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Help or Hurt?
Why We Select and How We Process
Online Social Information About Health

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by

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ABSTRACT

Help or Hurt? Why We Select and How We Process

Online Social Information About Health

by

Kristin Page Hocevar

Health information is increasingly being shared online not just by credentialed sources such as physicians or health organizations, but also by patients with personal experience with a health concern. This dissertation proposes a new measure of vigilance-avoidance, or tendency to approach or avoid threatening stimuli, in order to understand how individual differences in this personality characteristic might influence selection and processing of online information about health. Two online experiments focusing on the topic of breast cancer were conducted to explore how individual levels of vigilance-avoidance moderate the effects of health message threat, community endorsement (e.g., online recommendations), and source type (patient- or physician-generated information) on selective exposure, perceptions of credibility, and helpfulness ratings. Results of these studies indicate that vigilance-avoidance interacts with these source, message, and community characteristics to influence both online health information selection behaviors and evaluations of online health information.

Women who are more vigilant spend more time reading threatening health information and evaluate it as more credible than women who are more avoidant, suggesting that they may be more likely to find health information more credible simply because it is negative. Additionally, women who are more avoidant spend more time reading low threat information than high threat information. Women who are more avoidant also spend even less time looking at credible health information from a physician than they do information from a patient, suggesting that when allowed to selectively expose themselves to information, they may miss key messages from credentialed medical sources that are important to their overall health. Overall, results from these studies suggest that our tendency to approach or avoid health information, as well as our potential to trust and find it credible, are dependent on these key personality characteristics—a novel contribution in the areas of health, selective exposure, and information evaluation research.

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> "My physician colleagues often refer their most difficult patients to me for a second opinion. Oftentimes, patients had not improved because they refused to entertain effective therapies because someone, somewhere (but always on the internet) had terrified them into inaction, provided inappropriate advice for my patient's specific situation, or overestimated the benefits of "natural" remedies and diets." - *Arun Swaminath, physician, director of the inflammatory bowel disease program at Lenox Hill Hospital and associate professor of medicine at the Hofstra Northwell School of Medicine (2016)*

> "Frequently patients will come for cancer surgery consultation after spending hours scouring the internet, viewing personal blogs or searching hospital, university and governmental websites. …Physicians should embrace [these] inquisitive patients" - *Martin R. Weiser, physician, Stuart H.Q. Quan chair in colorectal surgery at Memorial Sloan Kettering Cancer Center and professor of surgery at Weill Cornell Medical College (2016)*

We currently have unprecedented access to health information. This access, afforded by the Internet, has the potential to revolutionize how people approach their health in a traditional healthcare setting, allowing for more informed conversation with physicians as well as feelings of empowerment and the ability to research our own treatment choices. People are looking online for health information in increasing numbers: as of 2012, 72% of Internet users used the Internet as a health information source (Pew Research Center, 2014), and this number is likely to continue to rise with time. These individuals are often driven by a specific health concern, and may be searching the web not just for medical information, but also reassurance or advice from others who share the same concern. Indeed, the Internet is a resource not just for physician-generated or commercial content, but also content from fellow patients or caregivers who provide their own experience or thoughts. How Internet users evaluate this information may have important effects on health behavior, such as self-care and health treatment choices (O'Neill, Ziebland, Valderas & Lupianez-Villanueva, 2014).

And yet, we have relatively little understanding of what might influence both an individual's selection and evaluation of online information about health.

Looking for health information online affords many benefits: it is fast, inexpensive, and allows people to seek information about potentially sensitive health topics privately and anonymously (Morahan-Martin, 2004). The Internet provides access to medically accurate and curated health information from nurses, physicians, and health organizations, but also to information from patients, family, friends, and caregivers who have personal experience with health concerns (Cullen, 2006; Rice, 2006). While the former are credentialed sources that possess expertise earned and demonstrated through formal training and professional experience, the latter demonstrate "experiential" expertise on relevant health issues based on their personal experience, suggesting that they too can serve as valid health information sources (Flanagin & Metzger, 2013; Pure et al., 2013).

Regardless of the source, searching for high quality online health information is challenging, as information varies in accuracy, and information seekers vary in health and Internet literacy. A number of studies have examined the accuracy of health information posted on websites or social media (e.g., Benigeri, 2003; Berland et al., 2001; Craigie, Loader, Burrows, & Muncer, 2002; Eysenbach et al., 2002; Gorczynski, Patel, & Ganguli, 2013; Hargrave, Hargrave, & Bouffet, 2006; Kunst, Groot, Latthe, Latthe, & Kahn, 2002; Mathur et al., 2005; McNally et al., 2012; Selman, Prakash, & Khan, 2006). While this dissertation will not examine health information accuracy, these findings suggest that characteristics of Internet health information, such as the source type, and

their effects on credibility perceptions may have broader repercussions for the information evaluator's health depending on the quality of the information being evaluated. Whether or not the advice, stories, and general information from experiential online sources (e.g., patients or caregivers) is selected and interpreted differently from credentialed information is a concern for health practitioners and researchers as well as the general public, particularly because of this potential for varying quality.

While searching for health information online, individuals may often specifically seek information that intentionally or unintentionally *reduces* their concern, or may denigrate or otherwise discredit via discounting or ignoring threatening health information in order to reduce discomfort. Our individual potential for this type of bias in health information selection and processing may be driven by our more general individual personality traits related to a desire to approach or avoid threatening information (see, e.g., Byrne, 1961). Thus, how threatening or comforting health information is perceived to be, in conjunction with preexisting personality characteristics of vigilance (threat approach) and avoidance might impact not only information selection, but also health information evaluation and our perceptions of health information credibility.

Cancer, in particular, is a serious and threatening health issue, and diagnosis can lead to reactions that vary from denial, to fatalism, to empowerment (Powe & Finnie, 2003; Straughan & Seow, 1998). A personality-based desire to avoid or selectively interpret threatening information about cancer may significantly influence how people interact with online content about it, particularly when that information is provided by

patients or knowledgeable caregivers rather than physicians. Women who are concerned about breast cancer tend to be exceptionally active sources and seekers of online health information, frequenting Internet-based health communities for social support and an opportunity to ask questions and help others (Blank, Schmidt, Vangsness, Monteiro, & Santagata, 2010; Gooden & Winefield, 2007; Rodgers & Chen, 2005; Winzelberg et al., 2003). In addition to source cues, such as whether the information provider is a physician or patient, many of these online health communities (e.g., discussion and question and answer sites) provide "community" cues, such as information about views or popularity, or endorsements such as helpfulness ratings or "likes." It is not just the experiential nature of this information, but also the endorsements that social media and online communities enable that make understanding how this type of online health information influences Internet users even more complex.

Aside from research on emotional benefits linked to online social support (e.g., Blank et al., 2010; Gooden & Winefield, 2007; Rodgers & Chen, 2005; Winzelberg et al., 2003), little is known about how women concerned about breast cancer process health messages shared by their peers. While the medical factual accuracy of breast cancer discussion posts is relatively high according to physicians (Esquivel, Meric-Bernstam, & Bernstam, 2006), the type of ambiguous – neither necessarily scientifically inaccurate nor accurate – personal health stories and information posted by patients, who are frequently uncredentialed but still experienced sources, may be difficult for information seekers to interpret. Thus, this study seeks to answer questions such as: What leads Internet users to choose certain sources of social health information over others? How do individuals

interpret this information? How do different source and message factors, as well as personality characteristics, influence selection and interpretation?

This series of two online experiments seeks to explore how an individual's personality trait-driven responses to threatening health information might help answer these questions, as well as to clarify how people evaluate and what they do with online information about breast cancer testing and diagnosis from Internet users with experiential versus credentialed credibility. In addition to these credibility source factors, the influence of community factors such as endorsement of shared information is also explored. To advance theory in this area, a selective threat processing framework of online health information is proposed and tested via two experiments. Results of these studies expand our knowledge of the influence of personality on processing and selection of online health information, bridging and extending health, communication, and psychological research.

Chapter I: Defense Motivation, Selective Exposure, and Information Processing

This dissertation explores the relationship between personality characteristics that might influence whether health information seekers approach (exhibit vigilance) or evade (exhibit avoidance) potentially threatening, cancer-related health messages via biased processing, selection, or both. First, the literature on selective exposure, including how preexisting attitudes or bias might influence exposure, will be reviewed. Next, theories that posit when and why individuals might exhibit defensive information processing will be discussed, in order to link processing, evaluation, and selection to the vigilant-avoidant personality characteristics that will be examined further in Chapter 2. Finally, the literature regarding source and message characteristics that are traditionally posited to influence credibility evaluation will be reviewed.

Defense Motivation and Selective Exposure

While presumably people desire to seek out accurate information about their health, they may also be defensively motivated to seek non-threatening information or information that conforms to preexisting health beliefs, regardless of whether those beliefs or that information is accurate. Many people seek out online health information sources when they have a certain level of concern or uncertainty about a health issue, and individuals frequently seek out health information online from other non-credentialed individuals (e.g., patients) who share their health concerns (Sillence, Briggs, Harris, & Fishwick, 2007). When the information that is sought is on a potentially threatening topic, such as cancer, information seekers may evaluate threatening, personally-relevant health information provided by other patients. While we rarely desire to perceive our

health to be threatened, or to receive threatening health information, the extent to which we choose to approach or avoid this type of information, both in terms of selection and processing, may vary depending on individual characteristics. For example, people may wish to both find information and process that information such that it conforms to their existing (e.g., a belief that "I am healthy") or potentially desired (e.g., information that makes an ailment seem less severe or frightening) health beliefs. Though individuals vary, this defensive bias may lead them to select or process information in accordance with these desired beliefs.

Defense motivation in the face of this threatening, attitude-inconsistent information can result not only in biased information processing, but also in biases in selective exposure to information. Thus, individuals can be motivated to "*feel* validated" versus "*be* correct" —or be defense- rather than accuracy-motivated—in their choice to expose themselves to information (Hart et al., 2009, p. 555, emphases in original). Selective exposure research is rooted in the classic psychological theory that indicates that discomfort is likely to arise when incongruence in attitude and behavior occurs (Festinger, 1957). This type of dissonance may then result in a desire to selectively avoid information in a manner that reduces this discomfort (Sears & Freedman, 1967).

Indeed, the assumption of much research in selective exposure is that people prefer to avoid dissonant information, and are motivated both to protect their existing attitudes and beliefs by avoiding information that would challenge these beliefs, as well as to seek out information that support their beliefs (Eagly & Chaiken, 1993; Festinger, 1957; Hart et al., 2009). For example, while individuals believe sources labeled or

perceived to be unbiased to be more credible than those that are biased, they still often seek out (i.e., selectively expose themselves to) biased sources in order to expose themselves to attitude-consistent information (Hartsell, Metzger, & Flanagin, 2012; Metzger, Hartsell, & Flanagin, 2015; Winter, Metzger, & Flanagin, 2016). While this type of selective exposure varies by context—for example, some research shows that while individuals tend to seek attitude-reinforcing political information they do not always avoid information that is contrary to preexisting political attitudes—"selective exposure" often refers to both a desire to select attitude-consistent and to avoid attitude-inconsistent information (Garrett, 2009).

Selective exposure to health or other information may be particularly easy in the online environment due to the wealth of sources of attitude-congruent information available to choose from and the nature of homophilous and self-reinforcing social networks (Garrett, 2009; Garrett, Carnahan, & Lynch, 2013; Hartsell et al., 2012; Chaffee & Metzger, 2001). Some theories suggest that individuals desire to hold opinions that are congruent with existing beliefs and self-concept; specifically, that we desire to hold attitudes congruent with current "self-defining attitudes and beliefs" (Giner-Sorolla & Chaiken, 1997, p. 85). This "defense" motivation can result in a self-serving bias in both information processing and information selection, such that an individual may seek out or process information such that it matches their existing attitudes or beliefs (Chaiken et al., 1996; Chen, Duckworth, & Chaiken, 1999). Research also indicates that defense motivation is a stronger predictor of selective exposure than accuracy motivation (Hart et al., 2009; Winter et al., 2016), suggesting that people may be particularly likely to select

health information that serves defensive goals, even if that information is lower in accuracy.. While some studies have examined selective exposure in a health context (e.g., Knobloch-Westerwick, Johnson, & Westerwick, 2013), most recent selective exposure research has explored the domain of political or news information, focusing on information that is threatening to pre-existing political attitudes or issue-related values (e.g., Borah, Thorston, & Hwang, 2015; Brundidge & Rice, 2009; Garrett, 2009; Garrett et al., 2013; Knobloch-Westerwick & Meng, 2009; Metzger et al., 2015; Winter et al., 2016), rather than information that is threatening to perceptions of health.

While concern about an individual's ability to avoid health-promoting or other health-related messages via selective exposure has been of concern in public health and related fields for decades (Swinehart, 1968), an individual may avoid health-relevant messages via means other than just regulating exposure. For example, some health message theories have focused on parallel processes of defensive (avoidant) motivation versus more protective and adaptive processing (Leventhal, 1970, 1971; Witte, 1992). When health messages are threatening, whether intentionally (e.g., fear appeals in health promotion messages) or unintentionally (e.g., personal health stories with negative outcomes), individuals may be particularly likely to process them defensively, resulting in biased attention, evaluation, or other potentially problematic methods that may influence related health behaviors.

Defense Motivation and Selective Processing

Understanding defense motivation, or motivation to hold attitudes that match our preexisting beliefs, may help explain how we selectively process health information,

which may influence our evaluations of its credibility, particularly when we perceive it to be threatening. Some of the most widely-used models and theoretical frameworks in credibility research are those that focus on dual processing of information. These models suggest that individuals evaluate information through different cognitive routes depending on the amount of cognitive resources they wish to or are able to expend. For example, the heuristic-systematic processing model (HSM; Eagly & Chaiken, 1993) and the elaboration likelihood model of persuasion (ELM; Petty & Cacioppo, 1986) both pose that persuasive messages can be processed through two cognitive routes. The first route is a more cognitively effortful route (termed "systematic" in the HSM and "central" in the ELM), and the second is a less effortful heuristic (HSM) or peripheral (ELM) route.

Petty and Cacioppo's (1986) ELM and Chaiken and colleagues' HSM (Chaiken, Giner-Sorolla, & Chen, 1996; Chen, Duckworth, & Chaiken, 1999) also suggest that people are motivated to hold "correct" (i.e., objectively accurate) attitudes. However, while the HSM initially posited that high levels of this "accuracy motivation" would lead to more effortful systematic processing, later versions of the model have suggested that in many situations other motivations may interact with or even override any need to be objectively correct or accurate in one's assessment of information (see Chaiken et al., 1996), irrespective of whether the information itself is factually accurate. This defense motivation is a desire to hold opinions that are congruent with existing self-defining beliefs, and can result in a self-serving bias in information selection as discussed previously, but can also result in biased information processing (Chaiken et al., 1996; Chen et al., 1999).

Defense motivation frequently results in the defensive use of heuristics, or a selective use of mental shortcuts that are congruent with preexisting beliefs (Chen et al., 1999). Similarly, Kunda's (1990) theory of motivated reasoning suggests that people arrive at conclusions they desire when they are able to justify or provide reason to do so. Together, these theories suggest that when an information seeker is defensively motivated, information may be processed selectively to meet the needs of the information receiver, potentially resulting in biased information evaluation. This is in contrast to accuracy motivation, which should promote people's processing of information in a more objective and systematic manner (Chaiken et al., 1996).

The HSM suggests that when a message is threatening, an individual who has more issue involvement (i.e., personal relevance) will have increased motivation to arrive at a preferred conclusion or reject an undesirable conclusion, resulting in biased systematic processing where threatening information is processed more critically than reassuring information (Liberman & Chaiken, 1992). Thus, personal relevance may lead an individual to process defensively when evaluating information about his or her own health, as well as the health of loved ones. Further, the model predicts that defense-motivated people will process heuristic cues in a biased manner. Heuristic (as opposed to systematic) processing will be dominant when the heuristic cues indicate support for reassuring information or information that matches the processor's preferred conclusion (Giner-Sorolla & Chaiken, 1997).

The HSM's principle of sufficiency suggests that people will put in the minimum processing effort necessary to reach a desired level of confidence. In the context of a

person who is defense motivated, sufficiency occurs not as an increase in certainty in the objective accuracy of information, but rather an increase in assurance of a preferred conclusion (Giner-Sorolla & Chaiken, 1997). Under conditions of defense motivation, people will selectively process information to meet their needs – a tendency that is amplified with the perceived relevance and criticality (i.e., a more critical concern as opposed to a minor concern) of the information or topic (Chaiken et al., 1996). The ELM similarly suggests that personal relevance, or issue involvement, can influence message processing (Petty & Cacioppo, 1986; Petty, Cacioppo, & Goldman, 1981). While neither theory specifically addresses the health domain, both personal relevance and criticality should be quite high in the realm of health concerns, increasing as the health concern is perceived as more serious or more central to the identity of the information seeker. Thus, biased information processing may be likely in the domain of health, and particularly likely when health concerns are of a serious nature, like breast cancer.

In the context of health, a desire to arrive at a preferred conclusion may even override any desire to be objectively "accurate." Prior research suggests that when paired with the other motivations theorized by the HSM (i.e., impression motivation, or a desire to be perceived favorably by others, and accuracy motivation), defense motivation is most dominant. For example, defense motivation dominates a desire to be accurate when people are both defense and accuracy motivated, and also is privileged over impression motivation when individuals are primed to be both impression and defense motivated (Lundgren & Prislin, 1998). This suggests that defense-accuracy motivated processing essentially resembles defense processing, as does defense-impression processing. Further,

self-induced dual motivation produces perceptions of accuracy that justify defensive biased processing (Lundgren & Prislin, 1998). Thus, defensive processing may occur even in domains in which one might expect accuracy-motivated processing, such as health.

Endorsement and Credibility of Online Health Information

Defensively processing health information may include not only bias in attention or selection, but also bias in evaluation. As more people turn to the web for health information, including others' personal health experience, advice, and opinions, assessing the credibility of online health information has become more complex. Credibility has traditionally been defined as the believability of information and is thus a perception of the information evaluator (Fogg & Tseng, 1999; Metzger & Flanagin, 2015). In one of the early theoretical works that has framed many more contemporary studies of credibility, source credibility is posed to consist of perceptions of source trustworthiness and expertise, with expertise defined as whether the source has the knowledge and/or experience to communicate valid information (Hovland, Janis, & Kelley, 1953).

Thus, personal experience with a health topic may lend a level of perceived expertise to Internet users who share information but lack traditional *credentialed* credibility, or expertise characterized by university degrees and professional healthcare experience (Eysenbach, 2008; Eysenbach et al., 2002). This *experiential* credibility, or credibility assigned to a source based on his or her personal experience, has been posed to influence evaluations of online user-generated information in a variety of domains (Flanagin & Metzger, 2013; Pure et al., 2013). Experiential credibility in the context of

health information implies personal experience with a health concern, and thus differs from a true layperson or uncredentialed source who might share health information with neither credentials nor personal experience.

Research into the perceived credibility of online information has also examined the cues that help people make credibility assessments in that environment. Online, information seekers frequently do not spend significant time critically evaluating content and instead often use heuristic cues that guide information evaluation while minimizing cognitive effort (Hilligoss & Rieh, 2008; Metzger, Flanagin, & Medders, 2010; Sundar, 2008). Two of the cognitive heuristic cues used by online information recipients are reputation and endorsement (Metzger et al., 2010). Thus, people are more inclined to perceive sources to be credible if others do as well (reputation), and tend to trust sources that are recommended by others (endorsement). This is similar to the "imitate the majority" heuristic used in decision-making, such that people are more likely to engage in a behavior if they observe others doing so (Gigerenzer, 2008), as well as the "bandwagon" heuristic (Sundar, Oeldorf-Hirsch, & Xu, 2008), wherein people tend to hold similar opinions to those indicated by others when making assessments. Both of these heuristics are derived from classic findings in the group influence and social conformity literature (e.g., Asch, 1955).

Research has also confirmed that an individual's perceptions and attitudes can change depending on his or her perceptions of others' opinions (Sundar et al., 2008), and that the information provided by other Internet users can influence subsequent user-generated information on the same topic (Flanagin & Metzger, 2013). These effects of

endorsement on perceptions and future behavior are relatively novel to the online environment, in that large-scale social endorsement is more easily observable and thus potentially more influential in the online context compared to offline. For example, individuals can recommend, "like," or otherwise rate online content provided by users, and these ratings are often aggregated (e.g., "78% of users recommend this") to provide additional endorsement information. Because social media frequently aggregate information from experiential sources, the effects of this cumulative experiential expertise (for example, both initial information shared by people about their personal health experience, and others' subsequent ratings or endorsement of that information) may be particularly persuasive for information evaluators.

Indeed, while the quality of online health information can vary widely (Kunst et al., 2002; Rice, 2001; Selman et al., 2006), the markers of the "quality" of information from credentialed experts are likely different than those that might indicate quality or helpfulness of information provided as the personal experience of someone with a health concern. For example, information from an experiential source might be perceived to be very helpful to an information seeker who shares the same health concern, even if that seeker understands that the source might be less credible than a credentialed source would be. As searches for online health information increasingly turn up content that is highly experiential in nature, understanding how people process this type of information and what they do with it is key to a clearer picture of the influence of the wide range of online health information on information seekers.

Summary

Overall, this research suggests that defense motivation, message characteristics, source cues (i.e., source type: experiential or credentialed) and endorsement may influence both selective exposure and perceptions of the health information (i.e., credibility) to which an individual is exposed. Much research in defense-motivated information processing has used an undergraduate sample and an experimentally primed issue (see, e.g., the meta-analysis conducted by Hart et al., 2009) to induce defense motivation, accuracy motivation, or motivations of other types. These primed issues may be self-relevant for undergraduate participants, but cannot compare in terms of defense motivation level to a cancer patient's desire to be healthy and survive a battle with cancer. Thus, while prior research suggests the potential for a strong defensive bias in information processing that may override other motivations, defense motivation may be even more likely to influence perceptions and attitudes in a significant health context than has been evidenced in prior research. Further, because defense motivation is manipulated in prior research, rather than measured, the potential variance in motivation between individuals to react defensively to threatening information via bias in information selection or processing is lost. Thus, the next Chapter will discuss personality characteristics that might contribute to an individual's level of defensive bias in information selection and processing. Finally, a selective threat processing framework will be proposed before specific hypotheses are put forth for testing.

Chapter II: Personality and Vigilant-Avoidant Selection and Processing

Personality Predictors of Threat Reactions: Vigilance-Avoidance

Many psychologists have theorized about a continuum of personality traits tied to processing and coping with threatening stimuli. These models use a variety of terminology, including repression-sensitization, vigilance-avoidance, and coping, to refer to these traits. For example, the classic model of a repression-sensitization continuum suggests that individuals vary from those who avoid (called repressors) to those who approach (called sensitizers) this type of stimuli, and individuals may fall anywhere between these two extremes (Byrne, 1961). This type of theoretical work linking personality characteristics and personality-based coping styles to how people deal with threatening information may lend additional insight into how people process, select, and react to online health information.

The modes of coping model (Krohne, 1993; Krohne et al., 2000), for example, posits that people who are more vigilant will intensively search for and thoroughly process stress-related information, whereas cognitive avoiders will eschew threat-relevant cues and desire to shield themselves from distressing stimuli. The model addresses coping strategies in the face of threat, or those strategies "which aim at changing the subjective representation of objective elements inherent in a threatening situation" in order to reduce distress (Krohne, 1989, p. 395). Thus, both models suggest a relationship between information processing, information search or selection, and personality traits, such that some people more than others may seek to avoid distressing information in the face of threat via biased selection, processing, or both (Harris, 1981).

While the repression-sensitization continuum is relatively simple (people who are higher on repression are lower on sensitization and vice versa), the modes of coping model suggests that avoidance and vigilance are independent constructs rather than a continuum (Krohne, 1993). According to the model, stimuli can be threatening due to indications of danger that then increase arousal, or indications of ambiguity that then increase uncertainty, and people can be averse to either or both of these stimuli. Cognitive *avoiders* attempt to avoid emotional arousal, or fear, that comes with information that indicates danger, while those who are more cognitively *vigilant* are averse to uncertainty, and use vigilance as a method of decreasing uncertainty about being at risk for harm. However, some research into these traits indicates that people tend to be either more vigilant and less avoidant or vice versa, rather than high or low on both constructs (Krohne et al., 2000), suggesting that the continuum proposed by Byrne (1961) may be more accurate to the nature of these personality traits than the two independent dimensions suggested by Krohne (1993).

Theoretically, people who are more vigilant are expected to approach threat, suggesting that they may both select and evaluate threatening information differently from those who are more avoidant of negative arousal or other potentially distressing effects of threatening stimuli. Some findings suggest that individual differences in repression-sensitization relate to interpretation of new information because they influence assimilation (or lack thereof) of new information to remembered information and pre-existing attitudes (Guilford, 1980). Repressors are more likely to "level," or omit inconsistencies between what is remembered and what is perceived (Holzman & Gardner,

1960). Repressors also exhibit bias in interpretation via avoidance behaviors that include avoidant attentional bias, avoidant interpretive bias, and avoidant memory bias (Derakshan, Eysenck, & Myers, 2007). Theory in the field of health communication similarly suggests that fear, which can arise in the face of threatening health information, is an avoidant emotion, resulting in less motivation to engage in a threatening message (Nabi, 2002), although theoretical work in this area does not include a thorough discussion of personality-based individual differences. In sum, this research suggests that traits of vigilance and avoidance might affect processing of online health information, via differences in attention, interpretation, and memory for threatening or distressing information.

Repressors are specifically likely to become defensive when faced with threats that are self-relevant and threatening to their physical or psychological well-being. For example, research indicates that trait-based repression can lead to avoidant attentional bias in information selection or attention, as well as avoidant interpretive bias that results in less threatening interpretations of ambiguous stimuli and situations (Derakshan et al., 2007). This suggests that online health information perceived as threatening to an individual's wellbeing may induce defensive motivation, particularly among repressors, for information selection and processing.

Indeed, even in a younger, undergraduate sample, being presented with threatening breast cancer information has been found to increase defensive reactions, such as defensive avoidance and message derogation (Ruiter et al., 2004). Additionally, people who experience stress in the face of threat, such as repressors, have been found to

spend less time reading and exhibit lower recall of a threatening health message as compared to a non-threatening one (Millar, 2005), indicating a clear link between repression and selective exposure in a health context.

Thus, when threatening health-related cues are processed, traits of vigilance/sensitization and avoidance/repression may affect how people regulate their exposure via methods such as skimming, skipping, or spending less time with the threatening health information, as well as how people process the health message. However, because of the current lack of a strong measure of vigilance-avoidance, a new measure will be developed as part of this dissertation before hypotheses related to vigilance-avoidance can be tested.

Measurement of Vigilance-Avoidance

While many measures of vigilance-avoidance or similar constructs exist, they suffer from a host of problems, including a lack of practical applicability for researchers outside of psychology. For example, repression-sensitization is the classic measure that has been used by psychologists for decades, but it is difficult to administer. First, the measure includes 182 items (156 to score, and 26 "buffer" items) (Byrne, 1961). Second, all items are drawn from the Minnesota Multiphasic Personality Inventory (MMPI; MMPI-2), a clinical and protected scale that can only be administered and interpreted by trained clinical psychologists or individuals holding a PhD in psychology or education (Pearson, 2016). This seriously limits the usability of repression-sensitization as an assessment of personality traits and reactions to threat in a wide range of potential research.

