems. You don't realize how much you need your bones to be strong until they aren't anymore.

When people find out that I have osteoporosis and I'm so young, I really tell them that it feels like osteoporosis is control of my life. I'm always afraid of breaking a bone and falling and stuff. I know that doing what the health practitioner said gives me a better chance of having healthy bones when I get older. But, I'm still scared and sad about what has happened. It's sometimes sad to always be thinking about that, but that's my life now.

APPENDIX C: "NO EMOTION" FIRSTHAND NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was created from interviews done March 2008-June 2008 with young women about osteoporosis.

"A Young Woman Living with Osteoporosis"

It is weird to talk about osteoporosis. I mean, I'm only 21 years old, a college student. Like many of women my age, I really thought osteoporosis is only supposed to happen to older people. But, I have osteoporosis.

I guess I knew something was wrong after I did one of those health fairs at home. I got one of those heel scans when they test your bone density, and it came back pretty low. When I got back to school the following semester, I broke my arm. That seemed to me to be part of having low bone density on the heel scan and I thought something was connected. I went to the University Health Services on campus to get it checked-out. I told them about the heel scan when they asked about my health history during the appointment. They also asked about my family and their bones. I told them I think my grandmom was diagnosed with osteoporosis. I try to get calcium, but it is hard since I am lactose intolerant. I do exercise when I can, but it's hard sometimes to get to the gym everyday. And I do walk around Penn State's campus a lot. But, I didn't even know what osteoporosis was. I just remember my grandmom having achy joints and breaking her hip. Now I know it was because she had low bone density, which means her bones are soft and brittle and they can easily break. It was hard for her to do everyday things because of her bones. But, it wasn't super bad. So, I mean I was not really certain she had it, but I knew she had some bone problems and was really fragile.

So, when I am in the health office, the health practitioner starts explaining the disease. Really, it is just when your bones become fragile, so you are more likely to break your bones because of low bone mass. She went on and said that this is the time now to help build the best bones possible during your mid-twenties. And, she mentioned that family history is an issue and can put you at risk. She wanted to run another bone density test, just to be safe. I really thought I was fine despite my grandmom's history. I mean, I'm young. I'm relatively active and stuff and do things at Penn State

When the test results came back, it showed that my bones were not quite as strong as they should be for someone as young as I am. I did have osteoporosis. In fact, the health practitioner said she had stronger bones than me and she was like in her 40s! Until it happens, you do not realize that this disease could actually happen to you. I really felt osteoporosis only happens to like older women. Even if I had a family history, I thought I would have a long time before it could affect me. After the test results, I immediately thought okay, fine what can I do to fix this?

So like right after I was told I had osteoporosis, the health practitioner launched into this laundry list of things to do. She asked about my exercise habits. I have to walk to class, so I told her I did that, but otherwise, I am not a big gym person. She was like, good, walking to class is important because weight-bearing exercises can help make your bones stronger. She recommended I do something else, if I could. I used to dance, so she said that is fine, maybe try to take it up again, but, then she warned not to do too much. Do not do anything beyond exercise for a healthy lifestyle. She also said that I should really try to get calcium and vitamin D into my diet as part of a healthy lifestyle--everyday. Since I am lactose intolerant, she skipped over the whole eat dairy from milk

and yogurt and cheese and stuff. At first, I was like oh great, I have to buy those expensive supplements. But, she mentioned all the generic ones would be okay just as long as I get like enough calcium. She went on to say that Vitamin D is important because it helps the body absorb all the calcium. I mean, I did not know, but you can really get Vitamin D from just being outside in the sun from walking to and from class. And, then she told me that green, leafy vegetables have calcium, too. So, I am like "sounds like everything she's saying is just a part of a healthy lifestyle." Then she mentioned to limit the amount of soda I drink, since it can help contribute to weaker bones. I drink a lot of soda, so that kinda sucked. I wanted to know how much I could drink and she said none would be best.

You know, it has been a while since then. Just like a lot of things, osteoporosis is just something I have to be aware of, and knowing that a few things can help me in the long run. I mean, I got my supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium. I also try to make sure to be a little more aware of my surroundings so I do not break another bone and just prevent falls overall, especially during winters and walking across Penn State's campus. I know that probably doing some high intensity sports are really not in the cards for me, but that is okay. It is fine doing things that are going to benefit me in the long run.

My friends and family have been so supportive. My parents always encouraged a healthy lifestyle. (I guess those balanced meals at dinner are a good thing!) My friends are not milk drinkers and never even thought of osteoporosis before my diagnosis, but, they get what I am doing to help make my bones stronger and are really cool with everything. Now they know that osteoporosis just doesn't happen to older people, and

that what you do now really can affect your bones. They really support me and that has been helpful. And I mean, you just do not really realize how you use your bones for doing everything. I guess I get on their nerves sometimes because I am always like, hey, eat something with calcium or get a supplement to have calcium and Vitamin D. I'm also a fan to get them to exercise, even just a little. And follow their doctor's orders to have strong bones. What can I say, I want them to be healthy. When people find out that I have osteoporosis and I am so young, I really tell them nothing has really changed. Except now, I do things to help make my bones stronger.

APPENDIX D: POSITIVE SECONDHAND NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was created from interviews done from March 2008-June 2008 with young women about osteoporosis.

"A Young Woman Living with Osteoporosis"

When thinking about osteoporosis, I don't think of it as something bad. I see my mom diagnosed with osteoporosis and she's okay. Sometimes I still can't believe that she was diagnosed, I mean, she's only 47 years old and I'm 21, a college student. Like many women my age, I thought osteoporosis is only supposed to happen to old people, right?