An additional criticism of the repression-sensitization scale is that it simply measures trait anxiety (general anxiousness as a personality trait), with repressors corresponding with those lower on trait anxiety and sensitizers with those higher (Cook, 1985; Eysenck, MacLeod, & Mathews, 1987, Golin et al., 1967). Indeed, people with higher anxiety are more likely to use sensitizing strategies when dealing with threatening information (Watson & Clark, 1984; Eysenck et al., 1987). However, this does suggest that people of different levels of cognitive vigilance-avoidance will examine anxiety-inducing health information with different processing outcomes. For example, avoiders/repressors are more likely to selectively forget anxiety-inducing information (Byrne, 1961).

A modified version of repression-sensitization, the multidimensional coping scale, was developed to better differentiate repression and sensitization from anxiety by examining coping strategies as opposed to symptoms of anxiety (Cook, 1985). However, this measure views coping more as a state (e.g., as a method of coping for problem solving; see Heppner, 2008) than the psychological trait posited by Byrne (1961) and studied widely using his scale. While state-based coping is worth exploring in its own right, Byrne's (1961) classic conceptualization of the trait of sensitization-repression provides the potential to understand why individuals might respond to the threat inherent in much health information in a consistently similar manner over time. Within the coping literature, repression-sensitization holds many similarities to the suppressive coping style in the Problem-Focused Coping Style instrument (PF-SOC; Heppner, Cook, Wright, & Johnson, 1995); however, the suppressive style is again posited to be a state rather than a

trait. While these measures may inform our understanding of coping in the face of threat, they are not currently applicable to research linking personality traits to selection and processing of threatening information.

Krohne's modes of coping model (1993; Krohne et al., 2000), which examines vigilance and avoidance as separate constructs, uses the Mainz Coping Inventory (MCI) as its measure of these traits. The MCI presents both ego- and physically-threatening situations, and provides respondents with avoidant and vigilant strategies to select based on how they would react. In addition to positing vigilance-avoidance as separate constructs, the measure suffers from some potential validity issues. Factor analytic testing indicates high residual covariance between avoidance and vigilance in two of the four physical threat scenarios. While a confirmatory factor analytic model of an adequate fit resulted when these were allowed to covary, the authors did not explain theoretically why half of the threatening scenarios presented to respondents should indicate covariance between vigilance and avoidance (Krohne et al., 2000), suggesting that this measure should also be further refined.

Despite the profusion of measures of vigilance-avoidance and related constructs, in order to apply the constructs outside of the psychological domains that they have traditionally been used in, new, more succinct measures must be created and validated. Thus, before exploring how vigilant and avoidant traits can impact information processing and selection in a health context, this study will first propose and evaluate a new measure of trait vigilance-avoidance. The terms cognitive "vigilance" and "avoidance" will be used rather than "sensitization" and "repression," both due to their

increased clarity in representing their associated constructs, and the measurement issues related to the repression-sensitization continuum reviewed previously (e.g., Cook, 1985; Eysenck et al., 1987, Golin et al., 1967).

Selective Threat Processing Framework

Prior research has examined defense motivation as a categorical state (see Hart et al., 2009) that can be primed and compared to other motivations (i.e., accuracy and impression) in different contexts. However, research and theory in the area of personality and coping suggests that processing and selection of threatening information may be influenced by *traits* of vigilance and avoidance. Some work has begun to explore the interaction between individual coping styles and selection of online health information. For example, Johnson and Knobloch-Westerwick (in press) found that individuals lower in avoidant coping (presumably higher in vigilance, though that terminology was not used by the researchers) spent more time reading messages higher in informational utility (i.e., accuracy and usefulness) than low in utility. However, that study examined state-based coping styles rather than more stable personality traits, and did not look specifically at more or less threatening health messages or an individual's potential personality-driven tendency to approach, rather than just avoid, those messages. Specifically, the discussion of the avoidant coping style does not fully explore what "low avoidant" coping might be – i.e., people who tend to be more vigilant in their search for and analysis of threatening information.

To further explore how traits of vigilance-avoidance might influence online health information selection and processing, this project proposes a selective threat processing

framework that will be tested in two experiments. Figure 1 illustrates this framework. The framework specifically suggests a moderating relationship, where vigilant and avoidant traits influence the link between threatening information and cognitive and behavioral outcomes. These traits should be particularly influential in the domain of online health information from experiential sources who have experience with a health concern, but who lack traditional cues of credentialed experts (e.g., physicians) to guide interpretation or selection of their information; this will be explored further in the following Chapters.

Two studies will explore and test this framework. Study 1 will focus on the relationship between vigilance-avoidance, community cues of endorsement, and message cues of threat, whereas Study 2 will examine the relationship between vigilance-avoidance, source cues (i.e., source type, either experiential or credentialed) and endorsement. Both studies are necessary so that each three-way interaction can be unpacked, and the framework will be tested via experimental research so message, source, and community cues of online health information can be manipulated. Study 1 will test hypotheses related to vigilance-avoidance and evaluation and selection of this patient-generated information. The goal of the first study is to examine (a) how the threat level and endorsement of health information influence selective exposure and processing, and (b), how vigilance-avoidance moderates those relationships. This will provide a more informed view of cues that research and theory traditionally suggest influence selective exposure and information processing, such as message characteristics, and whether vigilance-avoidance interacts with or even overrides those cues.

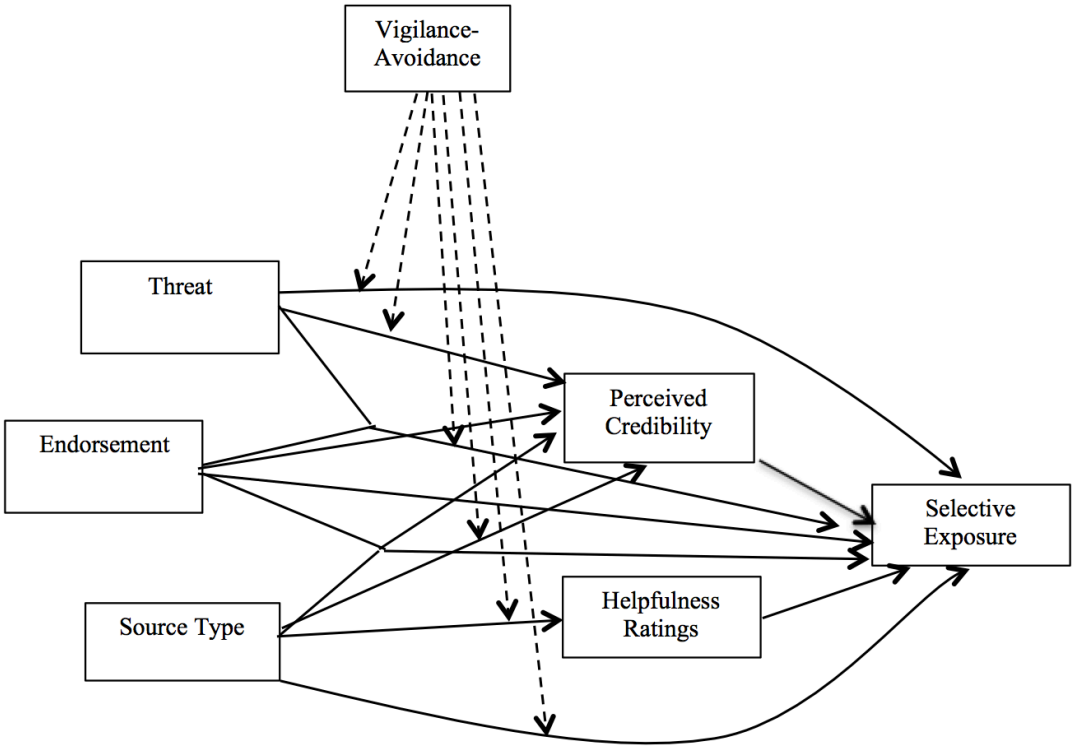

Figure 1. Visualization of relationships between key variables in the selective threat processing framework. Merging lines denote interaction effects and dotted lines denote moderating effects.

The second study will directly compare cognitive and behavioral reactions to experiential (e.g., patient-generated) versus credentialed (e.g., physician-generated) information, as the model proposes that vigilance-avoidance so interacts with these source cues. For example, perhaps people who are more avoidant may attempt to denigrate threatening health information from experiential sources (e.g., Ruiter, Verplankten, de Cremer, & Kok, 2004), but will find this more challenging to do when sources are clearly credentialed. The central goal of the second study is to follow up on

the results of the first study, which only assesses information from experiential sources, by exploring (a) how the type of source (experiential versus credentialed) and endorsement of health information influences selective exposure and processing, and (b) how vigilance-avoidance moderates those relationships.

Summary

Overall, research in information processing (e.g., defense motivation) and personality-based responses to threat indicate a moderating influence of vigilance-avoidance on the relationship between threat and outcomes relevant to the online information sharing environment, such as processing (e.g., perceptions of credibility) and selective exposure. The proposed selective threat processing framework of online health information in Figure 1 additionally incorporates cues that are theoretically important to evaluation and selection of information in the online environment, such as source type (experiential, credentialed) and the social endorsement of Internet content by other Internet users via information such as the percentage of others who recommend information.

The two studies will test specific hypotheses derived from the proposed framework. Specifically, this dissertation explores how vigilance-avoidance moderates the relationship between threat (Study 1), endorsement (Studies 1 and 2), and source type (Study 2) and outcomes relevant to the online information sharing environment, such as selective exposure (Studies 1 and 2), processing (i.e., perceptions of credibility, in Studies 1 and 2), and helpfulness ratings subsequent to information exposure (Study 2). Together, findings from the two studies will provide valuable information about how

individual levels of vigilance-avoidance may explain variance in the influence of source, message, and community cues on online health information selection and evaluation.

Chapter III: Rationale and Hypotheses for Study 1

Prior research indicates that people tend to selectively expose themselves to positive information (both health-relevant and otherwise) under conditions of threat (Greving, Sassenberg, & Fetterman, 2015), and that avoiders will be more likely to selectively evade aversive information (Miller, 1987). Thus, people higher in cognitive avoidance exposed to threatening health messages shared socially by patients (experiential health information sources) online may be less likely to desire to select and spend time reading that information. This suggests the first hypotheses:[1]

H1a: Selective exposure will be greater for lower threat health information than for higher threat health information.

H1b: An individual's level of vigilance-avoidance will moderate this relationship, such that selective exposure to higher threat health information will be lower for more avoidant individuals than for more vigilant individuals, and selective exposure to lower threat information will be higher for more avoidant individuals than vigilant individuals.

In addition to threat, endorsement such as recommendations from others can also influence selective exposure (see, e.g., Garrett, 2013; Knobloch-Westerwick, Sharma, Hansen, & Alter, 2005; Winter et al., 2016). As discussed previously, recommendations and endorsements are heuristic cues that can help individuals process and select online information (Metzger et al., 2010). For example, level of endorsement predicts message selection in an online context, although most of this research focuses on the domain of political information rather than health information (e.g., Messing & Westwood, 2012;

Xu, 2013). Messages about health experiences from individuals that lack endorsements from others may be less likely to be selected by information seekers because lack of endorsement of a health message could indicate lack of public support or others' negative perceptions about that message. Thus:

> H2: People will be more likely to selectively expose themselves to health information with more endorsements from others than messages with fewer endorsements.

And finally, levels of both threat and endorsement of a health message are expected to interact in their influence on selective exposure. Again, because reactions to threat in terms of information selection should vary depending on individual differences in vigilance-avoidance in addition to community cues of endorsement and message cues of threat (as discussed in prior hypotheses), the following interactions are posed:

> H3a: Threat level and endorsement will interact such that selective exposure to health information will be highest for online health messages that are low in threat and highly endorsed.
>
> H3b: An individual's level of vigilance-avoidance will moderate this relationship, such that the difference in amount of exposure to high endorsement low threat health information versus high threat low endorsement health information will be largest for more avoidant individuals and smallest for more vigilant individuals.

As discussed, when faced with threatening health information online, people may not just use avoidance methods, but may also selectively interpret threatening information that they are exposed to in a way that reduces distress. For example, prior research

suggests that people who were presented with threatening health information by being informed they had been diagnosed with an unfavorable medical condition were more likely than those presented with less threatening information to rate that diagnosis as less accurate, as well as to perceive the medical condition to be less serious (Ditto, Jemmot, & Darley, 1988; Ditto & Lopez, 1992). Additionally, threat influences selective processing of and memory for health information, such that when people want to think of themselves as healthy, they are less likely to remember attitude-inconsistent information about health (Kiviniemi & Rothman, 2006). Both of these findings suggest the potential influence of threat on perceptions of health message processing.

Biased interpretation may also influence evaluations of the credibility of information, as perceiving threatening information to be less credible would be one way to defensively process threatening information in order to reduce distress. Theoretically, the HSM suggests that when a health message is threatening and personally relevant, it may be processed in a defensive and biased manner (Liberman & Chaiken, 1992). This may result in biased perceptions of the credibility of information. In the context of online health information from experiential sources that lack credentials that would traditionally influence credibility perceptions, threat may have a particularly significant influence on evaluation. Specifically, information from experiential sources who lack medical or other relevant credentials may be dismissed as noncredible when the message they deliver is threatening. Thus, threatening information from these sources may be judged as inaccurate, biased, or otherwise lacking in credibility, particularly by avoiders who wish

to dismiss the threatening information through selective interpretation. Thus, the fourth hypotheses are posed:

H4a: High threat health information will be perceived to be less credible than low threat information.

H4b: An individual's level of vigilance-avoidance will moderate this relationship, such that the difference in perceived credibility of health information of high versus low threat will be largest for more avoidant individuals and smallest for more vigilant individuals.

Perceptions of the credibility of information from experiential sources may also be significantly influenced by the endorsement of others. Indeed, some scholars of social influence pose that in addition to traditional social influence based on perceptions of normative expectations (i.e., desire to conform based on others' expectations), people can also be influenced by others' information. Specifically, these scholars pose an "informational social influence," or influence such that people are more likely to accept information from others as "evidence about reality" (Deutsch & Gerard, 1964, p. 629). This suggests that online cues such as endorsements or ratings may indicate public support or positive perceptions of a message (Metzger et al., 2010). Further, research has found that endorsement of online user-generated content can influence credibility perceptions of that content, both in the domain of health and other information domains (Flanagin & Metzger, 2013; Lee & Sundar, 2013). Thus, the fifth hypothesis is proposed:

H5: Higher endorsement health information will be perceived to be more credible than lower endorsement health information.

And again, levels of both threat and endorsement of a health message, as well as levels of vigilance-avoidance, are expected to interact to influence perceived credibility:

H6a: Threat level and endorsement will interact such that the perceived credibility of health information will be highest for health information that is low in threat and highly endorsed.

H6b: An individual's level of vigilance-avoidance will moderate this relationship, such that the difference in perceived credibility between low threat/high endorsement health information and high threat/low endorsement health information will be largest for more avoidant individuals and smallest for more vigilant individuals.

While the level of threat and endorsement of Internet users' online health messages and personal stories are posited to impact perceived credibility and selective exposure, credibility may also mediate the relationship between threat and endorsement and selective exposure, either in terms of a desire for future selective exposure or in the amount of time spent (e.g., reading a chosen article). Indeed, prior research suggests that people interpret information that goes against their attitudes as a negative credibility cue, which can lead to reduced future desire to use the source again (Metzger et al., 2015). If threatening information is generally inconsistent with one's desired attitudes (i.e., goes against a person's desire to think of himself as healthy), then credibility may mediate the relationship between threat and selective exposure.

Endorsement, on the other hand, is likely to act as a positive credibility cue (Flanagin & Metzger, 2013; Metzger et al., 2010). Thus, the relationship between

endorsement and selective exposure may also be mediated by credibility. Because people may process threatening health information in a biased manner that influences credibility perceptions, the following hypotheses are posed:

H7a: Perceived credibility will mediate the relationship between threat and selective exposure, such that more threat will lead to lower perceived credibility, which will in turn lead to less exposure.

H7b: Perceived credibility will mediate the relationship between endorsement and selective exposure, such that more endorsement will lead to higher perceived credibility, which will in turn lead to more exposure.

In sum, this study explores the effects of different characteristics of health messages (e.g., threat, recommendations) shared in the context of online, social information platforms, where social endorsements can be provided. However, in addition to these message and community characteristics, source characteristics may also impact information evaluation and selection, as suggested in the selective threat processing framework of online health information. The second study continues to test hypotheses derived from that framework with a focus on the additional effects of relevant source characteristics and their interactions with vigilance-avoidance.

Chapter IV: Rationale and Hypotheses for Study 2

As discussed in the literature review and rationale for the first study, health information online can be provided by a variety of sources, including those with professional credentials (e.g., nurses, physicians, nurse practitioners, or physician's assistants) and patients or others with personal, firsthand experience with a focal health concern. The type of credibility afforded the source (i.e., an experiential or credentialed source type) may also interact with endorsement and vigilance-avoidance to influence processing of and selective exposure to online health information. How source type influences health information selection and processing, in interaction with some of the variables explored in the first study (vigilance-avoidance and endorsement) will be the focus of this second study. Because experiential and credentialed sources may provide health information of varying quality, understanding when information seekers select and how information seekers evaluate each source type—particularly as this interacts with more vigilant or avoidant tendencies to approach or evade the source's information via biased selection or processing—is a key component of the selective threat processing framework.

Some research in experiential health information provision has found that while source credibility is perceived to be higher for a credentialed health institution than for a patient, experiential information from a patient can have a powerful effect on attitudes and self-efficacy towards health behaviors (Neubaum & Kramer, 2014). Specifically, reading a blog about an individual's HIV experience correlates with more positive attitudes and increased self-efficacy towards HIV-preventive health behaviors than

exposure to the same information presented in a more impersonal, institutional health website format. This research into the compelling and persuasive nature of personal stories is derived from theories of social identity and self-categorization (Tajfel & Turner, 1986; Turner, 1991), as well as theory of exemplars, which suggests that the personal character of an exemplar's story could have a significant effect on persuasion and adoptions of health behaviors (Zillman, 2006). While exemplification theory focuses more on use of exemplars in media and their effects (see, e.g., the review of research in Zillman & Brosius, 2000), exemplar theory is useful in this context in that it suggests that the personal experience of an individual exemplar may be particularly impactful on other information seekers who share the same health concerns, even if this information lacks traditional credentialed credibility cues.

This proposition is additionally supported by meta-analytic work in source credibility research, which indicates that health information created by laypeople can be perceived to be credible in certain contexts, such as online discussion forums (Ma & Atkin, 2016). However, an individual with personal health experience need not only be an exemplar in order to influence others. Findings from research on the role of perceptions of similarity and shared identity between Internet users also suggest that experiential information from other patients may influence individuals with a shared health concern to the same extent as, or perhaps more than, information from more credentialed sources. These findings are supported by theories of social identity and self-categorization, which suggest that perceptions of shared group membership and similarity can have a powerful influence on attitudes and behavior (Tajfel & Turner, 1986; Turner,

1991). Specifically, these theories pose that the identity of an individual is dependent upon group identification and that individuals frequently act based on this perceived shared group identity (Tajfel & Turner, 1986; Turner, 1991).

Thus, people may be more likely to positively evaluate online health information when they perceive a sense of belonging with other discussion community members, identify with these other experiential sources, and perceive similarity between themselves and these sources of personal health information. At the same time, experiential sources such as patients may also possess their own personal expertise. While patients do not possess the same expertise as traditional credentialed sources (e.g., physicians), patients do possess their own unique expertise in experiences common to their disease or ailment (Eysenbach, 2008; Eysenbach et al., 2002; Flanagin & Metzger, 2013; Pure et al., 2013). Indeed, in the contexts of coping with regular health concerns, emotional support, and dealing with a minor ailment, non-professionals such as fellow patients, friends, or family are generally found to be more helpful than a credentialed source like a doctor or nurse (Pew Research Center, 2011). In the focal context of the present studies (breast cancer), it is possible that information from both professionals and experiential sources could be judged positively, though for different reasons.

Research in online health information seeking and evaluation supports the desire for patient-generated information, as findings indicate that people are more likely to seek out, positively evaluate, and select information from people who share similar health concerns or experiences, even if they are strangers (Sillence et al., 2007). Research has additionally demonstrated that perceived source similarity positively predicts credibility

judgments of online information across different domains or topics (i.e., this relationship is consistent in different domains), including health information (Flanagin, Hocevar, & Samahito, 2013; Wang, Walther, Pingree, & Hawkins, 2008). Perceived similarity between an individual and health spokesperson significantly predicts both expertise and trustworthiness afforded to that person, and these dimensions of credibility in turn predict health self-efficacy in the information receiver (Phua, 2014). Finally, identification with a message source can mediate the effect of source credibility on attitudes, such that people react more positively to information delivered via social media when they identify with the information source (Stephens, Goins, & Dailey, 2014).

Taken together, these findings suggest that individuals may at times positively judge experiential information, and experiential health information can be found credible depending on context and individual evaluator differences. As Wilson (1984) notes when discussing cognitive authority, an individual's world view or frame of reference will impact his or her behavior (e.g., information seeking), and thinking (e.g., information evaluation or processing). As explored in Study 1 and suggested by the selective threat processing framework of online health information (Figure 1), both personality characteristics that help guide an individual's reactions to threat, and online social endorsements from others, may affect perceptions of and selection of online health information. The research summarized above additionally suggests that under certain conditions, experiential health information may be evaluated favorably, even in comparison to credentialed information. However, while it would be a fallacy to expect that experiential sources are never viewed as experts, credentialed sources have

historically been privileged sources particularly in the domain of health and medical information.

Endorsements may layer additional community and social influence cues onto existing source cue information, again influencing health information seekers' responses. Research has begun to examine this interaction between source type and endorsement in the online context, and findings are intriguing, but complex. For example, health-related tweets from a credentialed source (e.g., a physician) with many followers are perceived to be more credible than those from a layperson who has many followers (Lee & Sundar, 2013). However, retweets show a different pattern; retweeted health information from a credentialed source is perceived to be less credible than a layperson's retweet. Similarly, endorsement levels have been found to influence perceptions of a credentialed source's expertise, but not a layperson's (Lee & Sundar, 2013).

Additional research indicates that negative comments about health information from an individual's online network can significantly decrease credibility perceptions of that information (Gao, Tian, & Tu, 2015), suggesting that there is a link between endorsement of health information and evaluations of that information, with negative commentary negatively impacting perceptions. This suggests that perhaps Lee and Sundar's (2013) findings were an effect of the generally low quality of the primary tweeted message: "The tongue patch diet—having a patch applied to your tongue helps weight loss by making it painful to eat solid foods" (p. 522-524). The authors argue that when there is a misalignment between cues – e.g., a layperson (low credibility source cue) with many followers (higher credibility cue)—credibility perceptions are negatively

impacted. This would suggest that when a post from a physician about health has few endorsements from Internet users, credibility should be lower – perhaps even lower than an experiential source with more endorsements, although the relative weight of the source cue (experiential/credentialed) versus the community cue (endorsement) is as yet unknown. By examining effects of both of these cues, this study will help shed light on whether one or both of these cues are privileged when evaluating online health information.

Overall, these studies suggest that endorsement levels affect perceptions of a credentialed source's credibility but not a layperson's (Lee & Sundar, 2013), and those that suggest that endorsement positively influences credibility and lack thereof negatively impacts credibility (e.g., Gao et al., 2015) of posts by Internet users more generally (e.g., Flanagin & Metzger, 2013). Due to these findings, it is expected that endorsement levels should matter to information evaluators, particularly when paired with a lower credibility source cue (i.e., an experiential source). Thus, the eighth hypothesis is posed:

> H8: Source type (credentialed, experiential) and endorsement (high, low) will interact such that people will evaluate high endorsement credentialed health information as more credible than low endorsement experiential health information.

Perceptions of credibility have traditionally been posed to mirror linked, but conceptually separate, components of information evaluation such as helpfulness and utility, in that individuals are likely to find information more helpful or useful if it is also more credible. However, when health information is provided by an experiential source,

it is possible that it could be very helpful to another Internet user concerned about the same health issue, even if the information lacks traditional cues of credentialed expertise. How Internet users perceive the helpfulness of health information can have significant behavioral effects. For example, the helpfulness of information can influence decision-making about treatment options among cancer patients (Bruera et al., 2003; Gaston & Mitchell, 2005). Helpfulness also predicts desire to use physicians, pharmacists, and other health care providers as sources of information (Huston, Jackowski, & Kirking, 2009).

Most of the research about online endorsements like helpfulness ratings has been in the domain of e-commerce; particularly studies that examine what factors influence product review helpfulness ratings. For example, findings suggest that valence, length, readability, and subjectivity of a review can influence helpfulness ratings (Ghose & Ipeirotis, 2011; Pan & Zhang, 2011). Reviews with extreme opinions (either positive or negative) tend to be rated as more helpful than those with more neutral opinions (Cao, Duan, & Gan, 2011). Additionally, reviews with content that express anxiety have been found to be more helpful than those that express anger (Yin, Bond, & Zhang, 2014). This suggests that elements such as valence or emotion in experiential information can influence how helpful that information is perceived to be.

Vigilance-avoidance may also guide responses to emotional or other threatening cues in a health message, as described in the first study. As discussed, people who are more avoidant are likely to exhibit bias in information processing such that they pay less attention to, selectively interpret, and selectively recall threatening information

(Derakshan et al., 2007; Holzman & Gardner, 1960). Further, avoiders are specifically likely to become defensive when faced with threats that are self-relevant and threatening to their physical or psychological well-being. Theoretically, people who are more vigilant will intensively thoroughly process threatening information, whereas cognitive avoiders will attempt to avoid or otherwise protect themselves from fully processing threatening stimuli (Krohne, 1993; Krohne et al., 2000).

Because avoiders are more likely to interpret information in a biased manner, they may find threatening health information from credentialed sources to be less helpful, even if it is more credible, than the same information from experiential sources. Because doctors are ascribed authority and credibility via their credentials, discounting threatening information from these sources as noncredible may be more challenging than it would be for experiential sources. However, avoidant individuals could perceive this information to be less helpful, as one form of biased processing and evaluation to suit their desire to discount or selectively interpret the threatening information. Experiential sources, on the other hand, might be dismissed as both unhelpful and lacking in credibility, as posed here:

> H9a and H9b: Source type (credentialed, experiential), and an individual's level of vigilance-avoidance will interact to influence perceptions of (a) credibility and (b) helpfulness such that people who are more avoidant (and less vigilant) will rate threatening health information from credentialed sources to be more credible, but less helpful, than the same information from experiential sources.

Because information from experiential sources may be perceived to be more helpful, even if less credible, than information from credentialed sources, the effect of source type on information selection seems unclear. On one hand, people may respond to heuristic cues of credentials (e.g., an "MD" title) and select information from traditionally credentialed sources over experiential sources. On the other hand, people may be driven to seek health information from experiential sources who have personal experience as patients that is likely more relatable to the information seeker.

However, classic credibility theory may shed light on whether experiential or credentialed information will be privileged in information selection, with the caveat that the importance of credentialed and experiential cues may vary by domain (e.g., news information versus health information). Overall, people are more likely to selectively expose themselves to higher credibility sources of online information (Johnson & Kaye, 2013; Metzger et al., 2015), as discussed in the foundations of the first study. Classic conceptualizations of expertise focus on competence, skills, and qualification as well as experience (Berlo, Lemert, & Mertz, 1969; McCroskey & Young, 1981; Whitehead, 1968), and credentialed sources are more likely to be rated higher on these dimensions than experiential sources would be. This suggests that selective exposure may be higher for credentialed sources, as indicated in the tenth hypothesis:

> H10: Source type will influence selective exposure, such that individuals will be more likely to selectively expose themselves to online health information from credentialed sources than from experiential sources.

As noted previously, the helpfulness of a health information source (e.g., a physician or health care provider) predicts a desire to use that source again (Huston et al., 2009), suggesting that helpfulness may additionally mediate the relationship between source cues, such as source type, and selective exposure. Indeed, people are unlikely to desire to expose themselves to health information they find unhelpful, as is suggested by the following hypothesis:

> H11: Helpfulness ratings will mediate the relationship between source type and selective exposure. Source type will influence helpfulness ratings (with individuals rating experiential information as more helpful than credentialed information) and higher helpfulness ratings will in turn lead to higher selective exposure.

Research has provided somewhat conflicting information about the interaction between source type and endorsement on credibility in the health context (e.g., Lee & Sundar, 2013). However, endorsement serves as a cue of community opinions and is an important heuristic, as discussed in the first study. This community cue has the potential to add to the effects of source cues, such as source type, and enhance its effects on selective exposure when source and community cues are aligned (i.e., a highly endorsed physician – see Lee & Sundar, 2013). As discussed and tested in the first study, people should be more likely to selectively expose themselves to information of higher endorsement levels. This, in combination with the prediction that information from credentialed sources will be selected over experiential sources (H10) suggests the following:

H12a: Endorsement and source type will interact to affect selective exposure such that people will be more likely to selectively expose themselves to online health information from highly endorsed credentialed sources than from low endorsement experiential sources.

However, even at low endorsement levels, vigilant individuals should still desire to selectively expose themselves to health information more than avoidant individuals, even if that information is threatening (as tested in the prior study). Some researchers have recently begun to examine the effect of vigilance-avoidance on selective exposure to health information. For example, Westerwick, Johnson, and Knobloch-Westerwick (2016) found that the perception that an individual has not currently reached his or her desired health status may drive the amount of time he or she spends looking at related health information (particularly when the individual desires health self-improvement), which then predicts attitudes about that health information. These results suggest that vigilant individuals, who are similarly desirous of information related to their health concerns, may seek out information regardless of whether the source is experiential or credentialed. In fact, despite theoretical reasons to expect differences in information selection based on source credibility, Westerwick et al. found no difference in this pattern in health information seeking between low and high credibility organizational sources (2016). While the focus of the present study is not on an organizational source, this research does suggest that other individual factors, such as vigilance-avoidance, may override source cues in the health context.

Other research has also found that while individuals tend to say that source credibility is important to their selection of health information, observation of information search behavior suggests that source credibility cues are sought relatively infrequently in the health context (Eysenbach & Kohler, 2002). Perhaps individual characteristics, such as vigilance-avoidance, drive health information search such that cues of source type and endorsement are weighed less, particularly when individuals are strongly driven to seek or avoid potentially threatening information. Thus, the final hypothesis is posed:

> H12b: An individual's level of vigilance-avoidance will moderate the interaction between source type (experiential, credentialed) and endorsement (high, low) to influence online health information selective exposure such that more vigilant individuals will be most likely to select health information that is provided by low endorsement experiential sources, whereas more avoidant individuals will be most likely to select health information from high endorsement credentialed sources.

Summary and Hypothesis Table

Together, this dissertation explores how vigilance-avoidance moderates the relationship between threat (Study 1), endorsement (Studies 1 and 2), and source type (Study 2) and outcomes relevant to the online information sharing environment, such as selective exposure (Studies 1 and 2), processing (i.e., perceptions of credibility, in Studies 1 and 2), and helpfulness ratings (Study 2). Table 1 provides a truncated version of each hypothesis.

Table 1

Studies 1 and 2 Hypotheses

Study 1 Hypotheses	**Study 2 Hypotheses**
H1a: Main effect of threat on selective exposure: more exposure for lower threat information	H8: Interaction between source type and endorsement on credibility: high endorsement credentialed more credible than low endorsement experiential information
H1b: Moderation of vigilance-avoidance on H1a main effect such that high threat information exposure lower for avoidant individuals	H9a-b: Interaction between source type and vigilance-avoidance on (a) credibility and (b) helpfulness such that avoiders rate information from credentialed sources to be more credible and less helpful than experiential information
H2: Main effect of endorsement on selective exposure: more exposure for highly endorsed information	H10: Main effect of source type on selective exposure: more exposure for credentialed sources than experiential
H3a: Threat and endorsement interaction on selective exposure: highest exposure for low threat/high endorsement information	H11: Helpfulness mediates the relationship between source type and selective exposure
H3b: Moderation of vigilance-avoidance on H3a interaction effect; H3a effect strongest for avoidant individuals	H12a: Interaction between source type and endorsement on selective exposure such that people select information from highly endorsed credentialed sources
H4a: Main effect of threat on credibility: high threat information is less credible than low threat	H12b: Moderation of vigilance-avoidance on the H12a interaction effect such that vigilants will be more likely to select low endorsement experiential information and avoiders will be more likely to high endorsement credentialed information
H4b: Moderation of vigilance-avoidance on H4a main effect such that H4a effect strongest for avoidant individuals	
H5: Main effect of endorsement on credibility; high endorsement information is more credible than low endorsement information	
H6a: Threat and endorsement interaction on credibility; credibility highest for low threat high endorsement information	
H6b: Moderation of vigilance-avoidance on H6a interaction effect such that difference in perceived credibility between low threat/high endorsement and high threat/low endorsement is largest for avoidant individuals	

Study 1 Hypotheses	Study 2 Hypotheses
H7a: The effect of threat on selective exposure is mediated by credibility	
H7b: The effect of endorsement on selective exposure is mediated by credibility	

Chapter V: Method

Study 1 examines the main effects of endorsement (high, low) and threat (high, low) on selective exposure and perceived credibility, along with interaction effects between these two categorical independent variables and the continuous independent variable, vigilance-avoidance, on both selective exposure and perceived credibility, and a three-way interaction on these dependent variables (H1a through H7b). Source type is held consistent in Study 1, with all health information in the stimuli provided by experiential sources who have personal experience with the focal health concern of breast cancer. Study 2 examines the main effects of endorsement (high, low) and source type (credentialed, experiential) on selective exposure, perceived credibility, and helpfulness ratings, as well as interaction effects between these categorical independent variables and the continuous independent variable, vigilance-avoidance, on the dependent variables, and a three-way interaction (H8 through H12b).

Both studies take the form of an online health information sharing community; the first study focuses on selection and evaluation of patient-generated health information via a discussion forum, and the second study on physician- and patient-generated information via a Q&A page. In both studies, participants are allowed to choose a headline (of varying threat in Study 1, varying source type in Study 2, and varying endorsement in both studies) that leads them to a discussion or Q&A page with characteristics of the same condition of the headline they chose.

Study 1 Method

As discussed in the literature review, problems and limitations with current measures of vigilance-avoidance and related constructs necessitate development of a new measure of vigilance-avoidance before the hypotheses of Study 1 can be tested. Additionally, high and low threat experimental treatment options, as well as perceptions of high and low endorsement levels, were pretested before the main Study 1 was conducted. Information about the vigilance-avoidance scale development, as well as these pretests, is in the measures section.

Study 1 Participants

Some of the most active health-related online discussion board participants are women with breast cancer (Blank et al., 2010; Gooden & Winefield, 2007; Rodgers & Chen, 2005; Winzelberg et al., 2003). However, breast cancer knowledge may vary significantly (with a potential influence on how threat is perceived) between people who have a general concern that they may someday get the disease versus those who have already been diagnosed, as well as by other characteristics, such as age. Because women who have already been diagnosed with breast cancer are often legally protected from research that might violate their private diagnostic information via health privacy regulations in the United States, adult women who may have a general concern about the possibility of developing breast cancer were targeted for this study.

While psychometric properties of vigilance-avoidance scales are not significantly different for men and women, there is some debate in the academic community as to whether women score slightly higher on vigilance and lower on avoidance than men (see,

e.g., Krohne et al., 2000; Weidner & Collins, 1993). This will be additionally tested during the vigilance-avoidance scale development, and those findings will be taken into consideration when interpreting results of both Study 1 and Study 2, which will only include a sample of women selecting and evaluating information on the topic of breast cancer. Thus, while the main studies use a sample of adult women, the measurement pre-test will use a sample of both adult men and women from MTurk. More information about the measurement study is in the following Chapter on pretesting.

Because questions of how female Internet users evaluate breast cancer information they find online can best be addressed by a sample of female adult Internet users (18 years of age and older) who use online health information sharing resources such as discussion boards, this age group of women was targeted as the population of interest. While breast cancer diagnosis at a young age is unlikely, younger women may still be concerned enough about the possibility of developing breast cancer later in life to be threatened by information about breast cancer. Rates of diagnosis are highest in women over 70, and the median age of breast cancer diagnosis is 61, suggesting that even women who have not yet experienced breast cancer symptoms may also be concerned about the possibility of breast cancer in their future (American Cancer Society, 2016). North American female Internet users were targeted in order to limit any cultural differences in assessment of breast cancer information.

One significant benefit of sampling online is that the Internet often affords access to a sample that is more representative of the general population than the more frequently used offline pool of undergraduate students (Mintz, Redd, & Vedlitz; 2006; Reips, 2002;

Skitka & Sargis, 2006). Amazon.com's "Mechanical Turk" (MTurk) is an Internet platform that allows for the recruitment of Internet-using adults to perform paid tasks. Research suggests that participants recruited via this tool can be a valid sample for studies that require adult Internet users (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011; Goodman, Cryder, & Cheema, 2012). Further, Mechanical Turk respondents are slightly more representative of the US population than most convenience samples, such as those comprised of college students (Berinsky et al., 2012; Buhrmester et al., 2011), although they do tend to be slightly younger and more liberal than the US population (Berinsky et al., 2012; Buhrmester et al., 2011; Skitka & Sargis, 2006). MTurk has also been used successfully for clinical health research (Shapiro, Chandler, & Mueller, 2013). Thus, MTurk was used for participant recruitment for all pretests and studies in this project.[2]

Study 1 Design and Experimental Treatment

Study 1 employed two different experimental design components: first, a threat priming phase, followed by free selective exposure. One third of the participants were part of the "free selective exposure" design, where subjects were freely allowed to choose between headlines that link to discussion threads about breast cancer, which are varied in a 2x2 (endorsement level x threat level) within-subjects factorial design, with the continuous independent variable of vigilance-avoidance. Source type was held constant in Study 1; all stimuli in the first study appeared to be posted by experiential sources. The other two thirds of the subjects participated in the same design, but with an added prime. With this design, subjects were randomly assigned to first view a priming post about

breast cancer of either high (one third of subjects) or low threat (the other third). Examples of the priming posts are available in Appendix C.

After that, all participants proceeded with the free selective exposure 2x2 within-subjects design, with vigilance-avoidance as a continuous moderator. Endorsement level of the headline was varied (high, low), as was the level of threat (high, low), based on pretest results discussed in the next Chapter. Depending on the headline chosen, participants were then taken to a discussion thread of either high or low threat, again based on pretest results. Dependent variables were perceived credibility of the information and selective exposure. The study also measured issue involvement as a potential control variable, because the personal relevance of breast cancer to respondents is expected to vary widely and may influence their interest in the issue (i.e., selective exposure) as well as perceptions of credibility (i.e., issue involvement can impact message evaluation, as posited by both the HSM and ELM; Liberman & Chaiken, 1992; Petty & Cacioppo, 1986; Petty et al., 1981). Finally, demographic information (age and education) was collected for sample description purposes. As discussed, both the HSM and ELM suggest that issue involvement (personal relevance) can impact information evaluation (Liberman & Chaiken, 1992; Petty & Cacioppo, 1986; Petty et al., 1981). Because personal relevance of breast cancer may vary widely in an adult female sample, issue involvement was measured as a potential control.

Participants were informed that they were reviewing discussion posts from a (fictitious) women's health discussion website, womenshealthcommunity.org, which was being redeveloped in order to improve the quality of the information and experience

offered to the women it serves. In case participants attempted to visit the fictional site, the researcher purchased the site URL and put up a splash page (with the same graphic design elements as the study discussion threads) including a message that Women's Health Community.org was being updated and an improved version was coming soon. Then, participants in the high and low threat prime conditions were presented with the prime, which was a breast cancer discussion post of high or low threat depending on the condition. They were presented with directions to read the prime post and answer questions about it, which included the manipulation check items for the threat manipulation and distractor items about design and layout. The directions also included brief information about breast cancer (the threat of which was emphasized in the high threat condition directions), as well as other benign conditions (such as cysts and fibrosis, the relatively common and benign nature of which were emphasized more in the low threat condition directions).

Next, all participants were presented with additional directions indicating that they should imagine that they have found a lump in their breast and are concerned about the possibility of cancer. The directions again included brief information about breast cancer as well as other benign conditions (such as cysts and fibrosis) that can cause breast lumps. This was to ensure that women who are unfamiliar with these conditions still understood the relative higher or lower threat nature of the posts they would read on the next page. Then, participants were asked to select one of four discussion thread headlines to read more.

Below the directions, the stimulus of four discussion thread headlines was apparent, each with varied threat and endorsement (low/high threat x low/high endorsement). For example, "26% of womenshealthcommunity.org users recommend: Women from our community tell happy-ending stories – a good reminder that not every breast abnormality means breast cancer!" (low endorsement, low threat), or "73% of womenshealthcommunity.org members recommend: 'I thought I had my whole life ahead of me' – women describe the emotional shock of an advanced breast cancer diagnosis" (high endorsement, high threat). A pretest was conducted to determine the specific endorsement numbers and high or low threat stimuli (both headlines and threads), as outlined in the measures section and pretest chapter. An image of the headlines as they appeared to participants is available in Appendix C. Headlines were presented in a random order (but still within an image of a "web page" used consistently throughout the study) to each participant to eliminate order effects.

Directions prompted the participant to click on one of the headlines to read the related discussion thread, and this constituted the within-subjects selective exposure to one of the four possible conditions. After selecting one of the headlines, participants were taken to a discussion thread in the same condition. The discussion thread and the page on which it appears were modeled after the discussion forums and individual threads and posts on breastcancer.org. Breastcancer.org has one of the most active discussion board communities on the web, with over 171,800 members and approximately 200 posts per day (breastcancer.org, 2016).

The question that the forum posts are written in answer to was displayed at the top, with the rest of the thread displayed below. The general topic of personal stories about breast cancer was chosen for all threads because a similar topic is popular on breastcancer.org, and this topic allowed the researcher to consistently vary threat level in different stimuli stories. Limited information identifying a source (e.g., as someone who has experienced breast cancer testing) was apparent in each post in the thread. Additionally, the date and time of the post and the screen name of the source were listed above the post, as is common in most health discussion boards. The main question that the posts are in answer to was neutral in terms of threat, and posted by the forum moderators. The question and responses were modeled from real questions and answers on breastcancer.org discussion boards to increase ecological validity.

The page was a static image of a webpage built by the researcher using a variety of design programs, including GoCentral and Fotor. Using images of web pages rather than a full website allowed the experiment to be administered online using Qualtrics. Administering the experiment by this method allowed the researcher to reach the population of interest without having to bring them into a lab. Participants were able to read the posts at their leisure, and the amount of time they spent reading was recorded by Qualtrics as part of the selective exposure measure.

The stimulus thread posts about breast cancer were written as the personal opinion based on the health experience of non-credentialed (experiential) sources, describing their experience finding a lump and being diagnosed with more advanced breast cancer in the high threat condition, or a benign condition of fibrosis/cysts in the low threat condition.

Threat was manipulated within the text of each post in the thread by using threat cues such as fear of how the diagnosis will affect family and life, or how breast cancer can happen even to people who live a healthy lifestyle and think it will never happen to them. For examples of low and high threat messages, as well as the experimental treatment page viewed by participants, see Appendix C. Threat level was manipulated by changing as few words as possible between the two conditions while still retaining believable experiential stories (e.g., a lump in the breast that turned out to be advanced cancer, versus a lump in the breast that turned out to be a benign cyst).

Study 1 Procedure

Participants were recruited to the online experiment via Mechanical Turk as discussed above. They then completed an initial questionnaire that measured vigilance-avoidance, issue involvement, and demographics (gender, age, and highest completed education level). Approximately 2-5 days later, participants were contacted again to complete the main study. This time between the initial questionnaire and main study was provided so that answering items about vigilance-avoidance did not artificially impact subjects' responses to the stimuli (see, e.g., testing as a threat to internal validity in Shadish, Cook, & Campbell, 2002).

59.92% of the people who completed the initial questionnaire completed the main study. This number was likely lower than desired because in order to know they were eligible for the main study, participants would need to both receive and check email from Mechanical Turk, as due to worker privacy protections there was no way for the researcher to contact participants directly. Participants were paid $0.20 for the initial

questionnaire and $0.30 for the main study; both the questionnaire and the study took approximately 10-15 minutes to complete.

After entering the main study, participants were randomly assigned to experimental conditions. One third of participants were assigned to the no prime, free choice selective exposure condition, where they were able to select from among four breast cancer discussion thread headlines (high/low threat x high/low endorsement) as discussed previously. The rest of the participants were randomly assigned to either a high (one third of participants) or low (the final third of participants) threat prime condition. After the prime, they saw the same options as the subjects who did not see a prime. A priming stage was included to ensure that some participants saw high threat stimuli. Because prior research had suggested that individuals would prefer to avoid threatening stimuli, the prime was included so that some subjects would experience a high threat stimulus, even if most or all participants chose (during the free selective exposure stage) low threat discussion headlines and threads.[3]

Manipulation of the threat and endorsement level of the selective exposure dependent variable occurred via the text of (1) a headline and (2) a corresponding discussion thread as detailed previously in the design and experimental treatment section, such that both the headline and the discussion thread reflected the same condition. Each thread was composed of six posts, and all threads were approximately the same length in each condition. After reading the thread, participants were asked to answer a series of questions in a randomized order, ostensibly for the purposes of providing feedback to website creators. These included measures of perceived credibility of the thread, intention

for future selective exposure, and manipulation checks for threat and endorsement, as well as distractor items about webpage design. After completing the experiment, participants received a debriefing form, which provided them with information about the nature of the experimental deception, the option to have their data removed from the study, as well as resources about breast cancer for anyone who felt concerned about breast cancer after participating in the study.[4]

Study 1 Measures

All measures are listed in full in Appendix B.

Dependent variables.

Selective exposure. Respondents were able to choose among four different headlines: high threat/high endorsement, high threat/low endorsement, low threat/high endorsement, and low threat/low endorsement. Which headline they selected was the first within-subjects measure of selective exposure. Then, the amount of time participants spent reading the discussion thread they were directed to based on that choice was measured in seconds. Finally, behavioral intention for future selective exposure was measured by asking three questions measured on a 1-7 scale where 1 = "very unlikely" and 7 = "very likely" ($\alpha = .92$) (adapted from Metzger et al., 2015). A sample item is: "Based on this thread, how likely are you to want to use this website in the future?"

Perceived credibility. Perceived credibility of the thread was measured with six items used in Flanagin, Hocevar, and Samahito (2013). However, one of the six items, measuring bias, significantly lowered the Cronbach's alpha level of the scale, likely because personal health information is one context in which information can be credible

but also biased. Thus, this item was removed from the credibility scale before items were averaged. All items were measured on a 7-point scale, and respondents were asked to recall the information in the entire discussion thread when evaluating credibility. Sample items from the final scale include: "Overall, how believable did you find the information to be?" and "Overall, how much did you trust the information?" Items were averaged to create the measure, and the Cronbach's alpha of the final measure was .92.

Moderators, control variables, and manipulation check scales.

Vigilance-avoidance. The personality characteristics of vigilance-avoidance were measured by a scale developed by the researcher as outlined in the scale development section, detailed in the pretesting section in the next chapter. Vigilance-avoidance was measured by 10 items reflecting an individual's responses to two threatening scenarios: one about illness and the other about a turbulent plane flight. Items, measured on a 1-7 scale (where 1 = very unlikely and 7 = very likely), assess how likely respondents are to be more vigilant (e.g., "Find out as much as you can about the situation" and avoidant e.g., "Become involved in other activities to keep your mind off of the problem") in those situations. Avoidant responses are reverse-coded, and all items are averaged across both scenarios, so that higher scores reflect more vigilant individuals and lower scores reflect more avoidant individuals ($\alpha = .88$), to reflect the continuum (from repression to sensitization) theorized by Byrne (1961).

Issue involvement. Issue involvement was measured using a modified version of the measure of AIDS issue involvement developed by Flora and Maibach (1990), with additional items derived from qualitative research on issue involvement (Aldoory, 2001).

The items were measured on a 7-point scale, ranging from "strongly disagree" to "strongly agree." Sample items include, "I think about breast cancer a great deal," and "I am affected by breast cancer." Items were averaged to create the issue involvement measure ($\alpha = .87$).

Demographics. Respondents were asked to indicate their age, gender (so that any men who were able to enter the study despite the gender restrictions could be removed from analysis) and highest achieved degree.

Manipulation checks. Perceived threat (of both the priming posts and the discussion threads) was assessed via a manipulation check, which consisted of six items derived from theory about threat and perceptual correlates of threat. Sample items include, "How distressing was the [post/thread]? and "How threatening was the [post/thread]? Items were averaged to create the perceived threat scale that served as the manipulation check ($\alpha = .85$ for the prime, $\alpha = .90$ for the thread). Endorsement was assessed by one item asking participants to recall whether they perceived the percentage of recommendations of the headline they clicked on to be "high," "low," or "I don't remember." Because this manipulation check was conducted towards the end of the experiment, participants were given the option to indicate that they did not remember due to the time that had passed.

Study 2 Method

The second study used substantially similar methods to the first study, including a similar sample and procedure. All differences between the two studies (e.g., different independent variables, manipulations, and dependent variables) are noted below.

Study 2 Participants

As in the first study, a sample of adult, female, North American Internet users (18 years of age and older) was recruited using Mechanical Turk. The researcher used MTurk's tracking capabilities to ensure that no subjects completed this study if they completed any of the pretests or Study 1.

Study 2 Design and Experimental Treatment

Like Study 1, participants answered the questionnaire items to measure covariates and control variables approximately 2-5 days before the main study. After entering the main study, one third of the participants proceeded directly to the "free selective exposure" design, where subjects were freely allowed to choose between headlines linked to discussion threads about breast cancer that were varied in a 2x2 (endorsement level x credentialed/experiential source type) within-subjects factorial design, with the continuous independent variable of vigilance-avoidance. The other two thirds of the subjects participated in the same design, but with an added prime for source type. Because subsequent online selection behavior may be influenced by what was seen previously, participants in the priming stage saw either a post from a credentialed or experiential source, to explore if that would influence their subsequent selection (in terms of source type) of a headline.

With this design, subjects were randomly assigned to first view a priming post about breast cancer of either experiential or credentialed source type. Then, they proceeded with the free selective exposure 2x2 within-subjects design, with vigilance-avoidance as a continuous moderator. Endorsement level (high, low) and source type

(credentialed, experiential) were varied based on pretest results. Other dependent variables measured were perceived credibility of the information, selective exposure, and helpfulness ratings. The study also measured issue involvement as a potential control variable, as well as the same demographics as Study 1.

The stimulus headlines indicated both endorsement levels and source type (e.g., "70% of womenshealthcommunity.org members recommend: Stories from the breast care center – women with breast cancer discuss their true experiences with diagnostic tests and common treatments" for high endorsement and the experiential source type). Headlines were presented in a random order (but still within an image of a "web page" used consistently throughout the study) to each participant to limit order effects. After selecting one of the headlines, participants were taken to a page of relevant Q&A posts based on the endorsement and source type condition they chose. The stimulus thread posts about breast cancer in the experiential condition were written as the personal health experience of non-credentialed sources, describing their experience with breast cancer diagnosis, treatment, or other experiences relevant to breast cancer (e.g., ultrasound, chemotherapy), in answer to a question from another community member. In the credentialed condition, credentialed sources (physicians who are breast cancer specialists) answered the same questions from the perspective of a medical professional. For examples of the formatting of the headlines as viewed by participants and the text of these Q&A post conditions, see Appendix C.

Study 2 Procedure

Participants were recruited to the online experiment via Mechanical Turk as discussed in Study 1, and again answered questions to measure the hypothesized moderator and controls (vigilance-avoidance and the same possible controls measured in Study 1) 2-5 days in advance of completing the main study. As in Study 1, participants were informed that they would be answering questions to give feedback to creators of womenshealthcommunity.org, a (fictitious) women's health information and discussion website that was being redeveloped to improve the quality of the information and experience offered to the community of women it serves. 57.16% of the total participants who took the pre-questionnaire also completed the main study. Again, this number was lower than desired likely due to the constraints of following up with Mechanical Turk participants to include them in the main study. As in Study 1, participants were paid $0.20 for the initial questionnaire and $0.30 for the main study; both the questionnaire and the study took approximately 10-15 minutes to complete.

Participants were randomly assigned to experimental conditions. One third of the participants were assigned to the no prime, free choice selective exposure condition, where they were able to select from among four breast cancer discussion thread headlines (experiential/credentialed source type x high/low endorsement). The other two thirds were randomly assigned to either the experiential or credentialed source type prime condition (one third each). After the prime, they saw the same options as the subjects who did not see a prime, and like those subjects were allowed to choose one of the four

headlines. From that point, all participants moved through the rest of the experiment together.

Manipulation of the source type of the selective exposure dependent variable occurred in the text of (1) a headline and (2) a corresponding discussion Q&A thread as detailed previously in the design and experimental treatment section. Additionally, endorsement levels (high or low) were indicated in the headline based on levels that were determined to be high or low during pretests. Each thread was composed of five Q&A posts, such that all threads were approximately the same length in each condition. The questions that the posts were written in answer to were consistent in each condition, and the posts themselves were as similar as possible across conditions, with only enough text being manipulated between conditions as necessary to indicate differences in source type.

After reading the thread, participants were asked to answer a series of questions in a randomized order, ostensibly for the purposes of providing feedback to website creators. First, participants were asked to indicate how helpful the thread was to them via a star ratings system, where they could assign anywhere from one to five stars (where one star = "not helpful at all," and five stars = "very helpful"; half stars could also be assigned) as a measure of the helpfulness dependent variable. Stars were used given their relative neutrality and the complex topic participants were evaluating (i.e., "liking" or giving a "thumbs up" to personal health information may seem inappropriate to some participants, even if they found the information helpful). Then participants were asked questions in a randomized order to measure perceived credibility of the thread, intention for future selective exposure, and manipulation checks. After completing the experiment,

participants received the same debriefing information as in the first study, including information about deception, breast cancer resources, and the option to ask the researcher to delete their data.

Study 2 Measures

All measures are listed in full in Appendix B.

Dependent variables.

Selective exposure. The same selective exposure measures were used as in Study 1. The Cronbach's alpha for the selective exposure scale in the Study 2 sample was .90.

Perceived credibility. The same perceived credibility measure was used from Study 1. The Cronbach's alpha for the selective exposure scale in the Study 2 sample was .92. As in Study 1, the bias item did not test as reliable with the other items, so the scale was created from the average of the other five items.

Helpfulness. Participants were presented with a star ratings system for the discussion thread about breast cancer, where one star indicated "not helpful at all" and five stars indicated "very helpful." They were asked to use this star scale to indicate how helpful they thought the thread was overall, including half stars (e.g., they could assign three and a half stars).

Perceived bias. As in the first study, the item measuring how biased participants perceived the information to be was administered as part of the credibility scale but did not load with the other credibility items. Thus, as part of post-hoc analyses, it was used on its own. The item, measured on a 1-7 scale, was: "Overall, how biased do you think the information was?"

Moderators, control variables, and manipulation checks. All of the same moderators and control variables from Study 1 were used in Study 2, and measured in the same manner as described in Study 1. The vigilance-avoidance Cronbach's alpha for the Study 2 sample was .90, and the issue involvement alpha was .88.

Manipulation checks. To ensure that participants were able to correctly differentiate between experiential and credentialed sources for the stimuli for Study 2, for each potential stimulus viewed, participants were asked, "Was the information you saw from (a) a patient who had personally experienced the health concern or treatment, or (b) from a healthcare practitioner (for example, a doctor or nurse)?" Endorsement was assessed by one item asking participants to recall whether they perceived the percentage of recommendations of the headline they clicked on to be "high," "low," or "I don't remember." Because this manipulation check was conducted towards the end of the experiment, participants were given the option to indicate that they did not remember due to the time that had passed.