It's actually kinda normal how she found out. It wasn't like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis. My mom was pretty positive and hopeful about not having the disease. But, she went to get checked-out and while she was there, the doctor asked about a family health history. My mom told them about my grandmom who was diagnosed with osteoporosis and now my aunt. I know my mom tries to get calcium and she always serves us milk at home with breakfast and dinner. She is a runner, so I know she does some exercise, but, I really don't even know what osteoporosis is. I just know my grandmom broke her hip and it was hard for her to do everyday things because of her bones. It was not super bad at all. Now I know it was because she had low bone density and that means her bones are soft and brittle and they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy. My aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. We were like what? I said, “I thought you had to be older like grandmom or at least in your sixties to be diagnosed.” “Nope, afraid not. It’s really okay. I mean, I’m happy and relieved I know now, and I’m hopeful I can help you and your sister. Now, your twenties, is actually a good time to help build the best bones possible. So this means you need to focus on your bones. Since you now have a family history, we really need to make sure to do this. I mean, I’m hopeful you won’t get low bone mass. If that happens, your bones are fragile, because then you’re more likely to break them.” I didn’t realize that my family history could affect me now, not later.

I remember she sounded really calm at that moment, and seemed really hopeful about everything. A few days later we were making dinner and I asked her how she was doing. “Until it happens, you don’t realize what this disease means for people my age and younger--people that aren’t like grandmom’s age,” she said. “It doesn’t just happen to women in their sixties. But it’s a relief knowing that the doctor recommended doing a few things that can really help make your bones stronger. I know that I can do them and I’m hopeful it will work. He wants me to try them for six months, and maybe later I will go on medication like your aunt.” She smiled and said, “And I’m also going to work with you girls. Aren’t you glad I’ve always served milk for you and your sister at breakfast and dinner?” I laughed at that. “I’m also going to get you some supplements, just to help all of us get enough calcium and vitamin D, and try to get you girls to eat some veggies that have calcium. You like broccoli, right?” she asked. So, now we have some type of green, leafy vegetable at every dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it’s one of the things that can contribute to weaker

bones, so my mom has seriously stopped stocking it in the refrigerator. I think the doctor told my mom no soda is probably best.

Since the diagnosis, my mom hasn't really changed and actually is doing okay. She's still the same happy person. Since the doctor recommended some exercises like weight-bearing ones, and she's a runner, she's been keeping up with it. She doesn't run when it's really icy out, but otherwise, she's doing well. I'm not a big runner, so I try to do more walking around Penn State's campus to get my weight-bearing exercise. My sister used to dance in grade school, and decided to take it up at Penn State next semester. I never knew that being outdoors is a way to get Vitamin D through the sun and it helps the body absorb calcium. My mom is always relieved when I tell how many times I walked from Thomas to Willard to the HUB and I'm "getting my Vitamin D." I guess looking back, the recommendations are pretty simple and part of just a normal healthy lifestyle, I mean my mom said she can do this. She knows following the doctor's orders will really help in the long run.

When talking to my mom about osteoporosis, she always says she's relieved and happy to know she's doing things to help her bones. For her, osteoporosis really hasn't gotten to be a serious health problem. "Just like a lot of things, osteoporosis is just something I have to be aware of. Knowing that a few things can help me in the long run is really okay," my mom said. "I bought some supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium a little bit more. And I try to be a bit more careful not to fall and be aware of our surroundings."

Our entire family has been really supportive. Our dad has been a real trooper, and things are going well. I mean all of us now know that osteoporosis just doesn't happen to

older people like my grandmom's age. And osteoporosis is something that both my sister and I need to think about, even though we're in our twenties because now is the time to help build strong bones so we don't get diagnosed when we're our mom's age. I'm planning on getting one of those heel scans at the local health fair next time I'm home, so I know what I'm dealing with.

So, all in all, my mom told me that life has been pretty happy and good since being diagnosed. She's relieved to have been diagnosed, and hopeful for the future. From what I can tell, nothing has really changed, except now she does things to help make her bones stronger and she's conscious of her bones. She said, "I'm glad I'm doing things to improve by bones. I trust what I'm doing will help me and I don't mind talking about it. I know that this gives me a better chance of having healthy bones when I get older, and being able to keep doing everyday things when I'm grandmom's age."

APPENDIX E: NEGATIVE SECONDHAND NARRATIVE

EVIDENCE IN PHASE 3

Please read the following message. **This message was created from interviews done March 2008-June 2008 with young women about osteoporosis.**

"A Young Woman Living with Osteoporosis"

When thinking about osteoporosis, it's definitely something that sounds serious and sad to me. I see the fear of breaking a bone that my mom has since being diagnosed. I still can not believe that she has it, she's only 47 years old and I'm 21, a college student. Like many women my age, I thought osteoporosis is only supposed to happen to old people, right? I mean I always that that was the case.

It's actually kinda normal how she found out, and it wasn't like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis, and that my mom should probably get checked-out. My mom was a little concerned, but not really worried because she felt she was healthier than my aunt. But, she went to the doctor and while she was there, the doctor asked about a family health history, and my mom told them about my grandmom who was diagnosed and now my aunt. I know my mom tries to get calcium and eats dairy because of my grandmom and she always serves us milk at home with breakfast and dinner. And she's a runner, so I know she does some exercise, but, I don't even really know what osteoporosis really is. I just remember grandmom has achy joints and she's broken her hip twice and that it is really hard for her to do everyday things because of her bones. I mean it was really scary to see because she can't even drive to visit people. I know my mom would fear living like that and is very sad that my grandmom is missing out on

things. Now I know it was because she had low bone density, and that means her bones are soft and brittle, so they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy because my aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. I was like "What?! I thought you had to be older like grandmom or at least in your sixties to be diagnosed?" "Nope. Afraid not. In fact, it's your early twenties that are a good time to help build the best bones possible. So, you and your sister need to start thinking about your bones." We were stunned, scared, angry and sad. "I mean, family history is an issue and can put you at risk, so now that grandmom, auntie and me have it, you two have to consider it. I'm really scared for you guys. You need to do whatever it takes to build your bones. It's not too late for you. I don't want you to be like me and have osteoporosis. I mean, I don't want you to fear breaking a bone because you have low bone mass and your bones are fragile."

A few days later, I asked my mom how she was doing and I could see the anger and sadness. "There are so many other things I need to worry about, not just this disease. I do not want osteoporosis," she said. "Until it happens, you don't realize. It doesn't just happen to women in their sixties. The doctor wants me to try some things at home first for six months, and maybe later I will go on medication like your aunt." She half-heartedly smiled and said, "And I'm also going to work on you girls. I guess I'll keep serving both of you and your sister milk at breakfast and dinner." It was sad the way she said it to me. "I'm also going to get you some supplements, just to help all of us get

enough calcium and Vitamin D, and try getting you girls to eat some veggies that have calcium. You still like broccoli, right?" she asked. So, we now have some type of green, leafy vegetable at dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it's one of the things that can contribute to weaker bones, so my mom has seriously stopped stocking it in the refrigerator. I think the doctor said no soda is probably best.

Since the diagnosis, my mom has changed and I think looks more scared and sad all the time. The other day she said, "It's sad and I get angry knowing that my bones are getting to be just like your grandmom's and she's twenty years older than me. I know I can do this, but it's like I'm always wondering if I'm going to fall down and break a bone. I feel like osteoporosis is taking over my life and changing me, and I don't want to change." Since the doctor recommended weight-bearing exercises, she has started walking a few miles everyday. She's been too scared to keep up with the running, because she was afraid she may fall. Our entire family has been really supportive, but I know they worry. My dad's afraid that my mom could have a slip and then end up like my grandmother. But, we get what she is doing to help make her bones stronger, and try to do our part. I'm keeping up with walking to all my classes, like from Thomas to Willard to the HUB and stuff to get exercise and vitamin D. Since I live in East Halls, I think that will work and my sister is planning to take up dance again next semester at Penn State. My mom told me that the Vitamin D you get from the sun can help the body absorb calcium, so it's important to get that too.

I wouldn't say my mom's life is perfect since being diagnosed. She said, "In a way, it feels like osteoporosis is control of my life and I'm always aware of getting

calcium or Vitamin D or making sure I eat something like broccoli at dinner. I know that doing what the doctor said gives me a better chance of having healthy bones when I get older, but I'm still scared and sad about what has happened." My mom still does remind all of us to eat foods with calcium or get a supplement to have calcium and Vitamin D and to exercise because she doesn't want us to be like her. She is really clear that we should follow the doctor's orders, and do what we can to prevent osteoporosis, so I'm planning to get a heel scan at the next local health fair to get an idea of my bone density, and, I always have a supplement to help. I can tell that it's sometimes sad for my mom to always be thinking about her bones, but, I guess that's how it goes.

APPENDIX F: "NO EMOTION" SECONDHAND NARRATIVE

EVIDENCE IN PHASE 3

Please read the following message. This message was created from interviews done March 2008-June 2008 with young women about osteoporosis.

"A Young Woman Living with Osteoporosis"

When thinking about osteoporosis, I think of my mom because she was diagnosed with osteoporosis. She is only 47 years old and I'm 21, a college student. Like many women my age, I always thought that osteoporosis was something for older women, like my grandmom, to consider and people younger do not need to think about it.

It is actually kinda normal how she found out, and it was not like she had a broken bone and went in for tests or anything like that. My aunt had just called my mom to tell her that she had osteoporosis. So, she went to get checked-out at the doctor's. While she was there, the doctor asked about family health history. My mom told them about my grandmom who was diagnosed with osteoporosis and now my aunt. I know my mom tries to get calcium. She always makes us drink milk at home with breakfast and dinner. She is a runner, so I know she does some exercise. But, I really don't even know what osteoporosis is. I just know my grandmom broke her hip and it was hard for her to do everyday things because of her bones. It was not super bad at all. Now I know it was because she had low bone density and that means her bones are soft and brittle and they can easily break. My mom thought she would be fine, since she does try to have a healthy lifestyle. But, I know she did not always eat so healthy. My aunt told me how my mom ate junk food all the time when she was younger. She only started running after my sister and I were born.

Well, when my mom got home, she told me and my sister that she had osteoporosis. I said, “I thought you had to be older like grandmom or at least in your sixties to be diagnosed.” My mom told me that’s not really the case. “Nope. What I’ve learned can help you and your sister. Now, in your twenties, is actually a good time to help build the best bones possible. So this means you need to focus on your bones. Since you now have a family history, we really need to make sure to do this. It is important to not get low bone mass so your bones are fragile, because then you’re more likely to break them.” I didn’t know family history would affect me right now, not later.