Chapter VI: Pretests

Vigilance-Avoidance Scale Development

First, a pool of potential items was developed based on review of theory and literature, as well as related scales, such as the Mainz coping inventory, which measures vigilance-avoidance (Krohne et al., 2001), and the multidimensional coping scale, which measures repression-sensitization (Cook, 1985). Additionally, items measuring trait anxiety (e.g., from Taylor, 1953) were tested to ensure that vigilance-avoidance correlates with but is still distinct from trait anxiety, which is a potential problem with measures of repression-sensitization as highlighted by prior research (Cook, 1985; Eysenck, et al., 1987, Golin et al., 1967).

Measures.

Trait Anxiety. Trait anxiety was measured by a slightly modified version of the Taylor (1953) scale, which asks respondents how true a series of 23 statements are for them on a 7-point scale. Sample items include, "I often find myself worrying about something" and "I feel anxious about something or someone almost all of the time." All items were averaged to create the final measure ($\alpha = .95$).

Vigilance-Avoidance. The personality characteristic of vigilance-avoidance was measured by an original scale developed by the researcher based on similar scales such as Cook's (1985) repression-sensitization scale. As part of the pretest, five threatening situations were tested. For each situation, subjects responded to 10 items reflecting his or her likelihood of responding in a certain way to those scenarios. These items were measured on a 1-7 scale, where 1 = "very unlikely" and 7 = "very likely," and assess how

likely respondents are to be more vigilant (e.g., "Find out as much as you can about the situation" and avoidant (e.g., "Become involved in other activities to keep your mind off of the problem") in those different threatening contexts. Avoidant responses were reverse-coded so that higher scores on the scale indicate more vigilance/less avoidance, and all items were averaged across individual scenarios as part of the pretests. Cronbach's alpha levels for each scenario were all good, ranging between .84 and .87. As individual scenarios were combined into larger scales by averaging, alpha levels increased.

Scale development procedure and results. In order to recruit a group of adults who range widely in their level of vigilance-avoidance, the online tool Mechanical Turk was used to recruit both male and female participants. While the main studies in this project focused on women and breast cancer, the scale development used participants of both genders in order to determine whether there are any significant gender or other demographic differences in vigilance-avoidance. 92 participants were recruited and responded to the questionnaire.

Once recruited to the study, participants were presented with a number scenarios and related items to measure vigilance-avoidance, as well as anxiety. The items measuring vigilance-avoidance were developed by the researcher based primarily on Cook's (1985) repression-sensitization scale, as well as Krohne et al.'s (2001) vigilance-avoidance scale. Participants were asked to respond to each item honestly, and all items were presented to respondents in a randomized order.

Psychometric theory suggests that scale validation should include correlational analysis to determine the relationship between the new measure and measures of related constructs, as well as exploratory and confirmatory factor analysis to examine the latent structure of the measure and any underlying relationships between factors (Messick, 1995; Raykov & Marcoulides, 2011). Thus, an exploratory factor analysis (EFA) with oblique rotation was conducted using Mplus to determine the factor structure of the items in each scenario. All scenario text and the full list of response items for each scenario are included in Appendix B. More scenarios than necessary were tested so that some could be dropped if the analysis suggested they were not a good fit. Oblique rotation was used instead of orthogonal rotation because factors were expected to intercorrelate, which is generally a more realistic representation of the interrelationships between factors than the assumption that they are uncorrelated (Brown, 2006). Goodness of fit statistics, factor loadings, and a scree plot were examined before follow-up confirmatory factor analyses (CFAs) were run.

CFA has a number of advantages over EFA, including the ability to model correlated measurement error (EFA assumes that measurement error is random) and the ability to adjust for that error (Brown, 2006). As the potential for correlated error is to be expected, the ability to estimate the relationships among variables while adjusting for measurement error will likely lead to a more stable overall model. All EFAs suggested that items fell into two groups: one represented by a latent variable that was more avoidant, and another that was more vigilant. Thus, CFAs with two predicted factors of (a) items indicating more vigilance and (b) items indicating more avoidance were run

using Mplus with a maximum likelihood estimator to confirm the final items for each scenario and assess their loadings and fit statistics.

Goodness-of-fit statistics presented in Table 2 indicate that each model (which represents responses to a single scenario) is an adequate fit. While some of the fit statistics suggest a good model fit and others suggest only a marginal model fit, researchers suggest these statistics should be examined in combination rather than individually (Brown, 2006). RMSEA suggests a marginal model fit, as some of the RMSEA values are greater than the cutoff of 0.08. However, CFI and TLI suggest either an acceptable (.90-.94) or good (.95 and above) model fit. Additionally, SRMR is below the cutoff of .08 for all models (Brown, 2006; Fabrigar et al., 1999; Hu & Bentler, 1999), again suggesting good model fit. Finally, while the significant chi-square tests do not indicate good model fit, the test has been criticized by some as overly stringent (see reviews in Brown, 2006 and Hu & Bentler, 1999).

Table 2

Fit Statistics of the CFA Models of Vigilance-Avoidance Items by Scenario

Model	χ^2	*df*	RMSEA (90% CI)	SRMR	CFI	TLI
Ill	56.05*	34	.08 [.04-.12]	.06	0.97	0.96
Fly	66.70***	34	.10 [.06-.13]	.06	0.95	0.94
Sick	79.13***	34	.12 [.08-.15]	.05	0.93	0.91
Baby	58.61**	34	.09 [.05-.12]	.06	0.96	0.94
Family	67.94***	34	.10 [.06-.13]	.05	0.94	0.92

Note. χ^2 = chi-square test of model fit; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean square error of approximation; SRMR = standardized root mean square residual.
*$p < .05$. ** $p < .01$. ***$p < .05$.

All confirmatory factor loadings for all models are reported in Appendix A. Factor loadings for all items in all models were adequately high (> .35; see Brown, 2006) and significant, and did not cross-load on other factors. The lowest factor loading was .58, and most loadings were above .70. Thus, from a factor analytic standpoint, all five scenarios would be strong options for the final vigilance-avoidance measure. Although vigilance- and avoidance-oriented items loaded on two separate factors, prior theoretical work has suggested that vigilance-avoidance and related constructs (e.g., repression-sensitization) are a continuum (Byrne, 1961). Thus, reliability testing was conducted to ensure that if vigilant and avoidant items were combined to create a continuum, the measure was still reliable.

First, avoidant items were reverse-coded, so higher scale points indicated more vigilance. Next, reliability of the vigilance-avoidance scales for each scenario was assessed via Cronbach's alpha. Alphas varied by scenario between .84 and .87,

suggesting sufficient reliability to proceed. Then, all items for each scenario were averaged, as were all items for the anxiety measure. Correlations were run between the individual vigilance-avoidance scenarios and the anxiety measure (Taylor, 1953) to ensure that correlations between the new vigilance-avoidance measure and anxiety are not so high such that they measure the same construct. The highest correlation between vigilance-avoidance and anxiety was $r = -.22$, which indicates that more trait anxiety significantly corresponds with less vigilance ($p < .05$), but was not high enough to be of concern that vigilance-avoidance and anxiety measure the same construct.

Finally, independent samples *t*-tests were run on the scaled version of each scenario to ensure that there were no significant differences in vigilance-avoidance levels between men and women. While none of the *t*-tests showed significant differences, the scenario with the highest *t*-value was the one pertaining to an unwanted pregnancy ($t(99) = 1.30$, n.s.*)*. Because it makes sense that women and men might react differently to this scenario, it was excluded from consideration for the final measure. Another scenario, which focused on a serious illness in a close family member such as a parent, child, or spouse, was also discarded; while it was threatening, it was not necessarily threatening to the evaluator him- or herself. Three scenarios were retained: two having to do with health (one of a serious illness diagnosis, the other of uncertainty around feeling sick) and one about a turbulent plane flight.

All three of these were measured in the main studies, with the goal of retaining only two of the three for the final 20-item measure. Based on reliability analysis in both Study 1 and Study 2, the two most reliable scenarios – flight turbulence and feeling sick –

were retained. Items from these scenarios were averaged to create the final measure in each study.

Threat, Endorsement, and Experiential/Credentialed Stimuli Pretests

Additional pretests were conducted to determine experimental treatment options that are perceived to be "high" versus "low" threat, as well as to determine perceptions of high and low endorsement levels.

Measures.

Perceived threat. Perceived threat of the headlines and posts was assessed to ensure that high and low threat headlines, primes, and threads in the main study would vary as intended. Items were derived from theory regarding vigilance-avoidance and threat, such that participants responded to items referring to different threat as well as specifically (for the posts, only) whether the physical wellbeing of the woman writing the post was threatened. Sample items include, "How distressing was the [headline/post]? and "How threatening was the [headline/post]"? Items were averaged to create a perceived threat score for each headline and post tested. Cronbach's alpha levels for the perceived threat scale varied depending on the individual headline and post being tested, but all levels were above acceptable ($\alpha \geq .70$).

Endorsement. Participants in the pretest were asked what they would consider a high or low percentage of endorsements (e.g., "8% people recommended this thread to others" as a low endorsement) for a health discussion thread. They indicated this on a sliding scale ranging from 0%-100%, and were asked to indicate high endorsement on

one scale and low endorsement on another scale as a separate question. Responses were averaged to determine ranges for high and low endorsement, as detailed below.

Experiential/credentialed source type. To ensure that participants were able to correctly differentiate between experiential and credentialed sources for the stimuli for Study 2, for each potential stimulus viewed, participants were asked "Was the information you saw from (a) a patient who had personally experienced the health concern or treatment, or (b) from a healthcare practitioner (for example, a doctor or nurse)?"

Interest. To ensure that (a) high and low threat and (b) experiential and credentialed sources were perceived as equally interesting and compelling across posts and headlines, respondents were asked how much they wanted to read the discussion thread based on the headline, how interesting it sounded to them, and, in the experiential/credentialed data collection only, whether they would want to read more about the topic of the headline from a) experiential and b) credentialed sources. Specifically, respondents were asked (about both headlines and posts), "If you wanted to know more about this topic, how likely is it that you would seek online information written by patients who had personally experienced the health concern or treatment?" and "If you wanted to know more about this topic, how likely is it that you would seek online information written by a healthcare practitioner (for example, a doctor or nurse)?" Responses were measured on a 7-point scale.

Stimuli pretest procedure and results. Two separate data collections were conducted; the first to assess high and low threat stimuli (posts and headlines), and the

second to re-assess high and low threat headlines, as well as test experiential/credentialed headlines and posts. For both pretests, adult female participants were recruited using MTurk, as adult women from MTurk are the sample for both studies 1 and 2. These participants were presented with both discussion thread headlines and discussion posts about personal breast cancer experiences of varied threat. Overall, a series of 12 headline (six high and six low threat) and 28 discussion post (14 high and 14 low threat) stimuli options were pretested to determine the appropriate text to induce the desired degree of threat in the main study. Pretesting this many statements of each type gave the researcher enough variability to choose the best options based on the pretest result, given that several posts would be needed to comprise each thread in the final study. Fewer headlines were pretested because fewer headlines were required for the main studies.

Because participants cannot be presented with text that is substantially the same (e.g., the high and low threat version of the same post), participants were randomly assigned to view only half of the post options, which also helped minimize respondent fatigue from evaluating too many posts. To ensure that only women participated, a gender check was conducted at the end of the questionnaire. As part of this check, a few people indicated their gender was male, and they were removed from analyses. The final *N* was 153; however, each participant saw only a random subset of the headlines and posts, and the number of participants who saw each is listed in Table 5. All headlines and posts were presented in a random order to minimize order effects. After reading each headline or post, participants were asked to rate them on a series of items used to measure

perceived threat. Participants were also asked how interesting the headline or post was to them.

Means and standard deviations for the perceived threat scale of the presumed high threat headlines are reported in Table 3, and for the presumed low threat headlines in Table 4. How interesting each headline was, as well as how much the respondent was interested in reading more of the story based on the headline, were also assessed and are reported in Tables 3 and 4. In general, high threat stories were not significantly more interesting than low threat stories, although each individual story did vary in how interesting it was perceived to be. Based on these results, four headlines were selected to re-test in a second data collection, as the sample size from this pretest was too small to conduct a paired-samples *t* test for each possible pair of high and low threat headlines.

Table 3

Means and Standard Deviations for High Threat Pre-Test Headlines

Topics	Not healthy	Shocking diagnosis	Heart-wrenching stories	1/8 women	Worst
Threat scale	5.31 (1.48)	5.14 (1.53)	4.71 (1.24)	4.71 (1.26)	4.39 (1.19)
Interesting	5.06 (1.98)	4.91 (1.78)	3.55 (1.64)	4.50 (1.44)	5.30 (1.01)
Read	4.69 (2.11)	4.59 (1.93)	3.58 (1.71)	4.26 (1.86)	5.58 (1.15)

Table 4

Means and Standard Deviations for Low Threat Pre-Test Headlines

Topics	No stress	Hurray	Benign	Joy	Happy ending
Threat scale	3.04 (1.37)	3.02 (1.30)	3.01 (1.33)	2.65 (1.11)	2.25 (1.15)
Interesting	5.20 (1.49)	5.09 (1.51)	4.79 (1.65)	5.09 (1.38)	5.48 (1.28)
Read	5.49 (1.12)	4.55 (1.89)	4.94 (1.63)	5.06 (1.66)	5.58 (1.48)

Independent samples *t*-tests were run on the perceived threat scale for the 14 high and 14 low threat discussion posts to ensure that high and low threat versions of each post were significantly different from one another. One *t*-test was not significant, indicating that the high and low threat versions of the post did not appreciably differ; it was thus removed. However, all other independent samples *t*-tests were significant, and results of each are reported in Table 5, along with descriptive statistics for each post. Based on these analyses, high and low threat versions of each post significantly differ, providing the researcher multiple stimuli options for the main study. High and low threat posts did not appear to differ appreciably in terms of how interesting they were, and most posts were moderately interesting, with means falling between 4.22 and 4.90 on a scale of 1-7, where 1 = "not at all interesting" and 7 = "extremely interesting." From these options, one post was selected to use as a high/low threat prime, and six posts were chosen to compile into high/low threat discussion threads for the main study.

Respondents were also asked how sad each post made them feel, to ensure that the posts incited threat rather than strong emotions such as sadness. Some sadness is to be

expected in any personal story about breast cancer, thus, rather than controlling for sadness, sadness values were examined in order to inform selection of the final stimuli posts. Generally, high threat posts (where women were diagnosed with cancer) were sadder than low threat posts (where women were diagnosed with benign conditions). While the "AZ" story had the highest *t* value of the posts tested, it also had the highest sadness rating, and might be most relevant to only a subset of women, as being a mom was a central part of the threatening nature of the post. Thus, the "Amy" post, which had a significant *t* value but was more broadly applicable and not as sad, was selected to be the priming post in the main study rather than the "AZ" post. The high and low threat versions of the "Amy" post are significantly different $t(61) = -6.11$, $p < .001$, and this post had the second largest *t* value. Both the prime post and the full thread of compiled low or high threat discussion posts are available in Appendix C.

Table 5

Descriptive Statistics and Independent Samples t-test Results for High and Low Threat Posts

	Low Threat			High Threat			95% CI for		
Post	M	SD	n	M	SD	n	Mean Diff	t*	df
Ladybug	4.10	1.32	31	5.15	1.30	34	-1.70, -0.40	-3.24	63
Kat	3.79	1.43	32	4.87	1.12	33	-1.72, -0.45	-3.41	63
Gram	3.56	1.30	33	4.95	1.30	29	-2.05. -0.73	-4.20	60
Sash	3.70	1.48	31	4.98	1.20	32	-1.96, -0.61	-3.80	61
Golden	3.01	1.29	32	4.20	1.46	32	-1.88, -0.50	-3.46	62
TSN	3.24	1.36	32	4.67	1.24	33	-2.07, -0.78	-4.43	63
Breezy	3.89	1.49	33	5.38	1.06	32	-2.12, -0.84	-4.60	63
AZ	2.85	1.27	29	5.28	1.25	31	-3.09, -1.78	-7.48	58
Amy	**2.64**	**1.67**	**30**	**5.02**	**1.41**	**33**	**-3.15, -1.59**	**-6.11**	**61**
WM	3.39	1.61	29	4.96	1.23	31	-2.30, -0.83	-4.21	52.34[5]
CANina	2.96	1.28	31	4.69	1.40	31	-2.41, -1.04	-5.06	60
Carolina	3.18	1.49	32	4.81	1.19	31	-2.31, -0.95	-4.81	58.78
TSN	3.24	1.36	32	4.67	1.24	33	-2.07, -0.78	-4.43	63
K25	3.37	1.23	33	4.86	1.24	33	-2.11, -0.86	-4.72	60

*All *t* values are $p < .01$. The bolded post will be used as the priming post in the main study.

The experiential/credentialed pre-test data were also collected with female participants using Mechanical Turk. This second data collection examined experiential and credentialed stimuli and perceived high and low endorsement numbers, as well as re-tested the four high and low threat headlines that were selected from the first data collection to re-collect for increased sample size. The final *N* was 130; however, each participant saw only a random subset of the headlines and posts to limit participant fatigue. Like in Study 1, any participants who indicated their gender was male were removed prior to analyses. Additionally, the researcher ensured that individuals who had participated in the first pretest (of high and low threat stimuli) were not part of this

pretest, because this pretest collected the additional data necessary to conduct a paired-samples t-test for the four threat headlines.

All pairs of low and high threat headlines were significantly different from each other; the *t*-test results for these are reported in Table 6. Thus, these headlines were retained to be used as stimuli in Study 1.

Table 6

Paired-Samples t-test Results for Threat Headlines

	M	SD	n	95% CI for Mean Diff.	r	t	df
Shock / Happy	5.45 / 2.64	1.39 / 1.36	32	1.92, 3.69	-.58*	6.49*	31
Wrong / Happy	5.06 / 2.62	1.30 / 1.27	33	1.65, 3.24	-.51*	6.26*	32
Shock /Joy	5.11 / 3.21	1.27 / 1.18	36	1.18, 2.62	-.52*	5.34*	35
Wrong / Joy	5.08 / 3.06	1.28 / 1.30	36	1.27, 2.76	-.42*	5.54*	35

* $p \leq .01$.

Six credentialed and six experiential headlines were pre-tested for Study 2, as well as 12 Q&A posts, with a credentialed and experiential version of each. Again, no participant saw both the credentialed and experiential version of the same post. To ensure that experiential and credentialed sources were perceived as equally interesting and compelling across posts and headlines, respondents were asked how much they wanted to read the discussion thread based on the headline, how interesting it sounded to them, and whether they would want to read more about the topic of the headline from a) experiential and b) credentialed sources. All these were treated as dependent variables, to ensure that there was no significant difference in participants' desire to read more from

an experiential vs. credentialed source depending on the source type of the Q&A or headline that they read.

Independent samples *t*-tests were run to ensure that the likelihood of respondents desiring to know more about the topic from either a credentialed or experiential source did not significantly differ for both (a) headlines and (b) Q&A posts. None of the tests were significant (*t*-values ranged between -.26 and .86, for example, for the main Q&A posts), suggesting that all posts and headlines were acceptable options for the main study. Additionally, chi-square tests were performed to assess manipulation checks between the experiential and credentialed version of each post to ensure that participants registered the post as either from a doctor or a woman with personal experience. All tests were significant and indicated that the experiential/credentialed source was clear for each post.

Because all headlines and posts were viable options, statistically, for the main study, headlines were selected for use in the main study based on clarity and lack of repetitiveness (i.e., some of the headlines were very similar, so overly repetitive headlines were cut). Posts were chosen based on widest applicability to a variety of women. Additionally, posts on non-controversial topics/treatments were selected over those that were less mainstream – for example, the posts on holistic or alternative treatments such as meditation and acupuncture might be somewhat controversial to some participants, so they were removed. The remaining Q&A posts were put together into threads of five Q&A posts for the main study.

Participants in both pretest data collections were also asked what they would consider a high or low percentage of endorsements (e.g., "8% people recommended this

thread to others" as a low endorsement) for a health discussion thread. This was measured on a sliding scale ranging from 0%-100%. Specifically, this question was asked about endorsement of discussion posts (first pretest) and Q&A answers (second pretest). The question was asked in both pretests to ensure that participants did not perceive high and low endorsement levels differently for discussion threads versus Q&A responses. Results were very similar in both data collections, so all data was combined to determine final endorsement levels for the main studies. After outliers were removed, the mean high endorsement level was 67.84% (16.10% SD), and the mean low endorsement was 30.49% (20.61% SD). Because the standard deviations were large, endorsement levels for the high endorsement posts for the main studies varied between the mean and approximately one half a standard deviation above the mean (i.e., 68%-76%), and the endorsement level for low endorsement posts varied between the mean and approximately one half a standard deviation below (i.e., 20%-30%). Specific percentages within these ranges were chosen for the stimuli for the main studies.

Chapter VII: Results

Study 1 Sample Characteristics

First, the sample was checked for gender, and any men who were able to enter the study despite gender restrictions were removed from further analysis (n = 12). Additionally, any participants who indicated during the debrief process that they wished for their data to be deleted were also removed (n = 13). After this process, the total N was 479. The final sample was all adult women, with 29.2% ranging from 18-29 years old, 30.9% between 30-39 years old, 15.4% ranging from 40-49 years old, 16.0% between 50-59 years old, 7.0% were 60-69 years old, and 1.5% were 70 or older. The sample was predominantly college-educated; only 0.2% did not graduate from high school, 11.1% were high school graduates, 30.6% completed some college, 40.8% received a college degree, and 17.3% received a graduate degree.

Study 1 Assumptions

Before hypothesis testing, the normality of vigilance-avoidance, perceived credibility, and both measures of selective exposure (in seconds and the scale) was assessed. Vigilance-avoidance exhibited normal distribution. However, the perceived credibility dependent variable exhibited a very slight negative skew, the selective exposure scale dependent variable exhibited a negative skew, and the selective exposure (seconds) variable exhibited a positive skew and positive kurtosis. Both a logarithmic and square root transformation were tested and compared on the selective exposure (seconds) variable, with the square root transformation resulting in a normal distribution. Additionally, four outliers were removed from this variable.

Due to their negative skew, perceived credibility and the selective exposure scale variable needed to be reflected before transformation. Because the negative skew for perceived credibility was very slight, transformation (square root, reciprocal, and log transformations were all assessed) did not improve the variable normality, and made any potential interpretation of results more difficult. Neither a log nor square root transformation significantly improved normality for the selective exposure scale either; however, both a transformed (reflected reciprocal transformation) and the non-transformed version of the variable were tested in the following analyses.

Study 1 Manipulation Check

An independent samples *t*-test was used to assess the effectiveness of the manipulation of threat at both the prime stage and thread stage of the study. Results indicated that perceptions of threat of the priming posts differed as intended, with those viewing the high threat prime evaluating it as more threatening ($M = 4.28$, $SD = 1.16$) than those who viewed the low threat prime ($M = 3.23$, $SD = 1.30$; $t(314) = -7.62$, $p < .001$). Likewise, perceptions of threat of the main threads differed significantly, with those viewing the high threat prime again evaluating it as more threatening ($M = 4.47$, $SD = 1.32$) than those who viewed the low threat prime ($M = 2.91$, $SD = 1.25$; $t(477) = -12.57$, $p < .001$).[6] Finally, a manipulation check conducted at the end of the study indicated that high/low endorsement conditions varied as intended (χ^2 [1] = 40.94, $p < .001$).[7]

Study 1 Hypothesis Testing

Prime Effects and Headline Choice. Two thirds of the participants were presented with either a low or high threat priming post before being allowed to choose between headlines of varied threat and endorsement levels; all other participants began the studies

with this headline selection. To examine whether (a) personality traits of vigilance-avoidance predicted whether high or low threat headlines were selected by participants and (b) whether the threat level of the priming post influenced headline selection, a logistic regression was run with vigilance-avoidance as a continuous independent variable and prime (high threat prime, low threat prime, or no prime) as a categorical independent variable, and headline selection as the categorical dependent variable. Based on this logistic regression, vigilance-avoidance does not significantly predict headline choice (b = -.05, SE = .11, p = n.s.), but for individuals who saw a priming post, the threat level of the prime does (b = .57, SE = .24, $p <$ .05). A follow-up chi-square test indicated that participants who viewed the high threat prime were more likely to select a high threat headline than either those who viewed the low threat prime or no prime (χ^2 (2) = 7.66, $p < .05$). This suggests that threat level does influence selective exposure (H1a), but in the opposite direction posed by H1a.[8] This is explored further when additional measures of selective exposure are considered.

Among all participants (regardless of whether or not they saw the prime), 42.8% of selected the low threat high endorsement headline, 25.1% chose the low threat low endorsement headline, 19.2% chose the high threat high endorsement headline, and 12.9% selected the high threat low endorsement headline. Although both endorsement and threat thus appear to influence selection in the directions anticipated, a chi-square test indicated that these percentages did not differ significantly from chance (χ^2 (1) = .49, n.s.).[9] Because all subjects (regardless of whether they saw a prime) participated in the headline selection stage and the rest of the study, all subsequent analyses represent results from all participants.

Main Effect and Interaction Testing. Threat and endorsement were posited to influence both selective exposure (H1a and H2, respectively) and perceived credibility (H4a

and H5, respectively). Additionally, threat and endorsement were hypothesized to interact to influence selective exposure (H3a) and credibility (H6a). Finally, vigilance-avoidance was posited to moderate all of these relationships. The general linear model was employed to initially test both main effects of threat and endorsement and interactions between threat and endorsement, threat and vigilance-avoidance, and endorsement and vigilance-avoidance on perceived credibility, the selective exposure scale, and selective exposure (measured in seconds). Thus, threat and endorsement were entered into the general linear model (GLM) as manipulated categorical independent variables, vigilance-avoidance was entered as a continuous independent variable, and perceived credibility and selective exposure (scale and seconds, respectively) were entered as the dependent variables.

The GLM is based on regression and allows a model that tests the main effects of a number of categorical independent variables and continuous independent variables, as well as their interaction (Tabachnick & Fidell, 2007). Issue involvement was added as a control to all analyses, because the personal relevance of breast cancer to respondents is expected to vary widely and may influence their interest in the issue (i.e., selective exposure) as well as perceptions of credibility as discussed previously. None of the independent variables had a significant effect on either the transformed or the non-transformed selective exposure scale as indicated in an initial test via the GLM. Because of this, and because selective exposure was already measured by time spent (in seconds) reading the thread, the selective exposure scale was removed from further analyses, and is thus not included in the multivariate tests reported as follows.

There was a significant multivariate effect for threat of the discussion thread (Wilks' lambda = .98, $F[2, 447] = 4.19$, $p < .05$, $\eta_p^2 = .02$) but not endorsement (Wilks' lambda =

.99, $F[2, 447] = 1.91$, n.s.) on selective exposure (in seconds) and perceived credibility. Thus, H2 and H5 were unsupported. Additionally, there was a significant interaction effect of threat and endorsement (Wilks' lambda = .98, $F[2, 447] = 3.55$, $p < .05$, $\eta_p^2 = .02$), and threat and vigilance-avoidance (Wilks' lambda = .98, $F[2, 447] = 4.75$, $p < .01$, $\eta_p^2 = .02$) on the linear combination of the dependent variables.