I remember she sounded really matter of fact at that moment when she was talking to us. A few days later we were making dinner and I asked her how she was doing. I wanted to make sure how things were going after the diagnosis. My sister and I had been talking about it and I thought dinner was a good time to bring it up. “Until it happens, you don’t realize what this disease means for people my age and younger--people that aren’t like grandmom’s age,” she said. “It doesn’t just happen to women in their sixties. The doctor wants me to try to do things like eating foods to get calcium and Vitamin D, and exercising at home for six months. Maybe later I will go on medication like your aunt, but we will see.” She smiled and said, “And I’m also going to work with you girls. Aren’t you glad I’ve always served milk for you and your sister at breakfast and dinner?” I laughed at that. “I’m also going to get you some supplements, just to help all of us get enough calcium and vitamin D, and try to getting you girls to eat some veggies that have calcium. You like broccoli, right?” she asked. So, now we have some type of green, leafy vegetable at every dinner. And fewer sodas, which I miss, but I get how we should cut back on soda. I guess it’s one of the things that can contribute to

weaker bones, so my mom has seriously stopped stocking it in the refrigerator. I think no soda is probably best.

Since the diagnosis, my mom hasn't really changed and actually is doing okay. Because the doctor recommended some exercises like weight-bearing ones, and she's a runner, she's been keeping up with it. She doesn't run when it's really icy out, but otherwise, she's doing well and still does it almost everyday. I'm not a big runner, so I try to do more walking around Penn State's campus to get my weight-bearing exercise. It seems my classes are always in Thomas or Willard so I walk between the buildings a lot almost everyday. I think this is a good way to get some exercise since I live in East Halls. My sister used to dance in grade school, and decided to take it up again next semester at Penn State as a way to get a weight-bearing exercise. I never knew that being outdoors is a way to get Vitamin D through the sun and Vitamin D helps the body absorb calcium. So, I guess walking helps my bones both as an exercise and getting Vitamin D. I guess looking back on everything, the recommendations are pretty simple and part of just a normal healthy lifestyle. I mean my mom said she can do this. She knows following the doctor's orders will really help in the long run.

When talking to my mom about osteoporosis, she says, "Just like a lot of things, osteoporosis is just something I have to be aware of. Knowing that a few things can help me in the long run is really okay," my mom said. "I bought some supplements and I try to exercise a bit everyday and eat some green, leafy vegetables like broccoli to get more calcium a little bit more. And I try to be a bit more careful not to fall and be aware of our surroundings."

Our entire family has been really supportive about my mom's diagnosis. Our dad has been a real trooper, and things are going well. I mean all of us now know that osteoporosis just doesn't happen to older people like my grandmom's age. And osteoporosis is something that both my sister and I need to think about, even though we're in our twenties. Because now is the time to help build strong bones so we don't get diagnosed when we're our mom's age. I'm planning on getting one of those heel scans at the local health fair next time I'm home, so I know what I'm dealing with.

From what I can tell, nothing has really changed for my mom. Except now, my mom does things to help make her bones stronger and she's conscious of her bones. It is has become a normal routine of life for us to be thinking about our bones and doing things to help make them stronger as a part of our family life.

APPENDIX G: POSITIVE OFFICIAL HEALTH ORGANIZATION NARRATIVE EVIDENCE USED IN PHASE 3

Please read the following message. This message was taken from information available on MayoClinic.com, an online health resource.

"About Osteoporosis"

There is a lot of information available about osteoporosis because it is a disease that affects a lot of men and women. For young women, there are some important things to consider when thinking about the disease. Living with the disease doesn't stop many people from living happy lives. There is hope.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak and bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals and both can cause bones to break more easily.

A common result of the disease is broken bones. Most broken bones are in the spine, hip or wrist. It is not just a women's disease, it can also affect men. Many people also have low bone density. It is never too late or too early to do something about the disease -- you can take steps to keep bones strong and healthy throughout life. There is hope for those with osteoporosis. Many people are hopeful to prevent the disease by providing this information to others, and many are relieved to have this information.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of

height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your bones depends on their size and density. Bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made. Bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. Your body makes new bone faster than it breaks down old bone when you are young. You reach your peak bone mass in your mid-thirties. After your mid-thirties, bone remodeling continues, but, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss. The leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. It's a relief knowing your risk factors. One key factor is how much bone mass you attained between your mid-twenties and mid-thirties. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have "in the bank." It means you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and can also cause faster bone loss later.

Three factors are important for keeping your bones healthy to help you throughout your life. It is a relief for some people to know these few things to help prevent the

disease. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. Getting enough calcium and Vitamin D is an important factor in reducing your risk of the disease. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker. It is possible in some cases to replace bone you have lost. The amount of calcium you need to stay healthy changes over your lifetime -- your body's demand for calcium is greatest during childhood and adolescence when your skeleton is growing rapidly. Older women and older men also need to consume more calcium; as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough Vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and may also improve muscle strength. Many people are relieved and happy to know they get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis which is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium. There are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed. Calcium and Vitamin D supplements are most effective taken

together. It is best to take them in divided doses with food. Many people are happy to know about the different sources of calcium.

It is a relief to know that additional measures also may help you prevent bone loss and increase hopes of preventing the disease. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young. It is important to continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Be happy knowing these. Family health history of the disease is one risk factor. So you can do things to decrease your risks. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is important to start these habits when hoping to have the strongest bones possible. Keeping a happy healthy lifestyle will help many people prevent the disease.

APPENDIX H: NEGATIVE OFFICIAL HEALTH ORGANIZATION NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was taken from information available on MayoClinic.com, an online health resource.

"About Osteoporosis"

There is a lot of information available about osteoporosis. It is a disease that affects a lot of men and women. For young women, there are some important things to consider when thinking about the disease. The effects of osteoporosis are frightening and sad.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak. Bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals and both can cause bones to break more easily.

A common result of the disease is broken bones and most broken bones are in the spine, hip or wrist. It is not just a women's disease; it can also affect men. Many people also have low bone density. It is never too late or too early to do something about the disease. You can take steps to keep bones strong and healthy throughout life. It is scary and fearful for those with the disease. You need to learn about the disease to help avoid it and not be afraid.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of

height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your bones depends on their size and density and bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made and how bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. Your body makes new bone faster than it breaks down old bone when you are young. You reach your peak bone mass in your mid-thirties and after your mid-thirties, bone remodeling continues. But, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss and the leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. One key factor is how much bone mass you attained between your mid-twenties and mid-thirties. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have “in the bank.” What this means is that you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and it can also cause faster bone loss later.

Three factors are important for keeping your bones healthy and these can help you throughout your life. Many people with the disease are angry and sad they did not know

this earlier. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker. It is possible in some cases to replace bone you have lost. The amount of calcium you need to stay healthy changes over your lifetime and our body's demand for calcium is greatest during childhood and adolescence because this is when your skeleton is growing rapidly. Older women and older men also need to consume more calcium because as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and it may also improve muscle strength. Many people get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis. That is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium. There are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed. Calcium and Vitamin D supplements are most effective taken together. It is best to take them in divided doses with food.

These measures also may help you prevent bone loss. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young. It is important to continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Family health history of the disease is one risk factor that people are sometimes angry about not knowing. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is really important to start these habits to avoid the awful effects of the disease.

APPENDIX I: "NO EMOTION" OFFICIAL HEALTH ORGANIZATION NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message was taken from information available on MayoClinic.com, an online health resource.

"About Osteoporosis"

There is a lot of information available about osteoporosis because it is a disease that affects a lot of men and women. For young women, there are some important things to consider when thinking about the disease. Living with the disease doesn't stop many people from living happy lives. There is hope.

Many people do not know that osteoporosis means "porous bones." The disease causes bones to become weak and bones are so brittle that simple activities can cause a bone to break. This includes things like bending over, or coughing. In most cases, bones weaken when you have low levels of calcium. Your bones could also have low levels of other minerals and both can cause bones to break more easily.

A common result of the disease is broken bones. Most broken bones are in the spine, hip or wrist. It is not just a women's disease, it can also affect men. Many people also have low bone density. It is never too late or too early to do something about the disease -- you can take steps to keep bones strong and healthy throughout life. There is hope for those with osteoporosis. Many people are hopeful to prevent the disease by providing this information to others, and many are relieved to have this information.

In the early stages of bone loss, you usually have no pain. There are few other symptoms, but once bones have been weakened by the disease, you may have osteoporosis symptoms. Some symptoms include back pain. Another symptom is loss of

height over time. It can go along with a stooped posture. Some symptoms also include breaking a wrist or hip.

It is important for people to know about the strength of their bones. The strength of your bones depends on their size and density. Bone density depends in part on the amount of calcium in your bones. It also counts the other minerals in your bones. Bones are less strong when they contain fewer minerals than normal. Eventually bones lose their internal supporting structure. Scientists still do not know why this all happens. Part of the reason involves how bone is made. Bone is always changing. New bone is made and old bone is broken down. It is called remodeling, or bone turnover. Your body makes new bone faster than it breaks down old bone when you are young. You reach your peak bone mass in your mid-thirties. After your mid-thirties, bone remodeling continues, but, you lose slightly more than you gain. At menopause, bone loss in women increases considerably. There are many factors that can cause bone loss. The leading cause in women is decreased estrogen making during menopause.

Your risk of developing osteoporosis depends on a lot. It's a relief knowing your risk factors. One key factor is how much bone mass you attained between your mid-twenties and mid-thirties. This is called peak bone mass. It is also determined by how rapidly you lose it later. The higher your peak bone mass, the more bone you have "in the bank." It means you are less likely you are to develop osteoporosis as you age. Not getting enough vitamin D and calcium in your diet may lead to a lower peak bone mass and can also cause faster bone loss later.

Three factors are important for keeping your bones healthy to help you throughout your life. It is a relief for some people to know these few things to help prevent the

disease. They are regular exercise, and enough amounts of calcium and Vitamin D. Vitamin D is important for absorbing calcium. Getting enough calcium and Vitamin D is an important factor in reducing your risk of the disease. If you already have the disease, getting enough calcium and Vitamin D can help prevent your bones from becoming weaker. It is possible in some cases to replace bone you have lost. The amount of calcium you need to stay healthy changes over your lifetime -- your body's demand for calcium is greatest during childhood and adolescence when your skeleton is growing rapidly. Older women and older men also need to consume more calcium; as you age, your body becomes less efficient at absorbing calcium. You are more likely to take medications that interfere with calcium absorption as you age, too.

Getting enough Vitamin D is just as important as getting enough amounts of calcium. Vitamin D improves bone health by helping absorb calcium and may also improve muscle strength. Many people are relieved and happy to know they get enough amounts of Vitamin D from sunlight. This may not be a good source if you live in high latitudes or if you are housebound. You should get Vitamin D from other sources if you regularly use sunscreen or you avoid the sun entirely. Vitamin D is present in oily fish such as tuna and in egg yolks. You probably do not eat these on a daily basis which is why calcium supplements with added vitamin D are a good option.

Dairy products are one source of calcium. There are other sources. Almonds, broccoli, cooked kale, oats and soy products such as tofu also are rich in calcium. If you find it difficult to get enough calcium from your diet, consider calcium supplements. They are inexpensive. They are generally well tolerated. If you take them properly, they can be well absorbed. Calcium and Vitamin D supplements are most effective taken

together. It is best to take them in divided doses with food. Many people are happy to know about the different sources of calcium.