To follow up, univariate tests were performed using the general linear model. The univariate follow-up tests for selective exposure revealed that selective exposure (measured in time spent reading) was significantly higher ($F[1, 444] = 6.52$, $p = .01$, $\eta_p^2 = .01$) for the high threat thread ($M = 10.52$, $SE = .33$) than the low threat thread ($M = 10.43$, $SE = .23$), although the difference in the square root of time spent reading is small. This supports the general logic of a main effect of threat on selective exposure, but in the opposite of the direction proposed in the hypothesis (H1a), which suggested that lower threat information would receive more exposure. Note that these means are representative of the square root of selective exposure taken during the transformation necessary to normalize the data, and should be interpreted accordingly.

Threat also had a significant main effect on perceived credibility ($F[1, 462] = 4.01$, $p < .05$, $\eta_p^2 = .01$), such that the high threat thread ($M = 5.35$, $SE = .09$) was slightly more credible than the low threat thread ($M = 5.23$, $SE = .07$). This supports the general logic of a main effect of threat on perceived credibility, but in the opposite direction proposed in the hypothesis, which suggested lower threat information would be perceived to be more credible. Endorsement did not have a significant main effect on selective exposure although it approached significance ($F[1, 444] = 3.48$, $p = .06$), with participants spending more time reading low endorsement information ($M = 10.91$, $SE = .31$) than high endorsement

information ($M = 10.16$, $SE = .26$). Endorsement also did not have an effect on credibility ($F[1, 462] = 2.20$, n.s.), leaving H2 and H5 unsupported.

The endorsement by threat interaction was significant ($F[1, 444] = 3.93$, $p < .05$, $\eta_p^2 = .01$) on selective exposure, but not on credibility ($F[1, 462] = 2.90$, n.s.), supporting the logic of H3a but not H6a. Specifically, participants spent the most time reading the high threat low endorsement thread ($M = 11.37$, $SE = .51$), followed by the low threat high endorsement thread ($M = 10.45$, $SE = .28$), the low threat low endorsement thread ($M = 10.40$, $SE = .36$), and the high threat high endorsement thread ($M = 9.80$, $SE = .44$). Because these means represent the square root, the difference between the reading time for the high threat low endorsement thread and the low threat low endorsement thread was 33.24 seconds. Thus, an interaction between threat and endorsement as posed by H3a was supported; however, again the condition that received the most exposure was contrary to hypothesized results. Additionally, the three-way interaction between threat, endorsement, and vigilance-avoidance on selective exposure (H3b) was unsupported, ($F[2, 444] = 1.41$, n.s.), as was the three-way interaction on perceived credibility, H6b ($F[2, 460] = .54$, n.s.). The interaction between vigilance-avoidance and threat on both credibility and selective exposure will be explored via regression in the following moderation analysis section.

Moderation Analysis. To probe the interactions between threat and vigilance-avoidance on selective exposure (H1b) and credibility (H4b), a simple slope analysis was performed using regression (for a discussion of this type of analysis, see Aiken & West, 1991, and Hayes, 2013). First, to test H1b, threat was dummy coded with low threat as the reference group. Then, the mean-centered[10] vigilance-avoidance variable, the dummy coded threat variable, and their interaction term were entered into the regression to predict selective

exposure (in seconds). The slope of the prediction of selective exposure from vigilance-avoidance is positive and significant for low threat health information, $b = .46$, $t = 2.00$, $p < .05$. To test the significance of the simple slopes for high threat, threat was re-coded with high threat as the reference group and a second regression was run. The slope of the prediction of selective exposure from vigilance-avoidance is positive and significant for high threat health information, $b = 1.77$, $t = 5.07$, $p < .001$. The b values indicate that the slope of the effect of vigilance-avoidance on selective exposure is stronger (steeper) for high threat health information.

To further probe this interaction, the differences in selective exposure between high and low threat were tested at low and high levels of vigilance-avoidance. To do so, vigilance-avoidance was re-centered at both low (one standard deviation below the mean) and high (one standard deviation above the mean) levels. First, a regression was performed to test for differences in selective exposure to low and high threat health information at low levels of vigilance-avoidance. The re-centered low vigilance-avoidance variable, dummy coded threat, and their interaction term were entered into the regression, with transformed selective exposure as the dependent variable. At low levels of vigilance-avoidance (i.e., people who are more avoidant), respondents spend less time reading high threat information than low threat information ($b = -1.28$, $t = -2.29$, $p < .01$). However, at high levels of vigilance-avoidance (which indicate higher levels of vigilance and lower levels of avoidance), respondents spend more time reading high threat information than low threat information ($b = 1.21$, $t = 2.16$, $p < .01$). This is depicted in Figure 2, and supports H1b.

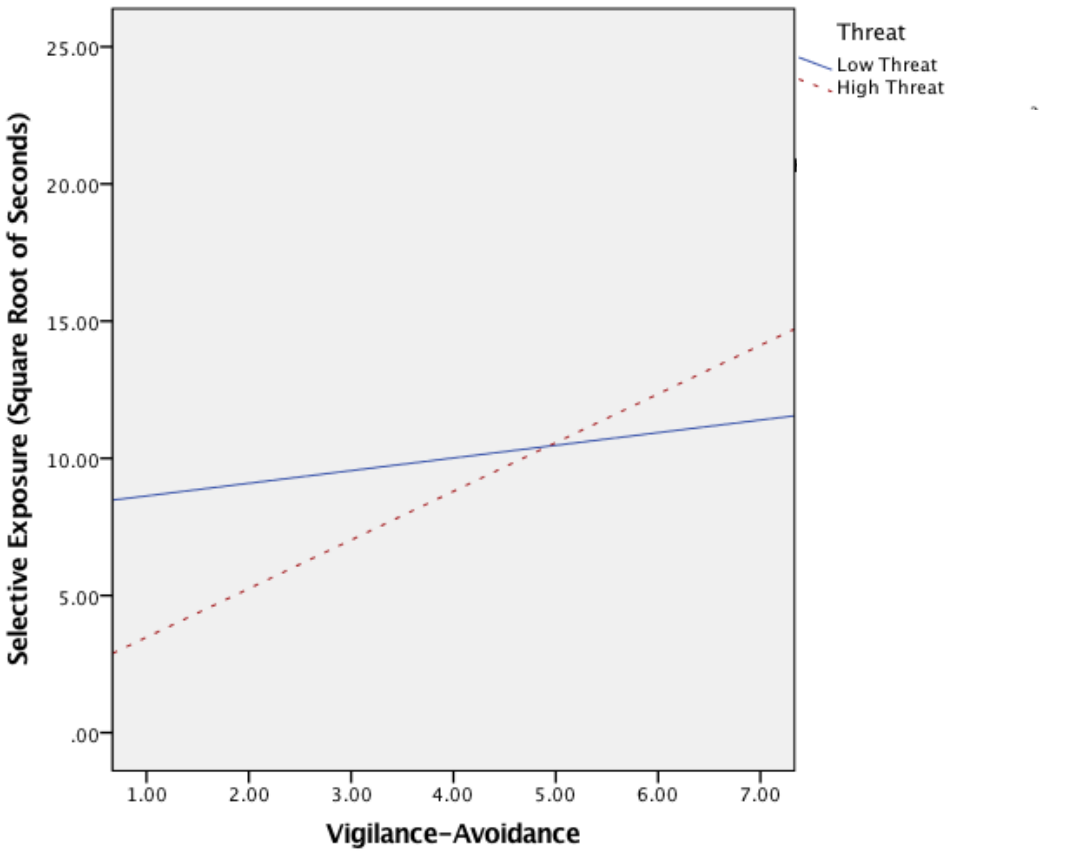

Figure 2. Visualization of interaction between vigilance-avoidance and threat on selective exposure (square root transformation of seconds spent reading).

Next, to test H4b, the mean-centered vigilance-avoidance variable, the dummy coded threat variable, and their interaction term were entered into the regression to predict perceived credibility. The slope of the prediction of perceived credibility from vigilance-avoidance is non-significant for low threat health information, $b = .04$, $t = .54$, $p =$ n.s. To test the significance of the simple slopes for high threat, threat was re-coded with high threat as the reference group and a second regression was run. The slope of the prediction of perceived credibility from vigilance-avoidance is positive and significant for high threat health

information, $b = .29$, $t = 3.00$, $p < .01$. Thus, the b values indicate that the slope of the relationship between vigilance-avoidance and perceived credibility is steeper for high threat information, as is depicted in Figure 3.

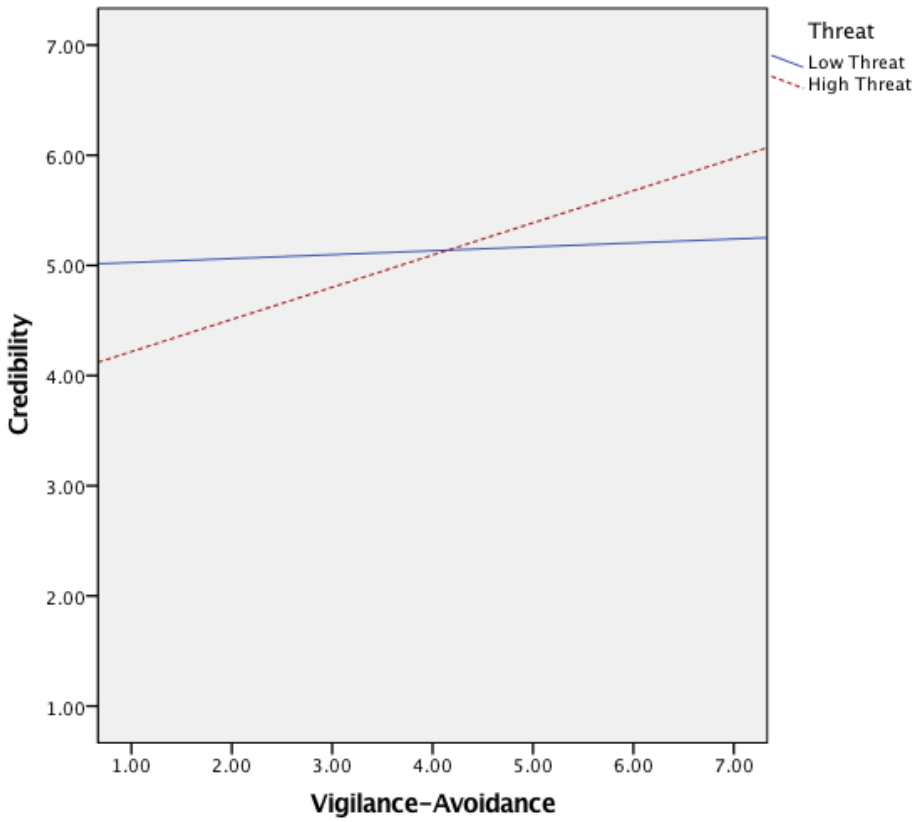

Figure 3. Visualization of interaction between vigilance-avoidance and threat on perceived credibility.

To further probe this interaction, the differences in perceived credibility between high and low threat were tested at low and high levels of vigilance-avoidance. To do so, vigilance-avoidance was re-centered at both low (one standard deviation below the mean) and high

(one standard deviation above the mean) levels. First, a regression was performed to test for differences in perceived credibility of low and high threat health information at low levels of vigilance-avoidance. The re-centered low vigilance-avoidance variable, dummy coded threat, and their interaction term were entered into the regression, with perceived credibility as the dependent variable. At low levels of vigilance avoidance, there is not a significant difference in perceived credibility of low and high threat health information (b = -.05, t = -.33, n.s.*)*. However, at high levels of vigilance-avoidance (which indicate higher levels of vigilance and lower levels of avoidance), respondents found high threat health information more credible (b = .44, t = 2.72, p < .01). Again, the graphic representation displayed in Figure 2 helps to illustrate these differences. Overall, H4b is supported, although the difference in perceived credibility of low and high threat information was largest for more vigilant individuals rather than for more avoidant individuals, as originally posited.

Mediation Analysis. It was posited that credibility would mediate the relationship between threat and selective exposure (H7a) and endorsement and selective exposure (H7b). Using the Baron and Kenny (1986) causal steps approach, the effect of threat on credibility approaches significance, but is not significant, leaving H7a unsupported *(*b = .19, t = 1.72, p = .09), although credibility does significantly predict selective exposure when controlling for threat (b = .59, t = 3.62, p < .001). Because endorsement did not have a significant main effect on credibility as found in the prior analyses, H7b was also unsupported.

However, whether or not perceived credibility significantly mediates the relationship between vigilance-avoidance and selective exposure was tested as a post-hoc analysis. First, vigilance-avoidance significantly and positively predicts selective exposure (b = .86, t = 4.42, p < .001) and credibility (b = .12, t = 2.08, p < .05). Additionally, the mediator (credibility)

still affects the outcome (selective exposure) controlling for vigilance-avoidance; $b = .50$, $t = 3.13$, $p < .01$. Overall this suggests that perceived credibility does mediate the relationship between vigilance-avoidance and selective exposure; however, because vigilance-avoidance still significantly predicts selective exposure when controlling for credibility ($b = .81$, $t = 4.22$, $p < .001$), this is only a partial rather than complete mediation model (Baron & Kenny, 1986).

Finally, these results suggested that perhaps the mediating relationship between threat and selective exposure via perceived credibility was conditional on vigilance-avoidance, which would require testing a moderated mediation model. Thus, a 10,000 resample bootstrap analysis was conducted using the SPSS macro PROCESS (Hayes, 2013). This analysis tests indirect, moderated (conditional) effects through intervening or mediating variables by repeatedly resampling with replacement. At high levels of vigilance-avoidance (75^{th} percentile), there is a significant, *indirect* effect = .16, 95% CI [.03, .39], indicating a significant indirect effect of threat on selective exposure via perceived credibility, but only for people who are more vigilant. In other words, people who are more vigilant find high threat information to be more credible, and expose themselves to this information more, such that the relationship between threat and selective exposure is mediated by credibility. However, this mediating relationship is moderated by (conditional upon) levels of vigilance-avoidance, because credibility only mediates the relationship between threat and selective exposure for people who are higher in vigilance-avoidance (i.e., are more vigilant) and does not hold for people who are more avoidant. For people who are more avoidant, credibility does not mediate the relationship between threat and selective exposure.

Study 2 Sample Characteristics

First, the sample was checked for gender, and any men who were able to enter the study despite gender restrictions were removed from further analysis (n = 9). Additionally, any participants who indicated during the debrief process that they wished for their data to be deleted were also removed at this stage (n = 10). After these data were cleared, the total N was 490. The final sample was all adult women, with 32.1% indicating they were between 18-29 years old, 36.4% between 30-39 years old, 14.6% between 40-49 years old, 12.1% between 50-59 years old, 3.8% between 60-69 years old, and 1.1% were 70 or older. The sample was predominantly college-educated; only 0.2% did not graduate from high school, 9.8% were high school graduates, 32.9% completed some college, 37.3% received a college degree, and 16.9% received a graduate degree.

Study 2 Assumptions

Before hypothesis testing, the normality of vigilance-avoidance, perceived credibility, and both measures of selective exposure (in seconds and the scale) was assessed. Vigilance-avoidance exhibited normal distribution, and the perceived credibility dependent variable was relatively normal, although did have a high frequency of "perfect" credibility scores (where the average of all credibility items measured on a 1-7 scale was 7). However, these respondents did not exhibit a patterned response bias elsewhere, suggesting that many people simply perceived the stimuli to be very credible. To ensure that this did not skew results, all tests involving the perceived credibility scale were run both including and excluding (as missing data) these cases. No differences in significant results were found between tests that included or excluded these cases, so all results below include these cases.

The selective exposure (scale) dependent variable exhibited a negative skew, and the selective exposure (seconds) variable exhibited a positive skew and positive kurtosis. As in Study 1, a square root transformation of the selective exposure (seconds) dependent variable resulted in a normal distribution and thus was used for all analyses. Additionally, two outliers were removed from this variable. Due to its negative skew, the selective exposure scale variable needed to be reflected before transformation. Neither a log nor square root transformation significantly improved normality for the selective exposure scale; however, both a transformed (reflected reciprocal transformation) and the non-transformed version of the variable were tested in the following analyses.

Study 2 Manipulation Check

A chi-square test was used to assess the effectiveness of the manipulation of source type at both the prime stage and thread stage of the study. Results indicated that participants correctly differentiated between experiential and credentialed sources in the priming post (χ^2 [1] = 158.47, $p < .001$). Likewise, a manipulation check after participants viewed the full thread indicated that individuals correctly recalled whether they viewed experiential versus credentialed posts (χ^2 [1] = 251.73, $p < .001$).[11] Finally, a manipulation check conducted at the end of the study indicated that high/low endorsement conditions varied as intended (χ^2 [2] = 167.79, $p < .001$), although some participants indicated that they could not recall, by the time the manipulation check was conducted, whether they saw a high or low endorsement headline.[12]

Study 2 Hypothesis Testing

Prime Effects and Headline Choice. Two thirds of the participants were presented with a priming post attributed to either an experiential (one third) or credentialed (one third)

source before being allowed to choose between headlines of varied source type and endorsement levels; all other participants (the remaining one third) began the study at this headline selection stage and did not view a prime. To examine whether (a) personality traits of vigilance-avoidance predicted which headlines were selected by participants and (b) whether the source type of the priming post influenced headline selection, a logistic regression was run with vigilance-avoidance as a continuous independent variable and prime (credentialed, experiential, or no prime) as a categorical independent variable, and headline selection as the categorical dependent variable.

Based on logistic regression, neither vigilance-avoidance (b = .06, SE = .09, p = n.s.) nor the prime condition significantly predicted headline choice. Specifically, the prime condition of the experiential prime as compared to the control of no prime does not significantly impact headline choice (b = .13, SE = .31, p = n.s.), nor does the credentialed prime as compared to the control (b = -.04, SE = .23, p = n.s.). H10 posed that source type would impact selective exposure; this finding suggests that a prime of source type does not increase the likelihood of future selection of that same source type. However, this hypothesis is further tested with other selective exposure measures detailed in the following section. Overall, 34.3% of participants selected the credentialed high endorsement headline, 29.4% chose the experiential high endorsement headline, 22.4% chose the credentialed low endorsement headline, and 13.9% selected the experiential low endorsement headline. Here, both endorsement and source type appear to influence selection in the directions anticipated, however, a chi-square test indicated that these percentages did not differ significantly from chance (χ^2 [1] = 2.92, p = .09).

Main Effect and Interaction Testing. The general linear model was employed to initially test a main effect of source type (H10), as well as the interaction between source type and endorsement on credibility and selective exposure (H8 and H12a, respectively), and a moderating effect of vigilance-avoidance on the interaction between source type and endorsement on selective exposure (H12b). Perceived credibility, the selective exposure scale, selective exposure (measured in seconds), and helpfulness were entered as the dependent variables, with source type and endorsement as manipulated categorical independent variables, and vigilance-avoidance as a continuous independent variable. Additionally, using the same rationale as Study 1, issue involvement was added as a control.

As in Study 1, in an initial test via the GLM neither the transformed nor the non-transformed selective exposure scale had any significant effects based on the between-subjects follow-up breakdown of the multivariate analysis by dependent variable. Thus, because selective exposure was already measured by time spent (in seconds) reading the thread, the selective exposure scale was removed from further analyses and is thus not included in the GLM results reported below. Additionally, both the perceived credibility scale with and without the "perfect" credibility scores (people who indicated that all credibility items receive a score of 7) were run, and no differences in the significance of main or interaction effects at the multivariate or univariate level were found, so these cases were retained.

The final model suggested a significant multivariate effect for source type (Wilks' lambda = .98, $F[3, 447] = 3.00$, $p < .05$, $\eta_p^2 = .02$) but not endorsement (Wilks' lambda = .99, $F[3, 447] = 2.08$, n.s.) on the linear combination of selective exposure (in seconds), perceived credibility, and helpfulness ratings. There was no significant interaction between source type

and endorsement (Wilks' lambda = .99, F[3, 447] = 2.03, p = .11) on the linear combination of the dependent variables. Thus, any hypotheses involving the interaction between source type and endorsement (H8, H12a, and H12b) were unsupported. However, vigilance-avoidance had a strong relationship with the dependent variables (Wilks' lambda = .94, F[3, 447] = 10.32, $p < .001$, $\eta_p^2 = .07$). This relationship is explored further via correlation at the end of this analysis.

To follow up on these results, univariate tests were performed using the general linear model. The univariate follow-up tests for selective exposure revealed that selective exposure (measured in time spent reading) was significantly higher (F[1, 450] = 3.96, $p < .05$, $\eta_p^2 = .01$) for the experiential source type (M = 11.68, SE = .30) than the credentialed source type (M = 10.46, SE = .25). Because these means represent the square root, the raw average difference between conditions is 27.01 seconds of reading time. This provides support for the logic of H10 – that there are differences in selective exposure to credentialed versus experiential health information – but in the opposite of the direction posited (the hypothesis suggested that credentialed sources would receive more selective exposure than experiential sources would). Note that these means are representative of the square root of selective exposure taken during the transformation necessary to normalize the data, and should be interpreted accordingly.

While it was not hypothesized that source type would have a main effect on perceived credibility or helpfulness ratings, post-hoc tests assessed these relations. Indeed, source type did not have a significant main effect on perceived credibility (F[1, 469] = .19, n.s.), such that the credentialed thread (M = 5.86, SE = .06) was not significantly more credible than the experiential thread (M = 5.71, SE = .07). It also did not have a main effect on helpfulness

ratings (F[1, 469] = 1.46, n.s.), such that the credentialed thread (M = 4.44, SE = .04) was not rated by participants as significantly more helpful than the experiential thread (M = 4.40, SE = .04).

Finally, H9a and H9b posed that source type (credentialed, experiential) and an individual's level of vigilance-avoidance would interact to impact perceptions of (a) credibility and (b) helpfulness, such that people who are more avoidant would rate threatening health information from credentialed sources to be less helpful than experiential sources, even if they find it to be more credible. To test this, helpfulness and credibility, which were measured on different scales, were both standardized by converting to z-scores to make the mean values of each more directly comparable to each other in the event of significant effects. Standardized perceived credibility and helpfulness scores were entered into the general linear model as the dependent variables, with source type as the manipulated categorical independent variable, vigilance-avoidance as a continuous independent variable, and issue involvement as a control. There was no significant interaction between vigilance-avoidance and source type on the combined dependent variables (Wilks' lambda = 1.00, F[2, 468] = .94, n.s.), leaving H9a and H9b unsupported.

However, during testing of the credibility scale, one of the items (whether or not the information was biased) was removed to increase reliability of the scale. That respondents rated the level of bias of the information differently than the other scale items suggests that perhaps in the context of personal health information, information can seem credible even when biased. This, in combination with findings that indicate a lack of difference between the perceived credibility of credentialed and experiential sources in this context, suggests that

perhaps experiential information, while more biased than credentialed information, may be perceived to be equally helpful and credible.

To test this, a MANCOVA was performed using the general linear model, with non-standardized perceived credibility, bias, and helpfulness scores as the dependent variables, source type as the manipulated categorical independent variable, and issue involvement and vigilance-avoidance as controls. Source type had a significant main effect on the dependent variables (Wilks' lambda = .97, $F[3, 468] = 5.69$, $p = .001$, $\eta_p^2 = .04$). Follow-up tests of between-subject effects show that there is a significant effect of source type on perceived bias ($F[1, 470] = 15.79$, $p < .001$, $\eta_p^2 = .03$), with experiential sources ($M = 3.05$, $SE = .12$) perceived as more biased than credentialed sources *(*$M = 2.42$, $SE = .10$). However, there is no significant effect on helpfulness ($F[1, 470] = .46$, n.s.) or credibility ($F[1, 470] = 2.76$, n.s.), suggesting that although experiential sources are more biased than credentialed sources, they are not significantly less credible or helpful in the context of online health information sharing. However, this result may need to be interpreted with caution as bias was only measured with a single item.

Because vigilance-avoidance had such a strong effect on the dependent variables in all analyses, correlations were performed to unpack the relationship between vigilance-avoidance and the hypothesized dependent variables, as well as the additional perceived bias dependent variable. Findings suggest that people who are more vigilant find health information from both credentialed and experiential sources to be more credible ($r = .17$, $p < .001$) and helpful ($r = .14$, $p < .01$), but *less* biased ($r = -.21$, $p < .001$) than people who are more avoidant.

Mediation Analysis. It was posited that helpfulness would mediate the relationship between source type and selective exposure (H11). Using the Baron and Kenny (1986) causal steps approach, the effect of source type on selective exposure is significant (b = -.61, t = 3.05, $p < .01$), but the effect of source type on helpfulness is not (b = .03, t = .96, n.s.), leaving H11 unsupported.

However, as a post-hoc analysis, whether or not helpfulness significantly mediates the relationship between vigilance-avoidance and selective exposure was tested. First, vigilance-avoidance significantly predicts selective exposure (b = .91, t = 4.68, $p < .001$) and helpfulness ratings (b = .09, t = 3.11, $p < .01$). Additionally, the mediator (helpfulness) still affects the outcome (selective exposure) when controlling for vigilance-avoidance; b = .84, t = 2.77, $p < .01$. Thus, the relationship between vigilance-avoidance and selective exposure is mediated by helpfulness. However, because vigilance-avoidance also still predicts selective exposure when controlling for helpfulness (b = .84, t = 4.29, $p < .001$), these findings support only a partial rather than complete mediation model (Baron & Kenny, 1986).

These results, as well as the results of moderated mediation in Study 1, suggested that perhaps the mediating relationship between source type and selective exposure via helpfulness was conditional on levels of vigilance-avoidance. Thus, a 10,000 resample bootstrap analysis was conducted using the SPSS macro PROCESS (Hayes, 2013). This analysis tests both direct and indirect moderated (conditional) effects through intervening or mediating variables by repeatedly resampling with replacement. Both moderated direct (i.e., effects of source type on directly on selective exposure, without a mediator, but conditional on levels of vigilance-avoidance) and moderated indirect effects (i.e., effects of source type

on selective exposure via helpfulness and moderated by vigilance-avoidance) were examined.

At low and medium levels of vigilance-avoidance (25th and 50th percentiles, respectively) there is a significant moderating effect of vigilance-avoidance on the relationship between source type and selective exposure, such that people lower in vigilance-avoidance (people who are more avoidant) spend less time reading information from credentialed sources. Specifically, at the 25th percentile of vigilance-avoidance, there is a *direct* effect = -1.75, t = -3.59, 95% CI [-2.71, -.79], $p < .001$, and this is also true at the 50th percentile: *direct* effect = -1.38, t = -3.57, 95% CI [-2.13, -.62], $p < .001$. Helpfulness was not found to mediate the relationship between source type and selective exposure when moderated by vigilance-avoidance. Based on the results of the first study, however, the PROCESS model was re-run to test moderated indirect effects via perceived credibility (i.e., effects of source type on selective exposure via perceived credibility and moderated by vigilance-avoidance) were examined.

At high levels of vigilance-avoidance (75th percentile), there is a significant indirect effect such that perceived credibility mediates the relationship between source type and selective exposure. Specifically, at high levels of vigilance, there is an *indirect* effect = .17, 95% CI [.01, .39]. To further unpack this effect, the individual relationships between source type and perceived credibility as well as perceived credibility and selective exposure, each moderated by vigilance-avoidance, were explored. The effect of source type on perceived credibility, moderated by vigilance-avoidance, only approaches significance for people high in vigilance-avoidance: *direct* effect = .20, t = 1.81, 95% CI [-.02, .41], p = .07, suggesting that the overall indirect effect should be interpreted with caution.

Summary Table of Study 1 and Study 2 Results

All results from both studies, including post-hoc analyses, are listed below in a summary table.