It is a relief to know that additional measures also may help you prevent bone loss and increase hopes of preventing the disease. Exercise can help you build strong bones and slow bone loss. Exercise will benefit your bones no matter when you start. You will gain the most benefits if you start exercising regularly when you are young. It is important to continue to exercise throughout your life. Some people do strength training and weight bearing exercises. Combining these exercises can help your bones and muscles. Strength training helps strengthen muscles and bones in your arms and upper spine. Weight-bearing exercises include walking, running, stair climbing, and skipping rope. They mainly affect the bones in your legs, hips and lower spine.

There are several risk factors for osteoporosis. Be happy knowing these. Family health history of the disease is one risk factor. So you can do things to decrease your risks. Eating soy products help maintain bone density. It may reduce the risk of fractures. Smoking increases bone loss. It is thought that smoking decreases the amount of estrogen a woman's body makes. It may also reduce the ability for your body to get calcium. The effects on bone of secondhand smoke are not yet known. Consuming more than two alcoholic drinks a day is a problem. It may decrease bone formation. It could also reduce your body's ability to absorb calcium. There is no clear link between moderate alcohol intake and the disease. Drinking modest amounts of caffeine will not harm you as long as your diet contains enough calcium. This means about two to three cups of coffee a day. It is important to start these habits when hoping to have the strongest bones possible. Keeping a happy healthy lifestyle will help many people prevent the disease.

APPENDIX J: POSITIVE INVENTED ATTENTION-CONTROL NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message is modified from Penn State's Career Services and Job Search at About.com.

"About Interviewing"

Sue is very happy to have landed an interview at a top company for a summer internship. The interview is in two weeks, and she wants to do the best she can to "wow" them and she knows that good preparation can make a difference. So, Sue decided to visit Career Services with hopes to learn more about what she could do. She made an appointment to meet with Jill to discuss interview preparation and thought, "I hope to know what will help me land that internship now, and get the skills I need to interview for jobs when I'm closer to graduation."

Jill was really nice and friendly and she said, "Thanks for coming in to meet with me. As you know, there are many resources available to you. To begin, I'll say that many people forget the purpose of an interview. Employers are trying to get information about you to see if you meet their needs for a prospective job or internship. On the flip side, as a prospective employee, you need to be learning as much as you can about the position so you can decide if they are what *you* want." Sue nodded and was already happy and relieved to be meeting with Jill.

"I think sometimes when people go on an interview, they forget one key thing: you need to know yourself first and know what kind of job or internship you want. Know what makes you feel qualified and think about what information you want to include in your responses during the interview. I know a lot of people go in "cold" and expect to do

well. Usually it doesn't work, but don't memorize, either. Remember to be natural and that this is a conversation between two people and be hopeful for a positive outcome."

"Okay, great. I feel so relieved. Well, I read that I should research more about the company? What do you recommend?" Sue asked.

"I think the best thing you can do is get the basics about the company, and this includes the company's size, location, product, or service. For instance, the employer could have several offices and you could mention how that appeals to you," Jill said. "You'll need to be prepared to answer the question 'What do your know about our company?' Also, know the answer to 'Why do you want to work here?' Knowing as much as possible about the company can make your interview go well and in fact, having that information could be just the leg up you need in a tough job market. Many people have been really happy knowing these details."

"Well, I want to be happy during the interview! Where should I go for that type of information?" Sue asked.

"Well, before the interview, review the company's Web site. You can even contact your prospective employer to request details or ask for company information if you need to. Google the company to see what other information is available online. Usually those three things are the easiest," Jill replied.

"Okay, great. I'm getting really hopeful. Is there anything else you would suggest?" Sue asked.

"Oh definitely that practice makes perfect. Practice with a friend to prepare for your interview, record or videotape your responses so you can replay and see how well you did. Practicing alone can help reduce jitters and be a relief. Also, I would prepare a

list of questions you want to ask. Remember, you are not simply trying to get the job. You're also interviewing the employer to assess whether this position is a good fit for you and your needs. Like asking, 'What are the most challenging aspects of your job?' 'Why do you enjoy working for the organization?' Any of these questions will show that you are interested in the company."

"Okay, anything else?" Sue asked.

"Actually, I'd arrive at least 10 minutes early for the interview, and know where the interview is taking place by visiting the location earlier, if possible. Also, look appropriate for the job. I won't say there is always one golden rule because for some jobs, this means little jewelry and wearing a suit and for others, it doesn't. Knowing the company and their style will help you determine the best look. But, most importantly look confident and be happy. Give a firm handshake, make good eye contact and smile!" Sue smiled.

Jill went on, "You know, there are several interview styles, so every interview won't be the same. I've seen that behavior based interviewing is becoming more common. It's based on the idea that a candidate's past performance can tell future performance. It doesn't ask typical interview questions on your background and experience. The best way to prepare is to think of examples where you have successfully used the skills you have gained. Also, list your skills, values, interests, strengths and weaknesses. Stress what you can do to benefit the company rather than just what you are interested in. But, also do not have 'canned' answers. Recruiters can spot those."

"Wow, this is a lot. I'm so relieved. Thanks so much, I really appreciate this," Sue said.

"Not at all, I'm here to help. Above all, be confident of what you have learned, your accomplishments and your skill set." Handing Sue a brochure, Jill said "I always give people these ten tips. I know you will land that internship. Good luck."