Table 7

Study 1 and Study 2 Results

Study 1 Hypotheses	Significant Results
H1a: Main effect of threat on selective exposure: more exposure for lower threat information	Significant main effect in opposite direction: more exposure to *high* threat information
H1b: Moderation of vigilance-avoidance on H1a main effect such that high threat information exposure lower for avoidant individuals	Supported by regression and simple slopes analysis
H2: Main effect of endorsement on selective exposure: more exposure for highly endorsed information	Unsupported, though approached significance in the opposite direction
H3a: Threat and endorsement interaction on selective exposure: highest exposure for low threat/high endorsement information	Significant interaction, but highest exposure was for high threat low endorsement information
H3b: Moderation of vigilance-avoidance on H3a interaction effect; H3a effect strongest for avoidant individuals	Unsupported
H4a: Main effect of threat on credibility: high threat information is less credible than low threat	Significant main effect in opposite direction: high threat information *more* credible
H4b: Moderation of vigilance-avoidance on H4a main effect such that H4a effect strongest for avoidant individuals	Support for proposed moderation, however H4a effect was strongest for vigilant individuals
H5: Main effect of endorsement on credibility; high endorsement information is more credible than low endorsement information	Unsupported
H6a: Threat and endorsement interaction on credibility; credibility highest for low threat high endorsement information	Unsupported
H6b: Moderation of vigilance-avoidance on H6a interaction effect such that difference in perceived credibility between low threat/high endorsement and high threat/low endorsement is largest for avoidant individuals	Unsupported

Study 1 Hypotheses	Significant Results
H7a: The effect of threat on selective exposure is mediated by credibility H7b: The effect of endorsement on selective exposure is mediated by credibility	H7(a and b) unsupported as proposed. Post-hoc analyses suggest that (a) the relationship between vigilance-avoidance and selective exposure is mediated by credibility and (b) the relationship between threat and selective exposure is mediated by credibility when moderated by vigilance-avoidance

Study 2 Hypotheses	Significant Results
H8: Interaction between source type and endorsement on credibility: high endorsement credentialed more credible than low endorsement experiential information	Unsupported
H9a-b: Interaction between source type and vigilance-avoidance on (a) credibility and (b) helpfulness such that avoiders rate information from credentialed sources to be more credible and less helpful than experiential information	Unsupported as proposed. Post-hoc analyses suggest experiential sources are significantly more biased than credentialed sources, but are not significantly less credible or helpful. Vigilance positively correlates with credibility and helpfulness, but negatively correlates with bias.
H10: Main effect of source type on selective exposure: more exposure to credentialed sources than experiential	Significant main effect in opposite direction: more exposure to *experiential* information
H11: Helpfulness mediates the relationship between source type and selective exposure	Unsupported as proposed. Post-hoc analyses suggest that (a) the relationship between vigilance-avoidance and selective exposure is mediated by helpfulness and (b) the relationship between source type and selective exposure is mediated by perceived credibility when moderated by vigilance-avoidance, but is not mediated by helpfulness.
H12a: Interaction between source type and endorsement on selective exposure such that people select information from highly endorsed credentialed sources	Unsupported
H12b: Moderation of vigilance-avoidance on the H12a interaction effect such that vigilants will be more likely to select low endorsement experiential information and avoiders will be more likely to high endorsement credentialed information	Unsupported

Chapter VIII: Discussion

This dissertation first developed a new measure of vigilance-avoidance, and then used this measure to explore how vigilance-avoidance moderates the effects of threat, endorsement, and source type on selective exposure, perceptions of credibility, and helpfulness ratings. The goal of the first study was to examine how message and community cues influence selective exposure to and processing of online health information, and whether individual characteristics (i.e., vigilance-avoidance) interact with or even override those cues. The second study additionally investigated how source cues and community cues influence selective exposure and processing, and how vigilance-avoidance moderates those relationships. Overall, results from both studies suggest that individual differences in vigilance-avoidance have an intriguing influence on why we choose and how we evaluate online social health information, and vigilance-avoidance should be considered in future health research.

Refining Measurement of Vigilance-Avoidance

Results of these studies indicate that vigilance-avoidance is a predictor of both online health information selection behaviors and evaluations of online health information. However, before applying vigilance-avoidance to the context of online health information selection and evaluation, this dissertation refined prior measures of vigilance-avoidance, repression-sensitization, and similar constructs in order to develop a more widely usable measure of these personality characteristics. The 20-item measure developed includes responses to both health-threatening and other threatening situations, thus representing vigilance-avoidance across a spectrum of threatening events rather than those only in the health context. It is much simpler to administer than the classic measure of repression-

sensitization (Byrne, 1961), which at 182 items and as part of the MMPI and MMPI-2, might be overwhelming to participants and would necessitate administration and interpretation by trained clinical psychologists or individuals holding a PhD in psychology or education (Pearson, 2016).

Unlike repression-sensitization, which has been criticized as a measure of trait anxiety (general anxiousness as a personality trait) rather than true vigilance-avoidance (Cook, 1985; Eysenck, MacLeod, & Mathews, 1987, Golin et al., 1967), the scale developed in this study does not correlate highly with anxiety and is thus clearly measuring a separate construct. Reliability and validity testing via exploratory and confirmatory factor analysis suggest that items separate into two underlying dimensions: vigilance and avoidance. Studying these constructs as a personality trait, rather than a state, provides the potential to understand why individuals might respond to the threat inherent in much health information in a consistent manner over time, which provides information about a broader set of predicted reactions to health or other threatening stimuli. This scale should help researchers who are interested in threat reactions, whether within or outside of the health context, understand how personality might predict attitudinal, interpretive, and behavioral responses to a range of threatening stimuli. Results of the two main studies of this dissertation support the value of vigilance-avoidance in predicting both behaviors related to online health information and also health information processing.

The Influence of Vigilance-Avoidance and Threat on Selective Exposure

The central goal of the first study was to examine: (a) how the threat level and endorsement of health information influences selective exposure and information evaluation, and (b), how vigilance-avoidance moderates those relationships. Overall, vigilance-

avoidance appears to have predictive power on both selective exposure and processing of online health information of varying levels of threat as posited, such that women who are more vigilant spend more time reading threatening health information and evaluate it as more credible than women who are more avoidant. Additionally, women who are more vigilant spend more time reading high threat breast cancer messages than low threat messages and also find high threat messages to be more credible, while women who are more avoidant spend more time reading low threat information than high threat information. Overall, this suggests that our tendency to approach or avoid health information, as well as our potential to trust and find it credible, are dependent on these key personality characteristics—a novel contribution in the areas of health, selective exposure, and information evaluation research.

The first study specifically examined how women evaluate more or less threatening information about breast cancer from other women (experiential sources), and posed that threat would influence selective exposure, such that selective exposure would be higher for lower threat health information than for higher threat health information. It was also expected that vigilance-avoidance would moderate this relationship, such that selective exposure to high threat health information would be lower for more avoidant individuals than for more vigilant individuals. Interestingly, threat did affect selective exposure, but the main effect of selective exposure (when controlling for vigilance-avoidance) was such that overall, more time was spent reading *high* threat messages, although the difference was small.

Thus, scholars who have suggested that all individuals exhibit a defensive bias that avoids threat (e.g., Ruiter et al., 2004) are not supported by the current results; indeed, threatening messages appear to be approached rather than avoided in terms of selective exposure. However, it is important to note that while analyses did control for issue

involvement, due to the younger age of the sample and the nature of the stimuli, it is possible that participants felt that the message was threatening generally, but not to them personally. This limitation of the current study should be addressed in future research that ensures that stimuli are constructed to be threatening to individual participants, specifically. That individuals spent more time reading threatening health messages regardless of personality characteristics may also indicate an increased interest in messages that are perceived to be more negative or threatening, although pretests did not indicate a significant difference in interest in more or less threatening posts. Given the attention-getting power of negative stimuli such as health-related fear appeals, the implications of differing levels of interest are not necessary problematic; however, the additional tendency for individuals to find these threatening messages more credible may have important implications for health message communicators, as discussed later.

When variance in vigilance-avoidance is additionally considered, women who are more vigilant spend more time reading high threat breast cancer messages than low threat messages, while women who are more avoidant spend more time reading low threat information than high threat information. Prior findings suggest that women defensively react to threatening breast cancer messages via avoidance regardless of need for cognition, which is the tendency to engage in cognitive effort (Ruiter et al., 2004). The present study lends additional insight into those findings, as this study used both an older sample (as opposed to the undergraduate sample used in Ruiter et al., 2004), and vigilance-avoidance has better explanatory value in the context of threatening health messages than need for cognition, which theoretically is not threat-specific. Thus, overall, it appears that not all women react defensively to threatening breast cancer messages—in fact, many people seem to prefer to

expose themselves to threatening messages, but this is again dependent on their personality characteristics.

While this project only tested the interaction between vigilance-avoidance and health message threat in the context of online health information, these findings may have much wider implications in the field of health, as they indicate the possibility that individuals may react more or less favorably to threatening health messages in a variety of contexts depending on their personality. For example, vigilance-avoidance may impact selection and processing of anything from the fear appeals frequently used in health promotion messages to threatening messages shared by physicians in interpersonal health practitioner-patient communication.

Theoretical work in the area of fear appeals for health promotion and behavior change has traditionally focused on parallel processes of fear control/defensive motivation (avoiding contact with fear or stimuli that will increase fear) and danger control/protection motivation (adaptive and problem-solving responses to fear appeals) as responses to threatening health-related stimuli, and suggestions for practice derived from the theory have included encouraging health promotion messages that cause the audience to adopt danger control behaviors rather than increase defensive motivation (see, e.g., the parallel fear control/danger control framework proposed by Leventhal, 1970, 1971, and extended by Witte, 1992, in the extended parallel process model). The present study would additionally suggest that health message developers should consider that their audience members may vary in their more or less adaptive reaction to fear appeals depending on their individual personality characteristics.

According to these parallel process theories, individuals do not continue to process a message if it is not threatening and self-relevant, and when processing a moderate or high threat health message, whether an individual is motivated to adopt an adaptive (approach the threat and make necessary changes) or maladaptive (avoidant) response depends on self-efficacy (Witte, 1992). However, results of the present studies suggest some additional modifications to these theoretical propositions. First, even when controlling for personal relevance, the present findings indicate that low threat messages are still selected and processed, although selective exposure to these messages varies depending on vigilance-avoidance. Thus, perceptions of low message threat may in fact not immediately stop message processing for all individuals as parallel processing theories suggest. Second, while this study did not measure relevant behavioral self-efficacy, findings do suggest that additional personality characteristics such as vigilance-avoidance might affect parallel process models—either in addition to or perhaps even more than self-efficacy—and influence behavioral results. For example, in the context of a breast cancer fear appeal message, self-efficacy might influence whether the message receiver acts upon the recommendations made in the threatening message, but individual levels of vigilance or avoidance may also influence adoption of these behavioral recommendations. Future research is needed to examine how vigilance-avoidance might interact with message characteristics and self-efficacy to influence action after receiving lower or higher threat health messages with behavioral recommendations.

While vigilance-avoidance had a significant effect on the amount of time women spent reading breast cancer information of lower or higher threat, and their choice of headlines did follow predicted patterns (i.e., the low threat high endorsement thread was

selected most frequently and the high threat low endorsement thread selected least frequently), selection percentages were more similar between the high and low threat headlines than anticipated, and indeed did not differ significantly from chance. A relatively high mean level of vigilance in the sample[13] may help explain this unexpected result. Perhaps more vigilant individuals are split between a desire to select a more positive and less threatening message, and a desire to scan for and approach threatening information, as they have been theoretically posited to do (e.g., Byrne, 1961; Krohne, 1993).

The priming effect of threat (i.e., whether participants saw a high or low threat prime) also influenced headline selection, such that people who saw a high threat prime were more likely to choose a high threat headline, which may again have increased the overall likelihood of high threat threads being selected. This again suggests that people may generally be interested in reading threatening information about others' health, particularly once they have previously seen threatening information on a relevant health topic. In the context of online health information sites, it is easy for users to move between different threads or questions. This suggests that perhaps subsequent behavior and information selection on these sites may be influenced by the threat level of what was first viewed. However, because vigilance-avoidance was not a significant predictor of headline selection, this again indicates that this tendency may occur irrespective of individual differences in personality. While pretests did not suggest significant differences in interest in high- versus low-threat health information, these additional findings suggest this still may need to be explored further with future research.

Indeed, avoiders may be equally likely to select high threat headlines in the online environment as vigilants, as vigilance-avoidance did not significantly predict headline

selection. However, because breast cancer as a topic may be inherently threatening to most women—perhaps particularly to avoiders—even the "low threat" headlines may have still been perceived to be threatening by participants.[14] The environment of both studies was relatively limited in that participants could only choose between headlines that had to do generally with breast cancer diagnosis and testing. Future research that allows for freer selective exposure (e.g., perhaps between different health issues of varying levels of threat, rather than just cancer) may be warranted to explore this further. Finally, because a relatively small group of the total sample size was both very avoidant and randomly assigned to see the high threat prime, these results may need to be re-tested in the future with a larger sample size of avoidant individuals to better understand how these individuals, specifically, react to a threatening prime in terms of subsequent information selection.

Findings from the present study do suggest that avoiders spend less time reading high threat information than low threat information, and also spend less time reading high threat information than vigilants do. These findings support theoretical work that suggests that people who are more vigilant will intensively search for and thoroughly process threatening information (Byrne, 1961, Krohne, 1993; Krohne et al., 2000). This may also lend support to the "repressive discontinuity hypothesis" (Hock & Krohne, 2004)—that avoidant individuals exhibit attention to threat at the encoding phase, but more quickly forget the threatening information when compared to vigilants. In cognitive research and theory, encoding is a phase that involves selection of information from the environment as well as transforming it into a mental representation (Lang, 2000, 2006). Other scholars have similarly suggested that because of the threat inherent in cancer messages, an individual's "aversive" system will be activated when encountering a cancer-related message, causing cognitive resources to be

allocated to both encoding and storage (Lang, 2006), although this theoretical model does not account for individual differences in approach-avoidance to cancer messages other than personal relevance.

Research that has indicated that avoiders demonstrate increased recall immediately after the encoding phase followed by decreased recall (as compared to vigilants) of threatening stimuli after a delay has been used to support the contention that avoiders wish to shield themselves threatening cues (Hock & Krohne, 2004; Krohne & Hock, 2008). However, these studies forced exposure to threatening stimuli on all participants, rather than allowing for selective exposure. Thus, perhaps a refined hypothesis is warranted, such that avoidant individuals do not necessarily initially avoid cues of threat—at least in the context of online health information—but that avoidance is manifested in decreased time spent with the threatening message.

The Influence of Vigilance-Avoidance and Threat on Credibility Perceptions

The present findings suggest that high threat information about breast cancer diagnosis from a patient was perceived to be more credible than low threat information, although this relationship was again moderated by vigilance-avoidance, such that people who were more vigilant found high threat information to be more credible than low threat information, but people who are more avoidant did not indicate significant differences in credibility. This suggests that vigilants do exhibit biased processing, such that they tend to more positively judge threatening health information than nonthreatening health information. Thus, prior scholars' suggestions that all individuals exhibit a defensive bias that avoids threat (e.g., Ruiter et al., 2004) are not supported; here it appears that people who are more

vigilant, if anything, exhibit a bias *towards* threat, as they find threatening information to be more credible.

However, because the low threat level in this study was indicated by receipt of a benign diagnosis for a breast lump (e.g., fibrosis or a cyst) and the high threat information was conveyed via a story describing receipt of a cancer diagnosis, it is also possible that participants found high threat information particularly believable because of their prior perceptions of the likelihood of a breast lump meaning cancer. While directions provided in the study noted that a breast lump may not always mean cancer, and may in fact frequently be a benign condition such as a cyst, it is possible that many vigilant participants found a cancer diagnosis more believable than a benign diagnosis due to prevalent perceptions that associate breast lumps with breast cancer.

Health anxiety, or a spectrum of anxiety (related specifically to health) that ranges from low anxiety to hypochondriasis (extremely high health anxiety that is usually maladaptive), is similarly positively associated with a tendency to believe threatening health information is more accurate than nonthreatening information (Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998; Warwick & Salkovskis, 1990). People who are more health anxious are also more likely to misinterpret ambiguous information as more personally threatening than it is in reality, and are more likely to seek reassuring health information (Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998). While health anxiety and vigilance-avoidance are clearly separate constructs—health anxiety (particularly at high levels or hypochondriasis) can be a seriously maladaptive characteristic of irrationally negative interpretations of "symptoms" or bodily changes, whereas vigilance-avoidance simply has to do with approach or avoidant tendencies to threatening information or stimuli more

broadly—the two constructs could benefit from further study in conjunction. For example, are people who are highly health anxious also more vigilant to both threatening and reassuring health information, or just to reassuring information? Can an individual be both avoidant and health anxious? Exploring interactions between these personality characteristics and their effects on health information search, evaluation, and resulting action (e.g., health risk reduction steps) would be an intriguing area for future research.

With the wealth of online health information of mixed accuracy and threat level available to information consumers, any potential for information to be found credible by individuals simply because it is threatening or provides a "worst case scenario" health story is concerning. While this study did not vary the accuracy of the health information evaluated by participants, it is possible that individuals who are more vigilant, in their desire to scan for and intensively process threatening information, may be biased in their interpretation; this could be particularly detrimental if inaccurate, threatening health information is perceived to be credible. Future research, by varying the accuracy of the information presented to participants, could help assess whether the processing bias exhibited by vigilants holds true even in the context of more ambiguous or inaccurate information, and what effect this might have on subsequent health knowledge, attitudes, and behaviors.

Even information that is not necessarily clearly inaccurate or accurate, such as the personal health stories used in the present study, could be easily interpreted as truthful by people who are more vigilant, even if the health threat of the story is exaggerated by the information provider. Interpersonal communication research suggests that people tend to judge others as honest and truthful even when they are not being truthful (e.g., the "truth bias" in Levine, Park, & McCornack, 1999), and a similar credibility bias may be more likely

for vigilants when the information they are evaluating is of higher threat, even if that information was exaggerated by the patient providing it. Prior research has also suggested that a desire to be accurate is frequently overridden by defense motivation when processing a message (Lundgren & Prislin, 1998). This may suggest that a defensive processing bias resulting in a skewed perception of credibility may be likely even in contexts (such as health) where accuracy would normally be privileged. The extent to which vigilance-avoidance resembles defensive processing characteristics suggests that people who are vigilant or avoidant may process both accurate and inaccurate health information in a defensive manner depending on its level of threat, although this contention remains to be explored further by researchers.

Avoiders may also exhibit biased processing such that high threat information is perceived to be less credible than low threat information; however, while this study showed trends in that direction, results were not significant. Information evaluated by participants in both studies was consistently rated as credible—i.e., while the credibility dependent variable exhibited sufficient variance, credibility ratings were relatively high across all conditions—which may have contributed to these results. Perceptions of credibility may also have been influenced by the relatively high education level of the sample, as highly educated individuals may have been more likely to consistently judge the information, which was accurate, as credible. Thus, prior research that suggests that people who are more avoidant exhibit defensive avoidance and message derogation in the face of threat (Ruiter et al., 2004) is only partially supported here. While avoiders do regulate their selective exposure to threatening information, they do not appear to discredit it through denigration of credibility. However, this is again discussed further in the second study.

As mentioned earlier, future research that over-samples avoiders may be necessary to replicate the non-significant results of the present study or explore a more avoidant sample to better understand any potential for biased processing of threatening information. While the relatively high vigilance level of the sample is an interesting discovery in itself—that these adult female participants generally tended to be more vigilant than avoidant—it did limit the testability of some of the hypotheses regarding behavior and processing at more extreme levels of avoidance. An additional limitation is that while many findings in which vigilance-avoidance interacted with other independent variables had significant effects on the dependent variables, effect sizes were generally small.. Future studies could remedy the potentially problematic avoidant sample size issue in the present studies by over-sampling people who are more avoidant in order to have a larger sample at the lower end of the vigilance-avoidance scale.

However, whether or not this sample is typical or atypical of the wider population is unknown, as it only included adult women recruited through Mechanical Turk. While prior research has suggested that men and women evaluate threatening, ambiguous, and nonaversive stimuli differently (Krohne & Hock, 2008), pretests for the present study did not find any significant gender differences in levels of vigilance-avoidance. However, a limitation of those tests is a small sample size of men, and future research should certainly explore vigilance-avoidance in the face of threatening health information across genders, and with a health concern that is less gender-specific than breast cancer, to understand how men's reactions to threatening stimuli might be moderated by personality.

Effects of Social Endorsement of Health Information

Endorsement was also posited to influence selective exposure and perceived credibility, based on prior research and theory about heuristic cues commonly used when evaluating online information (Metzger et al., 2010; Sundar et al., 2008), as well as findings that indicate information found online about others' opinions can impact our own opinions (Flanagin & Metzger, 2013). However, most of the hypotheses in this study regarding the effects of endorsement were unsupported; endorsement was not found to affect selective exposure (except when it interacted with threat level) or perceived credibility, suggesting that at least in the context of health information, we are not as influenced by community opinions as we may be in other contexts, such as product or business ratings.

While prior research has suggested that people frequently use cognitive heuristics such as reputation and endorsement (Metzger et al., 2010; Sundar et al., 2008) when evaluating the credibility of online information, findings from the present study suggest that use of these heuristics may vary by domain or topic, and are less influential in the domain of health. Research on doctor-patient interactions has demonstrated that patients often want to feel in control of their own healthcare, making informed decisions themselves with the help of their physicians (see, e.g., the review in Ong, de Haes, Hoos, & Lammes, 1995). Perhaps people similarly desire to make their own assessments of health information online, rather than perceiving sources to be credible if others do and trusting sources that are recommended by others like they might in the domain of product or service information.

At the headline selection stage, participants did seem to select high endorsement headlines over low endorsement headlines (62% to 38%), however, a substantial number of participants still selected one of the low endorsement headlines. This may have been

influenced by the cover story of the study, which told participants they were evaluating a women's health website; perhaps these participants wished to select "bad" information in order to provide more helpful feedback to the website creators, particularly as they were ostensibly being paid by Mechanical Turk to do so.[15] Endorsement also did not influence reading time, although it did interact with threat such that participants spent the most time reading the high threat low endorsement thread, followed by the low threat high endorsement thread, the low threat low endorsement thread, and the high threat high endorsement thread. As discussed previously, the level of vigilance of the sample may have contributed to a desire to spend more time reading threatening information.

Intriguingly, however, the high threat information was both highest in selective exposure (when low endorsement) and lowest in selective exposure (when high endorsement), with the two low threat conditions falling in between. The combination of few recommendations and high threat may have led to more curiosity about the topic, or participants may again have been motivated to spend more time scrutinizing the low endorsement information, particularly if they desired to provide good feedback to website creators or were curious as to what qualities of the message itself would have motivated so few others to recommend it. Indeed, this in combination with the overall high credibility ratings across all threads may suggest that participants were led to wonder what in this thread, which seemed credible, was so unpopular with others, adding to additional scrutiny time. This type of more thorough processing would particularly make sense for people who are more vigilant, however, the lack of a significant three-way interaction with vigilance-avoidance leaves this supposition unsupported.

Endorsement did not influence perceived credibility, either as a main effect or interacting with threat, nor was that interaction moderated by vigilance-avoidance. Again, the information provided in the study may have been too credible to participants to be overridden by an endorsement effect, as the information provided about breast cancer was consistently credible across high and low endorsement conditions. Additionally, while endorsement levels were pretested extensively, a limitation of both studies is that the manipulation check for endorsement was conducted long after the manipulation itself in order to limit undue effects on the dependent variables; this resulted in some participants not being able to recall the level of endorsement they saw. Thus, results in the present studies about the lack of endorsement effects in the context of health information should be interpreted with caution, and effects of other types of social endorsement (e.g., from known versus unknown others) of online health information would be very interesting to explore in future research to help clarify these findings.

The personal stories about breast cancer diagnosis used for this study were taken, with minimal modification from the researcher, from the discussion boards of breastcancer.org, a popular breast cancer discussion site. While these stories were not randomly sampled and were selected by the researcher due to their content for the purposes of this study, this does provide some preliminary evidence that perhaps women generally find breast cancer information provided by other women to be credible, regardless of community endorsements. This is particularly interesting in light of research that indicates that online health information is provided largely by a relatively small number of "superusers" (O'Neill et al., 2014). This, in combination with findings from the present study about the relatively high level of perceived credibility of information from these health information contributors,

suggest that future research that examines the quality of superusers' contributions, as well as characteristics of these information providers, would be of great value.

Mediating Variables

Finally, it was posited that perceived credibility would mediate the relationship between threat and selective exposure and endorsement and selective exposure, but neither of these hypotheses were supported. This is consistent with other findings that suggest that neither selective exposure nor perceived credibility is influenced by endorsement in this context. That credibility does not mediate the relationship between threat and selective exposure is somewhat surprising; however, this relationship is clarified once the moderating effect of vigilance-avoidance is considered. In a moderated mediation model, the effect of threat on selective exposure via perceived credibility is conditional on levels of vigilance-avoidance, such that *only* for people who are more vigilant is the relationship between threat and selective exposure mediated by perceived credibility. Thus, people who are more vigilant find high threat information more credible, and also selectively expose themselves to that information more, but this relationship does not hold true for people who are more avoidant.

Prior research in the domain of political information has suggested that people interpret information that goes against their attitudes as a negative credibility cue, which can lead to reduced future desire to use the source again (Metzger et al., 2015). This study indicates that the personality traits of the information evaluator may need to be considered as an additional explanatory variable. In the health context of the present studies, higher threat information is interpreted by vigilants (but not avoiders) as a positive credibility cue, leading to increased selective exposure in time spent reading. Additionally, perceived credibility mediates the relationship between vigilance-avoidance and selective exposure, again

suggesting that an individual's personality can influence information evaluation, which then influences selective exposure. However, a limitation of this finding is that the selective exposure measure used (time spent reading) was measured as the participant was interacting with the stimulus, and thus before the credibility mediator variable was measured. Ideally, in terms of time order, the mediator (credibility) would be measured before the distal dependent variable (selective exposure) (see, e.g., the review of mediation design and techniques in MacKinnon, Fairchild, & Fritz, 2007), although such a time order was not possible in the present study as the credibility of a message cannot be measured before a participant reads it.

Avoiders spend less time reading high threat information than low threat information (and vigilants do the opposite), but find high threat and low threat information relatively equal in credibility, which supports the contention that credibility only mediates the relationship between threat and selective exposure for people who are more vigilant. Perhaps people who are more avoidant are paying less attention to the message (due to their desire to avoid the negative stimuli) than people who are more vigilant. This contention is explored further in the discussion of the results from the second study.

Prior research and theory in credibility has explored how certain individual differences, such as need for cognition, can influence information evaluation. For example, the elaboration likelihood model (ELM; Petty & Cacioppo, 1986) and Metzger's (2007) dual processing model suggest that motivation to process a message can vary by a number of individual characteristics of the message receiver, including personal relevance of the information (issue involvement) and need for cognition, which is defined as the desire to cognitively process, understand, and reason with information (Cacioppo, Petty, Feinstein, & Jarvis, 1996). As noted previously, vigilance holds some similarities to need for cognition,

but is refined to be more specific to a desire to approach and thoroughly process threatening information. The present research indicates that vigilance has a positive correlation with credibility perceptions even regardless of message threat level, suggesting that in the context of health, it is an additional individual difference variable that should be considered by future credibility theory and research.

Prior findings suggest that individuals higher in need for cognition are more likely to indicate behavioral intention to complete a recommended breast self-exam when presented with relevant health promoting messaging; however, for people low in need for cognition, these messages may actually result in reduced intention to complete this recommended health behavior (Ruiter et al, 2004). It is possible that vigilance-avoidance might similarly influence not only online behavior, as found in the present studies, but also one's likelihood of adhering to health guidelines, particularly when those guidelines are perceived to be threatening. Individuals who construct health promotion messages (e.g., fear appeals) should consider that the effectiveness of these messages may vary accordingly given the level of vigilance-avoidance of their target audience.