Sue read the following 10 Tips and felt confident for the interview. Here are the 10 Tips:

1. There is no single right answer, it's often how you answer that is more important.

2. Be honest. Don't pretend that you were sure about your major from the very start, if you weren't. The details about how you chose your major may be much more interesting. It can tell some very positive things about how you make decisions.

3. Understand your skills and abilities accurately. Be prepared to answer why the position is a match for your skill, abilities, and education.

4. Stay focused and don't ramble. Give details that are relevant but do not start telling long stories that are not needed.

5. During the interview try to remain calm. Ask if you're not sure what has been asked. Remember that it's perfectly okay to take a moment or two to think about your responses so you can be sure to fully answer the question.

6. The recruiter saw something in your resume that was impressive. Go into your interview remembering that this person already likes what they saw.

7. The interview is a two-way conversation. Try to relax and enjoy the opportunity.

8. Sell yourself. If you don't state what your strengths, skills and accomplishments are, the recruiter will be unable to see you as a good candidate.

9. Genuine self-confidence and confidence in your ability to perform well at the job are your best assets in any interview.

10. End the interview with a thank you to the interviewer. Then follow-up with a personal thank you note within 24 hours after the interview.

APPENDIX K: NEGATIVE INVENTED ATTENTION-CONTROL NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message is modified from Penn State's Career Services and Job Search at About.com.

"About Interviewing"

Sue landed an interview at a top company for a summer internship. The interview is in two weeks, and Sue's terrified and angry it is so soon. She wants to do the best she can to "wow" them, but she is afraid of failing. She knows that good preparation can make a difference, so Sue decided to visit Career Services to learn more about what she could do. She made an appointment to meet with Jill to discuss interview preparation and thought, "I really want to know what will help me land that internship now, and get the skills I need to interview for jobs when I'm closer to graduation. I'll be so sad and angry if I miss this internship!"

Jill was really nice and friendly and she said, "Thanks for coming in to meet with me. As you know, there are many resources available to you. To begin, I'll say that many people get too scared and forget the purpose of an interview and that employers are trying to get information about you to see if you meet their needs for a prospective job or internship. On the flip side, as a prospective employee, you need to be learning as much as you can about the position so you can decide if they are what you want." Sue nodded.

"I think sometimes when people go on an interview, they forget one key thing: you need to know yourself first and know what kind of job or internship you want. Know what makes you feel qualified and think about what information you want to include in your responses during the interview. I know a lot of people go in "cold" and expect to do

well; usually it doesn't work. But do not memorize, either, so remember to be natural and that this is a conversation between two people. People get angry at themselves when they realize they were too 'fake.'"

"Okay, great. Well, I read that I should research more about the company? What do you recommend?" Sue asked. She didn't want to be sad or angry about missing these points.

"I think the best thing you can do is get the basics about the company including the company's size, like number of employees, location, product, or service. For instance, the employer could have several offices and you could mention how that appeals to you," Jill said. "You'll need to be prepared to answer the question 'What do you know about our company?' Also, know the answer to 'Why do you want to work here?' Knowing as much as possible about the company can make your interview go well and in fact, having that information could be just the leg up you need in a tough job market."

"Where should I go for that type of information?" Sue asked.

"Well, before the interview, review the company's Web site. You can even contact your prospective employer to request details or ask for company information if you need to. Google the company to see what other information is available online. Usually those three things are the easiest," Jill replied.

"Okay, great. Is there anything else you would suggest?" Sue asked.

"Oh definitely that practice makes perfect. Practice with a friend to prepare for your interview, or record or videotape your responses so you can replay and see how well you did and learn what makes you scared. Practicing alone can help reduce jitters. Also, I would prepare a list of questions you want to ask. People get sad when they forget to ask

these. Remember, you are not simply trying to get the job; you are also interviewing the employer to assess whether this position is a good fit for you and your needs. Like asking, 'What are the most challenging aspects of your job?' 'Why do you enjoy working for the organization?' Any of these questions will show that you are interested in the company."

"Okay, anything else? This is starting to sound scary." Sue replied.

"Oh, don't be angry, sad or scared. Actually, I would arrive at least 10 minutes early for the interview, and know where the interview is taking place by visiting the location earlier, if possible, because you'll be upset and angry if you arrive late. Also, look appropriate for the job. I won't say there is always one golden rule. For some jobs, this means little jewelry and wearing a suit and for others, it does not. Knowing the company and their style will help you determine the best look. But, most importantly look confident. Give a firm handshake, make good eye contact and smile!" Sue smiled, but she was still terrified.

Jill went on, "You know, there are several interview styles, so every interview won't be the same. I've seen that behavior based interviewing is becoming more common: it is based on the idea that a candidate's past performance can tell future performance. It does not ask typical interview questions on your background and experience. The best way to prepare is to think of examples where you have successfully used the skills you have gained. Also, list your skills, values, interests, strengths and weaknesses. Stress what you can do to benefit the company rather than just what you are interested in, but, also don't have 'canned' answers. Recruiters can spot those."

"Wow, this is a lot. I would have been really sad and upset to miss this information. Thanks so much, I really appreciate this," Sue said.

"Not at all, I'm here to help. Above all, be confident of what you have learned, your accomplishments and your skill set." Handing Sue a brochure, Jill said "I always give people these ten tips. I know you will land that internship. Good luck."

Sue read the following 10 Tips. Here are the 10 Tips:

1. There is no single right answer, it's often how you answer that is more important.

2. Be honest. Do not pretend that you were sure about your major from the very start, if you were not. The details about how you chose your major may be much more interesting. It can tell some very positive things about how you make decisions.

3. Understand your skills and abilities accurately. Be prepared to answer why the position is a match for your skill, abilities, and education.

4. Stay focused and don't ramble. Give details that are relevant but don't start telling long stories that are not needed.

5. During the interview try to remain calm. Ask if you are not sure what has been asked and remember that it is perfectly okay to take a moment or two to think about your responses so you can be sure to fully answer the question.

6. The recruiter saw something in your resume that was impressive. Go into your interview remembering that this person already likes what they saw.

7. The interview is a two-way conversation, so try to relax and enjoy the opportunity.

8. Sell yourself. If you do not state what your strengths, skills and accomplishments are, the recruiter will be unable to see you as a good candidate.

9. Genuine self-confidence and confidence in your ability to perform well at the job are your best assets in any interview.

10. End the interview with a thank you to the interviewer. Then follow-up with a personal thank you note within 24 hours after the interview.

APPENDIX L: "NO EMOTION" INVENTED ATTENTION-CONTROL NARRATIVE EVIDENCE IN PHASE 3

Please read the following message. This message is modified from Penn State's Career Services and Job Search at About.com.

"About Interviewing"

Sue landed an interview at a top company for a summer internship after sending in her resume. The interview is in two weeks, and she wants to do the best she can to "wow" them at the interview. She knows that good preparation can make a difference so, she decided to visit Career Services to learn more about what she could do to prepare for the interview. She made an appointment to meet with Jill at Career Services to discuss interview preparation and she thought, "I really want to know what will help me land that internship now, and get the skills I need to interview for jobs when I'm closer to graduation."

Jill was really nice and friendly and she said, "Thanks for coming in to meet with me. As you know, there are many resources available to you. To begin, I will say that many people forget the purpose of an interview: Employers are trying to get information about you to see if you meet their needs for a prospective job or internship. On the flip side, as a prospective employee, you need to be learning as much as you can about the position so you can decide if they are what you want." Sue nodded in agreement.

"I think sometimes when people go on an interview, they forget one key thing. You need to know yourself first and know what kind of job or internship you want, so know what makes you feel qualified and think about what information you want to include in your responses during the interview. I know a lot of people go in "cold" and

expect to do well. Usually it doesn't work. But don't memorize, either, so remember to be natural and that this is a conversation between two people. It is important to remember that."

"Okay, great. Well, I read that I should research more about the company? What do you recommend I should do?" Sue asked.

"Most importantly, I think the best thing you can do is get the basics about the company, and this includes the company's size, location, product, or service. For instance, the employer could have several offices and you could mention how that appeals to you," Jill said. "You will need to be prepared to answer the question 'What do your know about our company?' Also, know the answer to 'Why do you want to work here?' Knowing as much as possible about the company can make your interview go well and in fact, having that information could be just the leg up you need in a tough job market."

"Okay. Where should I go for that type of information?" Sue asked.

"Well, before the interview, you can review the company's Web site. You can even contact your prospective employer to request details or ask for company information if you need to. Google the company to see what other information is available online. Usually those three things are the easiest to learn about the company," Jill replied.

"Okay, great. Is there anything else you would suggest?" Sue asked.

"Oh definitely that practice makes perfect. Practice with a friend to prepare for your interview, record or videotape your responses so you can replay and see how well you did. Practicing alone can help reduce jitters. Also, I would prepare a list of questions you want to ask. Remember, you're not simply trying to get the job. You are also

interviewing the employer to assess whether this position is a good fit for you and your needs. Like asking, 'What are the most challenging aspects of your job?' 'Why do you enjoy working for the organization?' Any of these questions will show that you are interested in the company."

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Jill went on, "You know, there are several interview styles. So every interview won't be the same. I've seen that behavior based interviewing is becoming more common. It's based on the idea that a candidate's past performance can tell future performance. It doesn't ask typical interview questions on your background and experience. The best way to prepare is to think of examples where you have successfully used the skills you have gained. Also, list your skills, values, interests, strengths and weaknesses. Stress what you can do to benefit the company rather than just what you are interested in. But, also don't have 'canned' answers. Recruiters can spot those."

"Wow, this is a lot. Thanks so much, I really appreciate this," Sue said.

"Not at all, I'm here to help. Above all, be confident of what you have learned, your accomplishments and your skill set." Handing Sue a brochure, Jill said "I always give people these ten tips. I know you will land that internship. Good luck."

Sue read the following 10 Tips to prepare for her interview. Here are the 10 Tips:

1. There is no single right answer, it's often how you answer that is more important.

2. Be honest. Don't pretend that you were sure about your major from the very start, if you were not. The details about how you chose your major may be much more interesting. It can tell some very positive things about how you make decisions.

3. Understand your skills and abilities accurately. Be prepared to answer why the position is a match for your skill, abilities, and education.

4. Stay focused and don't ramble. Give details that are relevant but do not start telling long stories that are not needed.

5. During the interview try to remain calm. Ask if you are not sure what has been asked, and remember that it is perfectly okay to take a moment or two to think about your responses so you can be sure to fully answer the question.

6. The recruiter saw something in your resume that was impressive. Go into your interview remembering that this person already likes what they saw.

7. The interview is a two-way conversation, so try to relax and enjoy the opportunity.

8. Sell yourself. If you do not state what your strengths, skills and accomplishments are, the recruiter will be unable to see you as a good candidate.

9. Genuine self-confidence and confidence in your ability to perform well at the job are your best assets in any interview.

10. End the interview with a thank you to the interviewer. Then follow-up with a personal thank you note within 24 hours after the interview.

VITAE

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