Selection of Experiential and Credentialed Source Types

The central goal of the second study was to follow up on the results of the first study, which only assessed information from experiential sources, by exploring (a) how the type of source (experiential versus credentialed) and endorsement of health information influence selective exposure and processing, and (b) how vigilance-avoidance moderates those relationships and their interaction. As in the first study, vigilance-avoidance appears to influence both selective exposure and processing of online health information, even when levels of threat are held consistent, indicating that vigilance-avoidance may help explain

health-related information processing and selection behavior irrespective of whether the health concern is of higher or lower perceived threat to the individual.

The effects of source type on the dependent variables were somewhat contrary to expectations, but still resulted in useful findings that can inform our understanding of health information selection and perceptions, particularly in the online environment. It was anticipated that source type would influence selective exposure, such that individuals would be more likely to select online health information from credentialed sources than from experiential sources. While this was reflected in the selection of headlines from different source types (a third of participants selected the credentialed high endorsement headline, followed by the experiential high endorsement headline and the credentialed low endorsement headline, with only about 15% of participants selecting the experiential low endorsement headline, although a chi-square test of these differences only approached significance), the opposite was reflected in time spent reading the threads.

Overall, individuals seemed interested in selecting information from both experiential and credentialed sources (based on the headline selection results), but spent more time reading experiential information than credentialed information. This could be due to an expectation that experiential sources would be less credible than credentialed sources, thus requiring more time thoroughly scrutinizing and processing their information. It is also possible that patient information is perceived to be more interesting than information from physicians, and readers were drawn to information and stories provided by other "community members," although pretests conducted before the main studies indicated no significant difference in participant interest in physician- versus patient-provided information. More clarity is lent by considering the relationship between source type and perceived credibility

as conditional on levels of vigilance-avoidance. At low and medium levels of vigilance-avoidance there is a significant moderating effect of vigilance-avoidance on the relationship between source type and perceived credibility, such that women who are more avoidant spend less time reading information from credentialed sources than experiential sources, but at very high levels of vigilance this difference between selective exposure to credentialed and experiential sources is not significant.

These findings—that people who are more avoidant spend even less time reading credentialed information than experiential information—may be indicative of the type of defensive processing bias that is theoretically expected when avoiders encounter threatening information. Although threat level was not varied in this study, information about breast cancer diagnosis and treatment (e.g., what a core biopsy, chemotherapy, or radiation treatment is like) is likely to be perceived as threatening by women who are more avoidant, resulting in defensive bias. Because physicians are perceived to very credible in this context due to their credentials, it would be difficult even for people who are avoidant to discount or denigrate their information via biased perceptions or processing (e.g., "this information is inaccurate"), so the easiest method for avoiders to discount threatening information from credentialed sources would be to simply skip over it. These results are also similar to findings in health anxiety research, which suggest that people who are higher in health anxiety (e.g., closer to hypochondriasis) report responding negatively to online health information, but only when that information comes from trustworthy sources (Baumgartner & Hartmann, 2011). However, health anxiety is typically associated with more information search and scanning for threatening health information (Baumgartner & Hartmann, 2011; Eastin & Guinsler, 2006; Hadjistavropoulos, Craig, & Hadjistavropoulos, 1998; Warwick, &

Salkovskis, 1990)—characteristics that are more closely aligned with vigilance than avoidance.

Perhaps people who are more avoidant were hoping they could find errors, inaccuracies, or other reasons to disbelieve the threatening information from experiential sources, thus requiring more reading and processing time to search for those potential negative credibility cues. Because this project examined source type and threat as independent variables in two separate studies, whether or not vigilance-avoidance influences selection and interpretation of any interaction between threat and source type is still unknown, and a promising area for future research given the current results. For example, while it seems possible given findings from these studies, whether avoiders skim, skip, or otherwise evade threatening information from credentialed sources significantly more than they would nonthreatening information from those sources is still unclear.

The finding that women who are more avoidant spend less time reading information from credentialed sources may be particularly concerning, as these women may broadly defensively select and/or process health information from credentialed sources even beyond physicians, suggesting they may also avoid health promotion or health risk messages from other credentialed sources such as government or other health organizations. Concern in the public health community that the media landscape could negatively influence voluntary exposure to health information from these or other credentialed sources dates back to the 1960s (Swinehart, 1968), and the ability to voluntarily expose oneself to or avoid media—and by relation, health information shared via those media—has only increased since. If people who are more avoidant do indeed want to protect themselves from threatening stimuli such that they spend less time examining threatening health messages from credentialed

sources as indicated by these studies, they are easily able to do so in the contemporary media environment.

Indeed, the assumption in selective exposure research is that people prefer to avoid dissonant information and/or seek out consonant information (Eagly & Chaiken, 1993; Festinger, 1957; Hart et al., 2009), which is particularly easy to do online (Garrett, 2009; Garrett, Carnahan, & Lynch, 2013; Hartsell et al., 2012; Chaffee & Metzger, 2001). Most of the research that has made this argument is in the domain of political or news information, but results of the present study suggest that some people may desire to avoid threatening and/or credentialed health information online, while others may actively seek out such threatening information.

Whether or not individuals are more or less likely to do this with specifically attitude-congruent or attitude-incongruent information is still unclear, however, as it was not tested in the present studies. For example, would vigilants particularly seek out threatening health information that matches preexisting attitudes about their perceptions of disease susceptibility or perceptions of certain disease characteristics? If vigilants are also very health anxious, it seems likely that they might seek out threatening information that meets preexisting hypochondriastic attitudes, and also process information in a biased manner to interpret it in a self-threatening and potentially dysfunctional way (Warwick & Salkovskis, 1990). Additionally, research that suggests that individuals of varying levels of avoidance coping selectively expose themselves based on certain message characteristics (e.g., accuracy and utility) (Johnson & Knobloch-Westerwick, in press) suggest that the interaction between pre-existing health attitudes, vigilance-avoidance characteristics, and message cues is a promising area for future research.

Credibility of Experiential and Credentialed Source Types

Findings from this dissertation indicate that people who are avoidant spend even less time looking at credible health information from a physician than they do from a patient, again suggesting that when allowed to selectively expose themselves to information, they may miss key messages that are important to their overall health. Because it is difficult to control a patient's selective exposure to media, health practitioners should be thoughtful in their communications with patients, and ensure that patients have thoroughly processed any information shared with them. Additional findings in this study suggest that experiential sources received more exposure overall, but there were no significant differences in perceived credibility between experiential and credentialed sources when controlling for vigilance-avoidance. Thus, for most people, both credentialed sources with their traditional markers of credibility, and experiential sources due to their personal experience, are considered knowledgeable and trustworthy, even if more time was needed to inspect the experiential information to come to that conclusion. This may indicate that source type cues in fact *do* matter to some extent, as people may be more initially skeptical of experiential information, but if the message itself seems credible then these cues do not overtly influence overall evaluation.

It was additionally found that while there were no significant differences in either perceived credibility or helpfulness ratings between credentialed and experiential sources, there was a significant difference in perceived bias between these sources. In other words, while experiential and credentialed sources are relatively equal in helpfulness and credibility, experiential sources are perceived to be more biased than credentialed sources. Prior credibility research has often related source bias to other constructs, such as persuasive intent

or trustworthiness, and suggested that such bias is a negative credibility cue (see review in Pornpitakpan, 2004). However, the present study did not find any differences in the perceived credibility of someone's personal health experience with a breast cancer diagnostic test or treatment (which was also perceived to be more biased) as compared to a physician's explanation of the same test or treatment (which was perceived to be more unbiased). This suggests that bias may have a more complex relationship with perceived credibility than previously understood, such that there are contexts (e.g., when reporting a relevant personal experience) in which a perceived biased source can be perceived as credible. However, this should be explored more thoroughly in future research, as bias in the present study was only measured as a single item and included as part of post-hoc analysis.

These studies indicate that individuals may be equally likely to select online health information from physicians and patients, and that information from both can be considered equally helpful and credible. With the amount of user-generated health content growing online, this is of major concern only if the accuracy of such content is substantially lower than that provided by a credentialed source, such as a physician or a reputable health organization. This study did not test for such differences, and future research that does will be valuable in understanding what negative or positive effects this user-generated information may have on health information seekers. However, it is important to note that information evaluators in this study did recognize that patients were more biased than doctors, but that this recognition still did not negatively impact perceptions of credibility or helpfulness. Apparently, in the context of discussing our own health, we can be biased but still credible to others–perhaps precisely because of the experiential nature of personal health information. The extent to which this source bias manifests itself in biased health information

shared by that source has yet to be explored, but would be very helpful in lending further clarity to these results.

Prior research has suggested that repression-sensitization (which the measure of vigilance-avoidance is derived from) relates to perceptions of source credibility (Pornpitakpan, 2004), such that repressors are more influenced by cues of source expertise and sensitizers are more influenced by argument strength (DeBono & Snyder, 1992). Because the present study suggests that experiential and credentialed sources may be equally "expert," though for different reasons, these prior research findings were not replicated. However, it is possible that vigilance-avoidance interacts with both source cues and message cues not tested in the present study (e.g., argument strength), and researchers should continue to explore these interactions by manipulating both source and message cues.

Overall, many of the hypotheses of this dissertation regarding endorsement were unsupported; for example, endorsement was not found to affect either selective exposure or perceived credibility in Study 2. This again suggests that at least in the context of health information, individuals are not as influenced by community opinions shared online as they might be in other contexts. Most of the research on endorsement's effect on online information evaluation and behavior is in the domain of ecommerce. For example, product ratings have been found to influence purchase intent and subsequent ratings (Moe & Trusov, 2011; Sridhar & Srinivasan, 2012), as well as evaluations of product quality and product preference (Flanagin, Metzger, Pure, & Markov, 2011; Zhu, Huberman, & Luon, 2012). However, while some research has examined online ratings of physicians (Gao, McCullough, Agarwal, & Jha, 2012; Hanauer, Zheng, Singer, Gebremariam, & Davis, 2014; Kadry, Chu, Kadry, Gammas, & Macario, 2011), little research has examined the effects of endorsement

of personal health information and experiences from patients on subsequent selection and evaluation.

That endorsement did not significantly influence selective exposure or perceived credibility, either as a main effect or interacting with vigilance-avoidance, suggests both that (a) these types of community endorsement cues are not as important in the context of health information and (b) there is no relationship between vigilance-avoidance and these cues. In other words, people who are more or less vigilant do not view cues of endorsement as cues that might indicate threat or comfort, nor do they react to these cues in the way that they reacted to more clearly threatening or nonthreatening information in Study 1. Thus, while the social influence of others' behavior and opinions has, in classic social psychological theory, been considered a motivator in many contexts (e.g., Asch, 1955; Deutsch & Gerard, 1955), it does not appear to be as influential when individuals are evaluating the credibility of others' health stories.

Based on results of these studies, a revised selective threat processing framework is presented in Figure 4. Overall, in terms of relative weight of the independent variables examined in this project as a whole, individuals are influenced by message cues (threat) and source cues (source type) more than they are community cues (endorsement) when selecting and evaluating online health information; this is reflected by the more limited role of endorsement in the revised model. Perhaps when evaluating information about health—a particularly important domain, in which trusting incorrect information could have significant negative consequences—individuals are unswayed by the opinions of others, and prefer to come to their own conclusions. Similarly, helpfulness ratings do not appear to play as strong a role as perceived credibility, again suggesting that perceptions of credibility may differ

from perceptions of the helpfulness of information, even if helpfulness was not a significant dependent variable or mediator in these studies.

It is also important to note that selective exposure, as represented by the model, is the amount of time spent reading a message. Future research that further explores selective exposure, and differences between information selection (e.g., clicking a headline or link) versus time spent reading would be a great asset to the selective exposure literature. Finally, vigilance-avoidance not only moderates most relationships between source cues and message cues and information evaluation and processing, it also moderates the mediating role of perceived credibility. In sum, these studies make clear that individual differences in vigilance-avoidance should be considered in the context of health and other contexts that might expose people to threatening information or stimuli.

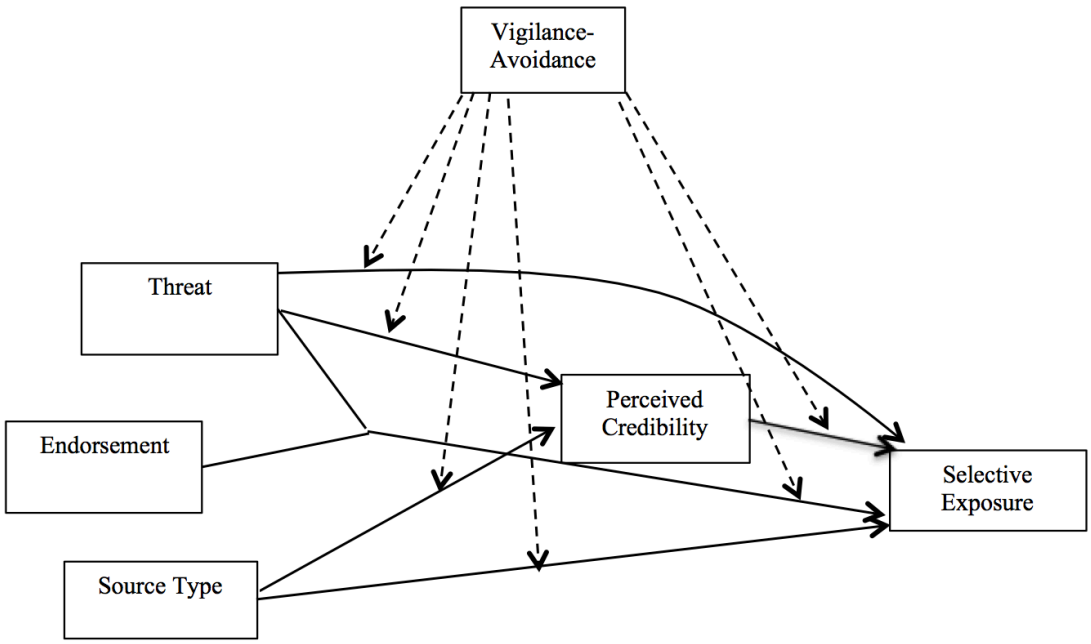

Figure 4. Revised selective threat processing framework. Dotted lines represent moderation; merging lines represent interaction effects.

Conclusion

Taken together, results of these studies support the proposition the people exhibit differences in selection and evaluation of health information depending on their personality characteristics of vigilance-avoidance. Women who are more vigilant spend more time reading threatening health information about breast cancer and evaluate it as more credible than women who are more avoidant, and women who are more avoidant spend more time reading low threat breast cancer information than high threat information. These findings suggest that individuals who are higher in vigilance should be particularly wary of any tendency they may have to trust health information simply because it seems threatening. Avoidant individuals, however, should also be mindful of their interactions (or lack thereof) with health information, as they are more likely to react defensively to such information by skipping or skimming over it. Health practitioners, patients, and health organizations, too, should consider how laypeople may react to their messages. While a threatening headline or health story online may generate more interest and time spent reading a webpage, content creators should also consider that the threat level of a message may unduly influence whether individuals find the information more or less credible.

Women who are more avoidant spend less time reading information from credentialed sources such as physicians than experiential sources such as patients. These findings—that people who are more avoidant spend even less time reading credentialed information than experiential information—may be indicative of the type of defensive processing bias that is theoretically expected for people who are more avoidant, and is concerning in that these individuals may miss important, credible information that could have significant benefits to their health. Finally, these studies indicate that individuals who fall

anywhere along the vigilance-avoidance spectrum may find information from experiential and credentialed sources to equally helpful and credible, even though most information evaluators do view experiential sources as more biased than credentialed sources. As more personal health stories are shared and read online, we need to be particularly cognizant of the varied quality possible when health information is provided by a (potentially biased) patient, particularly if we find ourselves seeking those personal health stories and viewing them as comparably credible to health information from credentialed sources.

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Appendix A: Factor Loading Tables for Vigilance-Avoidance Items

Factor Loadings for ML Confirmatory Factor Analysis for Unplanned Pregnancy Scenario Items

	Avoidant	Vigilant
Else	0.86	
Other	0.89	
Not	0.73	
Normal	0.82	
Distract	0.90	
Information		0.86
Find		0.83
Options		0.64
Plan		0.69
Questions		0.59

Note. All loadings are significant at $p < .001$.

Factor Loadings for ML Confirmatory Factor Analysis for Illness Scenario Items

	Avoidant	Vigilant
Else	0.88	
Other	0.85	
Not	0.84	
Normal	0.84	
Distract	0.78	
Information		0.90
Find		0.85
Options		0.74
Plan		0.73
Questions		0.72

Note. All loadings are significant at $p < .001$.

Factor Loadings for ML Confirmatory Factor Analysis for Flight Scenario Items

	Avoidant	Vigilant
Other	0.89	
Normal	0.88	
Else	0.85	
Distract	0.80	
Not	0.81	
Information		0.85
Find		0.87
Options		0.65
Questions		0.84
Plan		0.58

Note. All loadings are significant at $p < .001$.

Factor Loadings for ML Confirmatory Factor Analysis for Sick Scenario Items

	Avoidant	Vigilant
Other	0.84	
Normal	0.86	
Else	0.87	
Distract	0.85	
Not	0.82	
Information		0.84
Find		0.87
Options		0.65
Questions		0.79
Plan		0.70

Note. All loadings are significant at $p < .001$.

Factor Loadings for ML Confirmatory Factor Analysis for Family Scenario Items

	Avoidant	Vigilant
Else	0.91	
Distract	0.85	
Not	0.81	
Other	0.78	
Normal	0.78	
Find		0.80
Questions		0.79
Information		0.79
Plan		0.63
Options		0.60

Note. All loadings are significant at $p < .001$.

Appendix B: Measures

Main Studies

Final Vigilance-Avoidance measure:

Directions:
Some situations are listed below that you may have experienced yourself or that you can imagine if you have not experienced them personally. For each situation, you will be presented with some things you might do or ways in which you might react. Please read each situation carefully, and then indicate the extent to which you think each of the responses would be true for you. Please respond to each item.

Situations/Scenarios:
A. Imagine you are on a flight that becomes extremely turbulent and a commotion seems to be happening near the cockpit where the pilots are. How likely are you to react in the following ways?
B. Imagine you are feeling really sick and don't know what is wrong with you.. How likely are you to react in the following ways?

Responses:

1	2	3	4	5	6	7
Not at all likely						Very likely

Come up with a plan to deal with the situation and follow through with it.
Try not to think about it.*
Become involved in other activities to keep your mind off of the problem.*
Keep your mind occupied by thinking about something else.*
Weigh various options and consider the best way to deal with this unpleasant situation.
Figure out a way to find out more information.
Try to take your mind off it by acting normal and thinking about other things.*
Keep yourself busy to distract yourself (for example, by reading a magazine or book, or by doing something on your phone).*
Ask a relevant, credible source questions to figure out the best course of action.
Find out as much as you can about the situation.
*All more avoidant responses were reverse-coded before being combined with the more vigilant responses, so higher final scores on the scale indicate higher vigilance and lower avoidance.

Issue Involvement measure (modified from Flora & Maibach, 1990 and Aldoory, 2001):

The following questions ask about how relevant breast cancer is to you personally.

I think about breast cancer a great deal.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

I am affected by breast cancer.
Breast cancer is a personally relevant topic.
I think it is likely that breast cancer will impact my life in the future.
I actively seek the most recent information about breast cancer.
Breast cancer is one of my primary health concerns.

Perceived credibility measure (from Flanagin et al., 2013):

The following questions ask about your perceptions of the information provided in the discussion thread. Thinking of the thread:

Overall, how believable did you find the information to be?

1	2	3	4	5	6	7
Not very believable						Very believable

Overall, how complete did you feel the information was?
Overall, how much do you trust the information you found?
Overall, how accurate did you find the information to be?
Overall, how credible did you find the information to be?
Bias measure:
Overall, how biased do you think the information was?

Selective exposure scale measure:

1	2	3	4	5	6	7
Very unlikely						Very likely

If you were concerned about breast health, how likely would you be to use this website for information again in the future?
If you were concerned about breast health, how likely would you be to want to read more discussion threads similar to this one?
Based on this thread, how likely are you to want to use this website in the future?

Demographics:

Age
Please indicate your age:

A. 18-29 years old
B. 30-39 years old
C. 40-49 years old
D. 50-59 years old
E. 60-69 years old
F. 70 years or older

Education
What is the highest level of formal education you have completed?
Less than high school
High school graduate
Some college
College degree
Graduate degree

Gender
(as an additional check so any males can be removed)
A. Male
B. Female

Manipulation checks:

Threat measure:

How threatening did you find the post?

1	2	3	4	5	6	7
Not at all						Extremely

How uncomfortable did the post make you feel?
How distressing was the post?
How anxious did this story make you feel?
How worried did this story make you feel?

Was the physical wellbeing of the person in the story threatened?

1	2	3	4	5	6	7
Not at all threatened						Extremely threatened

Source type measure:

Was the information you saw from (a) a patient who had personally experienced the health concern or treatment, or (b) from a healthcare practitioner (for example, a doctor or nurse?)
A. Patient with personal experience
B. Healthcare practitioner

Endorsement measure:

Was the percentage of womenshealthcommunity.org members who recommended the headline you clicked on:
A. High
B. Low
C. I don't remember

Pretests

Full Pretested Vigilance-Avoidance measure

Situations/Scenarios:
Imagine [(a) you are unmarried and do not want a baby right now, but are awaiting the results of a pregnancy test to tell you if you are pregnant or have fathered a pregnancy.] How likely are you to respond in the following ways?
[(b) You have recently been told you have a serious illness.]
[(c) You are on a flight that becomes extremely turbulent and a commotion seems to be happening near the cockpit where the pilots are.]
[(d) You are feeling really sick and don't know what is wrong with you.]
[(e) A close family member, like a child, parent, or spouse, may have an illness that is difficult to treat. You are waiting to hear from a doctor about whether or not they have that illness.]
How likely are you to react in the following ways?

Responses:

1	2	3	4	5	6	7
Not at all likely						Very likely

Come up with a plan to deal with the situation and follow through with it.
Try not to think about it.*
Become involved in other activities to keep your mind off of the problem.*
Keep your mind occupied by thinking about something else.*
Weigh various options and consider the best way to deal with this unpleasant situation.
Figure out a way to find out more information.
Try to take your mind off it by acting normal and thinking about other things.*
Keep yourself busy to distract yourself (for example, by reading a magazine or book, or by doing something on your phone).*
Ask a relevant, credible source questions to figure out the best course of action.
Find out as much as you can about the situation.
*All more avoidant responses were reverse-coded before being combined with the more vigilant responses, so higher final scores on the scale indicate higher vigilance and lower avoidance.

Trait Anxiety (modified from the Taylor Manifest Anxiety Scale, Taylor, 1953)

Directions: Consider each item carefully, then indicate whether each item is true or false for you. (Note – notes in parentheses will be used for coding purposes and will not be part of the items presented to participants).

1. I am often sick to my stomach.

1	2	3	4	5	6	7

Not at all true Very true

2. I am about as nervous as other people. (RC)
3. I work under a great deal of strain.
4. I blush as often as others. (RC)
5. I worry quite a bit over possible troubles.
6. When embarrassed I often break out in a sweat which is very annoying.
7. I do not often notice my heart pounding. (RC)
8. At times I lose sleep over worry.
9. My sleep is restless and disturbed.
10. I often find myself worrying about something.
11. I wish I could be as carefree as others.
12. I feel anxious about something or someone almost all of the time.
13. At times I am so restless that I cannot sit in a chair for very long.
14. I have often felt that I faced so many difficulties I could not overcome them.
15. At times I have been worried beyond reason about something that really did not matter.
16. I do not have as many fears as my friends. (RC)
17. I am more self-conscious than most people.
18. I am the kind of person who takes things hard.
19. I am a very nervous person.
20. Life is often stressful for me.
21. I am not at all confident in myself.
22. I don't like to face a difficulty or make an important decision.
23. I am very confident in myself. (RC)

Appendix C: Stimuli

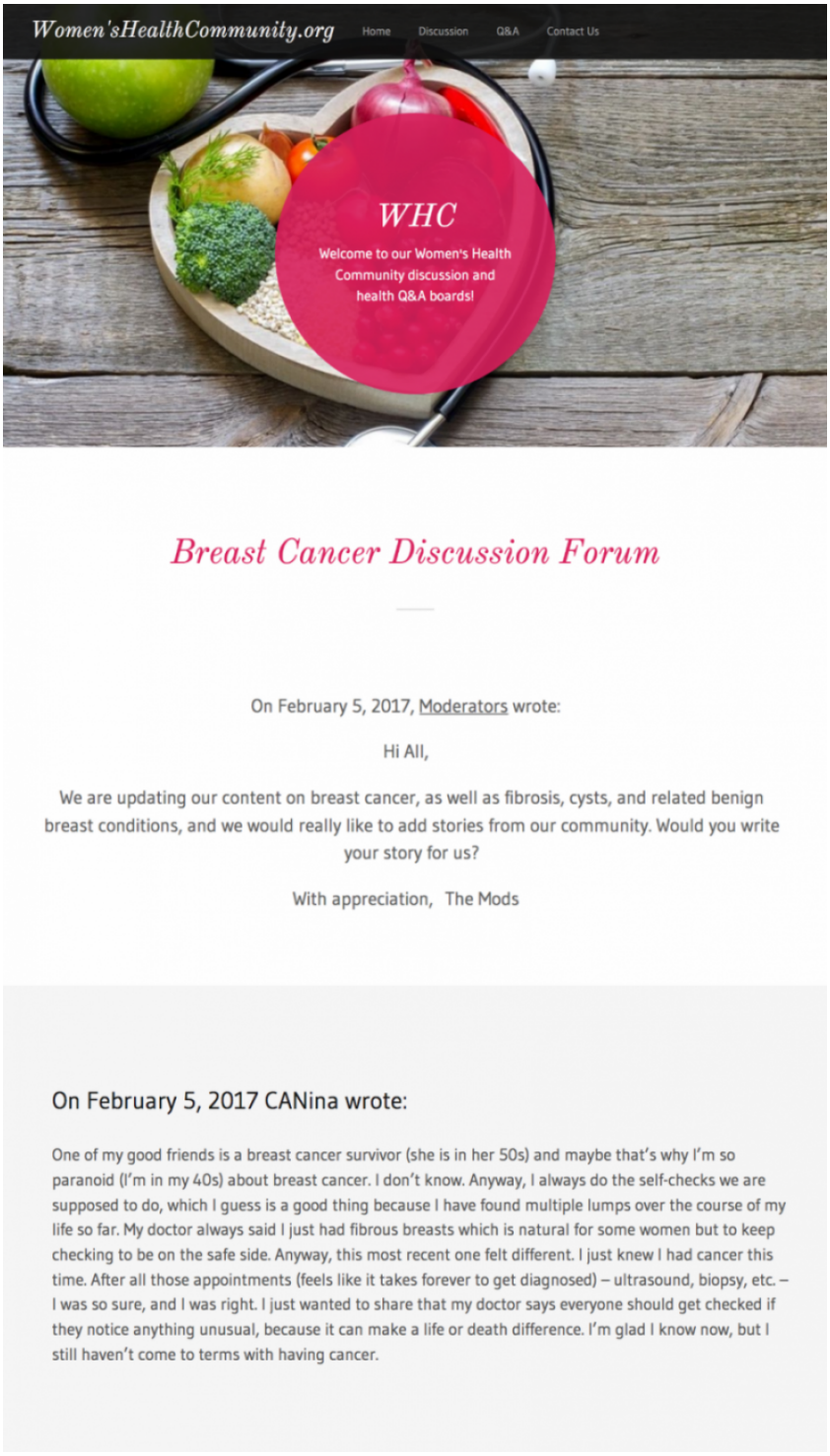

Figure 4. High threat prime for Study 1.

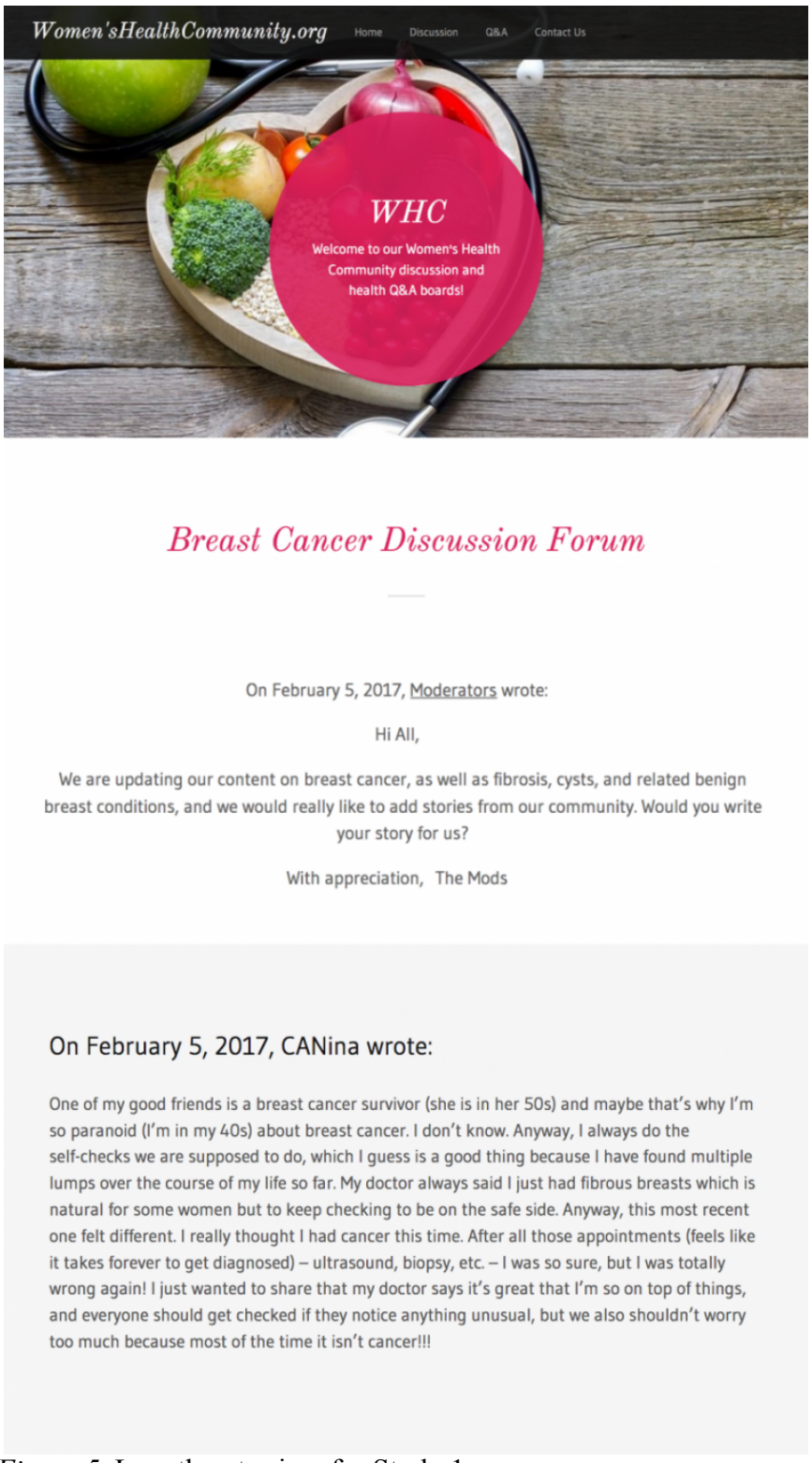

Figure 5. Low threat prime for Study 1.

Breast Cancer Discussion Forum

26% of womenshealthcommunity.org members recommend:

Women from our community tell happy-ending stories – a good reminder that not every breast abnormality means breast cancer!

29% of womenshealthcommunity.org members recommend:

These women thought they were living healthy lifestyles and had very low cancer risk, but they were wrong...

70% of womenshealthcommunity.org members recommend:

Women detail what it's like to go through some of the tests (not that bad!) and the joy of ending the rollercoaster with a benign diagnosis!

73% of womenshealthcommunity.org members recommend:

"I thought I had my whole life ahead of me" – women describe the emotional shock of an advanced breast cancer diagnosis.

Figure 6. Headlines for Study 1.

Prompt and Discussion Text for Study 1 Low Threat Thread

Moderators wrote:

Hi All,

We are updating our content on breast cancer, fibrosis, and cysts on our site and we would really like to add your personal stories to help others who come here and have it feel more personal, with real member stories. Would you write your story for us?

With appreciation,

The Mods

February 6, 2017 gramama wrote:

I found a lump and in a single month it grew from small bean size to what felt like larger than a quarter. It was not round, more oblong with hard uneven ridges on edges & rough feeling. By the end of the month it was clearly visible thru skin on the outside of my left breast. It is was a firm mass & felt like a foreign object in my breast. I was scared, and showed both my husband & mother in law, and the their reaction was even more worrisome, so I went to the doctor. The tests weren't bad, though the waiting was a little stressful. However, in the end it was just a fluid cyst! I feel like this type of thing happens to women all the time, so I just wanted to share my story so you know that if you find something weird, of course you should go to the doctor, but don't stress out because it might be nothing!

February 6, 2017 amy3959 wrote:

I found a lump in my breast right before the holidays. Thankfully, even though I thought it would be impossible to see a doctor around Christmas and New Years, I was seen relatively quickly. It was stressful to wait a bit between appointments, but all the tests they ran were really easy painless. Thankfully, it was just a cyst!!! That meant I was able to be my normal self, have fun with my kids, do everything I wanted, and keep my family enjoying the holidays. Even in normal years the holidays are a mix of happiness and stress, but this year despite the stress I was feeling so grateful at this happy time. I was so relieved it seemed like everyone was really full of holiday cheer.

February 7, 2017 BreezyC wrote:

My journey started out with a painful lump in my left breast back in July. At first I thought it was hormonal since I had just quit nursing my littlest in April. I figured it would go away after a cycle or two. Well a few months later it was still present, more painful and had grown larger. I made an appointment with my midwife. Her initial thought was maybe ductasia or a cyst that would need drained. She sent me for a Mammo and ultrasound just to be sure. Then after those tests the radiologist thought I needed an MRI. I had the MRI the following

friday and waited until Tuesday for results. They highly recommended a stereotatic biopsy due to a type 2 enhancement curve. I was too in shock to even ask questions. My emotions were all over the place. I had no family history of cancer, lead a fairly healthy lifestyle. But I know it can happen to anyone. In my case, eventually, after all those tests, I found out it was totally benign, nothing to worry about… Thank goodness. I could not be more overjoyed!!!

February 7, 2017 kitten25 wrote:

As weird as this sounds before I ever found a lump and had to go through all the tests my 16 year old daughter had already had a Core Needle Biopsy. She had a lot of pain afterwards so I was kind of afraid for mine, which I had to have after finding a lump and going through the ultrasound process. But I personally have a high tolerance to pain so it turned out okay. Then I had to wait for what felt like forever for my tests to come back. Thankfully, thankfully, like my daughter's it was totally benign. I am so relieved and she and I are both so happy!!!

February 9, 2017, 2016 tsn1212 wrote:

Honestly my experience was to be scared. You don't know if you're faced with something totally benign or advanced cancer. Particularly if you are someone who has seen first hand what cancer does to a person/family. We all want to be prepared for what is ahead. I work in a hospital, and when I was getting diagnosed, every time a person came in with breast cancer I burst into tears, not knowing if that would be me. I thought I might have only months to live. Before I had my first biopsy attempt, I thought the only women who get breast cancer are those who ignore their breast lumps. (Which is totally wrong.) Since I didn't have any, I thought my docs were just silly. That said, I'm so glad my doctors were thorough. Not only do I have the incredible relief now of knowing I don't have cancer, I'm really confident my doctors did a thorough job and I know they didn't miss anything. I really don't have cancer!!!

February 9, 2017, 2016 sasha15 wrote:

I am 60. My mother had died of breast cancer in her 40s, and I always felt I had done everything right and it would never happen to me. I was vegetarian for a long time, took healthy supplements, kept active, ran my own business, had regular mammograms, and was genetically tested for the breast cancer gene and it came back negative. All the things we believe are supposed to keep us healthy. I had noticed a lump in my breast for years but each mammogram was negative and my doctors assured me it was a fibroid cyst and nothing to worry about. In 2014, I realized I hadn't done a breast self-exam in quite some time so stood before the mirror to check myself out. As soon as I raised my left arm, I felt like something was different. However, I went to the doctor and again it was just the same cyst. I had just recently moved to a new state to open a small business in my favorite vacation spot, didn't really know anyone, had no friends or family within a thousand miles, so I was incredibly grateful to have another benign diagnosis!

Discussion Text for Study 1 High Threat Thread

February 6, 2017, 2016 gramama wrote:

I found a lump and in a single month it grew from small bean size to what felt like larger than a quarter. It was not round, more oblong with hard uneven ridges on edges & rough feeling. By the end of the month it was clearly visible thru skin on the outside of my left breast. It is was a firm mass & felt like a foreign object in my breast. I was scared, and showed both my husband & mother in law, and the their reaction was even more worrisome, so I went to the doctor. After many unpleasant tests and even worse waiting, I was diagnosed with advanced cancer. I feel like this is such a scary thing and can honestly happen to anyone, even if you think it would never happen to you. I never thought this would happen to me and it felt like it came out of nowhere.

February 6, 2017, 2017 amy3959 wrote:

I found a lump in my breast right before the holidays. First of all, it seems like it's getting harder to get a doctor's appointment any time, but around Christmas and New Years it's impossible. I was so stressed but just had to keep waiting to get seen, and then after they felt the lump waiting to get various tests, and then after that waiting to get test results back… And then I found out I had breast cancer. Meanwhile I'm trying to be my normal self which is a mom who does it all, and I had a hard time emotionally struggling with trying to live up to my old holiday self and keep my family enjoying the holidays. Even in normal years the holidays are a mix of happiness and stress, but this year I was angry at myself for feeling upset at a "happy" time. I was trying to hide it and was feeling really alone and scared when everyone else seemed full of holiday cheer.

February 8, 2017, 2016 BreezyC wrote:

My journey started out with a painful lump in my left breast back in July. At first I thought it was hormonal since I had just quit nursing my littlest in April. I figured it would go away after a cycle or two. Well a few months later it was still present, more painful and had grown larger. I made an appointment with my midwife. Her initial thought was maybe ductasia or a cyst that would need drained. She sent me for a Mammo and ultrasound just to be sure. Then after those tests the radiologist thought I needed an MRI. I had the MRI the following friday and waited until Tuesday for results. They highly recommended a stereotatic biopsy due to a type 2 enhancement curve. I was too in shock to even ask questions. My emotions were all over the place. I had no family history of cancer, lead a fairly healthy lifestyle. But I know it can happen to anyone. In my case, eventually, after all those tests, I found out it was pretty advanced breast cancer. Now I'm even more in shock, I have no idea what to say or do. I'm so scared.

February 7, 2017 kitten25 wrote:

As weird as this sounds before I ever found a lump and had to go through all the tests my 16 year old daughter had already had a Core Needle Biopsy. She had a lot of pain afterwards so I was kind of afraid for mine, which I had to have after finding a lump and going through the ultrasound process. But I personally have a high tolerance to pain so it turned out okay. Then I had to wait for what felt like forever for my tests to come back. Unfortunately, and it's hard even to write this because that means really admitting it, it was breast cancer, and not an early stage. I think I'm still in shock.

February 9, 2017 tsn1212 wrote:

Honestly my experience was to be scared. You don't know if you're faced with something totally benign or advanced cancer. Particularly if you are someone who has seen first hand what cancer does to a person/family. We all want to be prepared for what is ahead. I work in a hospital, and when I was getting diagnosed, every time a person came in with breast cancer I burst into tears, not knowing if that would be me. I thought I might have only months to live. Before I had my first biopsy attempt, I thought the only women who get breast cancer are those who ignore their breast lumps. (Which is totally wrong.) Since I didn't have any, I thought my docs were just silly. I was so wrong – I did have cancer. But I am glad my doctors were thorough, because now that I know I do have cancer, at least I have a better chance of survival. Still scared, though – how could you not be?

February 10, 2017 sasha15 wrote:

I am 60. Even though my mother had died of breast cancer in her 40s, I felt I had done everything right and it would never happen to me. I was vegetarian for a long time, took healthy supplements, kept active, ran my own business, had regular mammograms, and was genetically tested for the breast cancer gene and it came back negative. All the things we believe are supposed to keep us healthy. I had noticed a lump in my breast for years but each mammogram was negative and my doctors assured me it was a fibroid cyst and nothing to worry about. In 2014, I realized I hadn't done a breast self-exam in quite some time so stood before the mirror to check myself out. As soon as I raised my left arm, I knew I had cancer. I just couldn't believe it and felt life was playing a cruel joke on me. I had just recently moved to a new state to open a small business in my favorite vacation spot, didn't really know anyone, had no friends or family within a thousand miles, and had never felt so alone in my life.

Breast Cancer Q&A

Question: I'm not exactly sure what the American Cancer Society recommendations mean for me, as someone who has a family history of breast cancer and is in my late 30s. Can anyone help?

azmom posted:

I think at this point everyone has heard that the American Cancer Society released updated breast screening guidelines, which now state that women at average risk start annual mammograms at age 45 and then go in every other year starting at age 55. However, I would like to note that I was diagnosed with breast cancer in my 30s, even though I didn't have a family history of the disease. These recommendations are for women with "average risk" of breast cancer, but it can be difficult to know what "average risk" means – I think I would have been considered "average risk" and my cancer would have been missed with these guidelines. I think based on my experience everyone should request screenings earlier to be on the safe side.

Figure 7. Experiential prime for Study 2.

Breast Cancer Q&A

Question: I'm not exactly sure what the American Cancer Society recommendations mean for me, as someone who has a family history of breast cancer and is in my late 30s. Can anyone help?

Maria Martinez, MD, breast cancer specialist, posted:

I think at this point everyone has heard that the American Cancer Society released updated breast screening guidelines, which now state that women at average risk start annual mammograms at age 45 and then go in every other year starting at age 55. However, I would like to note that I have had patients diagnosed with serious breast cancer in their 30s, even without a family history or who tested negative on a genetic test. These recommendations are for women with "average risk" of breast cancer, but it can be difficult to know what "average risk" means. Some physicians and organizations recommend all patients request screenings earlier to be on the safe side.

Figure 8. Credentialed prime for Study 2.

Breast Cancer Q&A

29% of womenshealthcommunity.org members recommend:

I was just diagnosed; what happens now? Women with breast cancer answer questions about their experiences.

26% of womenshealthcommunity.org members recommend:

I found a lump in my breast – what do I do? Doctors discuss some possible next steps.

70% of womenshealthcommunity.org members recommend:

Stories from the breast care center – women with breast cancer discuss their true experiences with different diagnostic tests and common treatments.

73% of womenshealthcommunity.org members recommend:

What are breast cancer diagnostic tests actually like? Doctors walk you through the process.

Figure 9. Headlines for Study 2.

Study 2 Experiential Q&A Text

Question: I found a lump in my breast, and my doctor said I will need a core needle biopsy to tell if it is cancer. Could you explain what that is? It sounds painful! I'm pretty anxious about it.

Amy3959 posted:

I had a core needle biopsy just a couple of days ago. They used a big hollow needle to take out small chunks of tissue from the breast lump. Mine was done in my doctor's office with anesthesia that was injected into the area right before the needle went in. Honestly even with the numbing it was still a bit uncomfortable – sort of a weird pressure feeling. Definitely don't be afraid to tell them if you're feeling uncomfortable or feel any pain, though. They put the needle in many times before they got enough samples. Now I have some bruises. I felt really anxious too and it wasn't fun but really wasn't all that bad. I hope this helps!

Question: What is a breast MRI like? I have been told by my doctor that I need one as a follow-up to some "suspicious" ultrasound results, but I'm nervous since I have never had an MRI before and don't know what to expect.

Angela678 posted:

I don't know about you but I'm kind of claustrophobic, so I was really freaked out about my MRI! I had a breast MRI done pretty recently for similar reason (something suspicious on my mammogram), and here's how it went. First they injected dye into my arm through an IV. I had made the mistake of wearing earrings, which I had to take off and then got lost in my purse (so you might want to not bother wearing any jewelry) so they didn't get sucked up by the magnet. Then they had me lie on my stomach on a platform, which then goes into the MRI machine, where you have to stay perfectly still for what feels like forever if you are claustrophobic. I would recommend talking to your doctor – since I was worried about it mine gave me a mild sedative which I think helped a lot. It's boring, but painless, and the only real discomfort is the close quarters and banging noises the machine makes.

Question: This is probably a silly question, but what is an ultrasound like? I have a breast lump that needs to be checked on, and my doctor recommended an ultrasound rather than a mammogram as a first step because I'm a little young for a mammogram. I've always been healthy and never really had to have any sort of tests before, so even though she said it was painless I'm a little freaked out.

NanC posted:

I'm guessing you have never been pregnant ;) I think I had my first ultrasound when I was pregnant, but my daughter actually recently went through one similar to you because she found a small (turned out to be normal and benign) lump in her breast. I was with her for that since she was nervous too. Basically, you lie down, remove whatever clothing is necessary,

and a technician will put gel on the area of interest and slide the small ultrasound device along your skin to sort of see "inside". It's totally painless and honestly probably even easier than a mammogram, in my opinion. Wipe off the goo afterward and you are done! Good luck!

Question: What is chemotherapy like when you are getting it as an infusion? I need it for my breast cancer, and I have no idea what to expect. I'm really anxious about it.

BreezyC posted:

Like you I had infusion chemotherapy (which different from taking your chemotherapy in pill form – I wish I could do that). Here's what I have learned through experience and I hope it helps! I got my chemo at the hospital through an IV in a room filled with a bunch of other people also getting chemo, which was kind of hard to watch in some cases since some people are really sick. Someone would usually check my vitals and determine the amount of chemotherapy medicine I needed before they started, but don't expect to have a doctor or nurse with you the whole time… and be prepared for a loooong time. Also think about what you want to entertain you while you sit there – I learned I can't stand typing with an IV in me, so bringing my laptop wasn't that helpful. Because of the IV you have limited mobility, so I have found that a good book is helpful. Afterwards I was exhausted. They tell you to make sure to get enough fluids, but all I want to do afterwards is get out of there as quickly as possible and go home and rest. I wish you the best of luck…

Question: I'm about to start radiation for my breast cancer and I'm kind of freaked out. Can someone walk me through what to expect?

SueWR posted:

I had radiation pretty recently. The actual delivery of radiation treatment itself was painless, but there were definite side effects to my breast where it was given. I have pretty fair skin and sunburn easily, and it was almost like a sunburn – my skin turned red and was super sensitive and sore and irritated. There was also some peeling and it was a little gross. Beware anywhere where your bra rubs and try to wear comfortable bras because any rubbing just makes it worse. My doctor gave me a cream/salve that helped soothe it, although I wouldn't say it made it totally go away. I don't know if you have had chemo or not, but if you have unlike chemo radiation appointments can be on the shorter side, and so I was able to mostly follow my normal routine during radiation in a way I wasn't able to as much during chemo. However, I was still pretty tired and didn't feel normal.

Study 2 Credentialed Q&A Text

Question: I found a lump in my breast, and my doctor said I will need a core needle biopsy to tell if it is cancer. Could you explain what that is? It sounds painful! I'm pretty anxious about it.

Amy Weiss, MD, breast cancer specialist, posted:

A core needle biopsy uses a large hollow needle to take out samples of tissue from the breast lump. It should not be too painful, though of course all women's experiences with this procedure may vary. Many of these are done in your health care provider's office with local anesthesia, which is injected to numb the area. You may experience some discomfort; tell your health care team if you're feeling uncomfortable. The needle is typically put in multiple times until enough samples are collected. The procedure can cause some bruising. It's normal for patients to feel anxious, but should be a relatively simple procedure without much discomfort. I hope this helps!

Question: What is a breast MRI like? I have been told by my doctor that I need one as a follow-up to some "suspicious" ultrasound results, but I'm nervous since I have never had an MRI before and don't know what to expect.

Angela Li, MD, breast cancer specialist, posted:

A breast MRI (MRI stands for magnetic resonance imaging) uses magnets and radio waves to provide details of the inside of your breast, and is commonly used as a follow-up to any unusual findings from a mammogram or ultrasound. Before the MRI, you may have a dye injected into your arm through an IV. You must also remove any metal from your person, since the MRI is magnetic. You will most likely lie on your stomach on a platform which will then slide into the MRI machine. The test is painless, but the machine will make a lot of noise. You must remain still for the duration, which can be about a half hour at a minimum. If you are claustrophobic this can be difficult, so talk to your doctor about any concerns you may have.

Question: This is probably a silly question, but what is an ultrasound like? I have a breast lump that needs to be checked on, and my doctor recommended an ultrasound rather than a mammogram as a first step because I'm a little young for a mammogram. I've always been healthy and never really had to have any sort of tests before, so even though she said it was painless I'm a little freaked out.

Nancy Williams, MD, breast cancer specialist, posted:

An ultrasound is a relatively simple test and nothing to worry about. You may actually be somewhat familiar with them already from the media or friends/family, because they are

often used during pregnancy to check on the baby! Most likely, you will lie down, remove whatever clothing is necessary, and a technician will put gel on the area of interest. They will then move a device along your skin in that area as necessary to capture the image they need. It is completely painless. I wish you the best of luck and encourage you to ask your doctor if you have any further questions.

Question: What is chemotherapy like when you are getting it as an infusion? I need it for my breast cancer, and I have no idea what to expect. I'm really anxious about it.

Christine Smith, MD, breast cancer specialist posted:

This is a very common question and something you should also discuss with your doctor and oncology nurse so you know what to expect, as much of this will vary slightly depending on your specific type of chemotherapy regimen (for example, chemotherapy by infusion is different from taking your chemotherapy in pill form). However, I can walk you though some possibilities. If you receive your chemotherapy at the hospital or a clinic, which many people do, you will start by having an IV put in at the chemotherapy center. Your oncologist will determine the amount of chemotherapy medicine you need, and you will receive it through the IV. It can take up to several hours to complete the whole infusion process, so I recommend that my patients bring something to entertain themselves while they are there. Your doctor or nurse will go over side effects with you, but one of the most common is fatigue. Along with getting rest afterwards, you should also drink plenty of fluids.

Question: I'm about to start radiation for my breast cancer and I'm kind of freaked out. Can someone walk me through what to expect?

Susan Allen, MD, breast cancer specialist, posted:

Radiation is a local, targeted therapy. Radiation is given to the area where the cancer started or to another part of the body to which the cancer spread; so, it sounds like in your case it will probably be given in the area of your breast. The actual delivery of radiation treatment is painless, although the radiation itself may cause some discomfort over time. Specifically, in the area where you are receiving radiation, your skin can turn pink, red, or tan, may be sensitive and irritated, and may also peel. This may be worse if you have fair skin, sunburn easily, or have had recent chemotherapy. Creams and other medicines can soothe these symptoms. Radiation appointments are short so you'll most likely be able to follow most of your normal routine during treatment. However, during your treatment course, you may feel tired.

Endnotes

[1] All hypotheses for both studies are briefly stated and organized in Table 1 at the end of the Study 2 rationale and in the summary section.

[2] Information about pretests, including the measurement data collection, are in Chapter VI: Pretests.

[3] Because the combined prime and "free selective exposure" stimuli could possibly have compounding or contrasting (e.g., if someone saw a high threat prime and then selected a low threat thread) effects on the DVs, the analyses were also run using just the portion of the sample that saw no prime. In Study 1, the only difference that was found is that the smaller sample did not have enough power to make the threat by endorsement interaction significant. However, all other significant results were the same, suggesting that the prime did not affect the dependent variables.

[4] The number of participants who opted out in each study is noted in the sample characteristics section.

[5] Fractional degrees of freedom are reported for the two scenarios that had a significant Levene's test, because statistics are reported reflecting adjustments made for equal variances not assumed.

[6] Because this manipulation check was measured via multiple items on a Likert-type 1-7 scale, it was unclear how to assess which subjects "met" the manipulation check without an arbitrary decision by the researcher (e.g., the highest quartile in the low threat condition and lowest quartile in the high threat condition theoretically could be removed, but there seemed no strong justification to do so or to choose certain cutoffs). Thus, no subjects were removed.

[7] 5.3% of participants misidentified the low endorsement condition (i.e., were in the low endorsement condition, but during the manipulation check, indicated that they recalled choosing a high endorsement headline) and 14.0% misidentified the high endorsement condition. However, these subjects were retained, because the endorsement manipulation check was conducted at the end of the study (after respondents had answered questions about DVs) and thus some subjects may merely not have clearly remembered specific endorsement levels, and it cannot be known for sure if the manipulation failed for those subjects, or if at the time of manipulation it worked and these results merely reflect recall problems. The manipulation check could not be conducted earlier due to the potential for it to influence dependent variables (see, e.g., Hauser & Schwarz, 2015). Additionally, some researchers question the need to conduct this type of manipulation check at all, particularly when stimuli were pretested as in the present study (see, e.g., Sigall & Mills, 1998), and conducting the check at a time recall would be higher might unduly influence the dependent variables. Others suggest that removing subjects after data collection for not meeting the manipulation check can bias data (Mongomery, Nyhan, & Torres, 2016). A detailed discussion of this complex issue is outside the scope of this dissertation, however, all subjects were retained because (a) the overall assumptions of all manipulation checks, that conditions differed as intended for the majority of participants, were met and (b) that the endorsement manipulation check results may be problematic and unclear as to which subjects did and did not meet the check due to the time of administration. Thus, the endorsement effects should be interpreted with caution and should be re-tested in future research.

[8] All results for both studies, including post-hoc analyses, are organized in Table 7 at the end of the Study 2 results section.
[9] While these percentages appear as if they may be significant, the chi square test looks at the totals of threat and endorsement across multiple headlines, and due to the total percentages that chose each condition across multiple headlines, the comparison to the expected percentages is non-significant.
[10] Mean-centering continuous independent variables is used to limit effects of multicollinearity, per Aiken and West (1991).
[11] 1.4% of participants misidentified the experiential condition (e.g., thought they had seen a credentialed source) and 14% misidentified the credentialed condition. These cases were retained for consistency as no cases in these studies were thrown out due to other manipulation checks, as discussed in prior endnotes.
[12] 3.9% of participants misidentified the low endorsement condition (i.e., were in the low endorsement condition, but during the manipulation check, indicated that they perceived they saw a high endorsement headline) and 6.6% misidentified the high endorsement condition. However, 24.8% indicated that they could not remember whether what they saw was high or low endorsement. Again, because the manipulation check overall passed and given that the check was administered some time after the manipulation itself, that some subjects could not clearly remember does not mean the manipulation check was not met for these subjects. Thus, all subjects were retained, but results related to endorsement should be interpreted with caution.
[13] The sample for Study 1 had a mean level of 4.90 where scores of one would indicate high avoidance and seven would indicate high vigilance.
[14] Based on the manipulation check, the low threat condition had a mean of 2.91 on a 1-7 scale, where 1 represents "not at all" threatening and 7 represents "extremely" threatening.
[15] Several participants provided unsolicited additional comments to the researcher via email that suggested this conclusion. Specifically, some women took unpaid time to email additional detailed feedback and suggestions on website/page design, state that they thought having this site was really important for women, or tell their personal story or family's story of breast cancer. One woman specifically noted that she intentionally chose one of the "less popular" headlines and provided additional written feedback about the content she saw.