Full length article

The role of emotions and social cognitive variables in online health information seeking processes and effects

Jessica Gall Myrick

The Media School, College of Arts & Sciences, Indiana University, 1229 E Seventh Street, Radio Television Building Room 323, Bloomington, IN 47405, United States

A B S T R A C T

Individuals are increasingly turning to the Internet to search for health information. However, scholarship has yet to carefully examine how online health information seeking contributes to post-search health behaviors, including the sharing of information found during the search with others. Combining insights from the appraisal theory of emotions and social cognitive theory, this study used a naturalistic experiment ($N = 380$) to test a model of the role of post-search emotions in shaping post-search cognitions and behavior in the context of influenza. Moreover, the vast amount of online health information—some of it of dubious quality—makes the task of finding relevant information difficult. Therefore, this experiment also tested an approach to improving the online health information seeking process by tailoring search engine results about influenza to the emotional action tendencies of users. This study finds varied effects for different post-search discrete emotions (fear, hope, contentment, interest, and inspiration) and explores how social cognitive mediators and perceived relevance shape post-search attitudes and behaviors. The results underscore the importance of studying discrete emotional reactions to online health information in order to better predict the attitudinal and behavioral outcomes of this popular avenue for acquiring health information.

© 2016 Elsevier Ltd. All rights reserved.

The information seeking process involves the integration of affective, cognitive, and physical aspects of the human experience (Kuhlthau, 1991). Online health information seeking, in particular, is an increasingly common activity for American Internet users (Fox, 2013), and the affective component (i.e., emotions) is a key—yet understudied—part of this process. For instance, someone who feels feverish may be afraid she has the influenza virus. This fear could motivate her to open her laptop and search for information about influenza symptoms and early treatment with antiviral drugs. After finding information online that matches her emotional and informational needs, she is hopeful she might have caught the virus early. She calls her doctor, schedules an appointment, and then calls her college-aged son to remind him to get a flu shot.

As this hypothetical situation demonstrates, emotional responses to health information can motivate a search but also impact the outcomes of that search as the emotions and related goals of the information seeker shift. The goal of the present research is twofold. First, it aims to address how discrete post-search emotional states influence subsequent cognitions and behaviors. Although previous work has revealed many antecedents of health information seeking, less work has tied the psychological processes and effects of information seeking to behavioral outcomes (Lee & Kim, 2014). This study helps fill that gap by experimentally testing the relationships between searching behavior and post-search outcomes. Second, this study analyzes how tailoring search engine content to the emotional action tendencies of users may influence online health information seeking outcomes. This theoretical issue is also of great practical interest; technology companies are already showcasing the emotion-detection technology they can use to tailor search results to individual users' emotional states (Intel Real Sense Technology, 2014). Within the specific context of influenza messages, and subsequent online searches for information related to influenza, this paper proposes and tests a conceptual model to explain the ways in which emotion-based search result tailoring and users' post-search emotional states may influence post-search cognitions and behavioral intentions.

1. Literature review

1.1. Emotions and health information seeking

While information seeking is often studied from a cognitive perspective (e.g., users making rational, calculated choices about what information to view and what to do with it), emotions are also an important part of the information seeking process (Kuhlthau, 1991). For example, in a survey of Microsoft employees, White and Horvitz (2009) found that 38.1% of respondents reported that online health information seeking made them feel *more* anxious than they felt prior to their search, while more than half (50.3%) said searching made them feel *less* anxious. In another survey, this one of Dutch university students, Baumgartner and Hartmann (2011) found that general health anxiety predicted health information seeking, and that this type of anxiety also predicted negative responses to searching, such as feeling overwhelmed, confused, and frustrated. While this work suggests that the act of searching can be shaped by and result in anxiety, it remains to be seen how emotions other than anxiety or fear relate to post-search outcomes. Online health information seeking has also been found to help searchers fill information voids and enhance their coping abilities (Morahan-Martin, 2004), which indicates that searching may result in gratification and positive emotions for some users.

The appraisal theory of emotion provides a theoretical framework for understanding how various emotions incurred during the search process may impact post-search behavior. This theory posits that emotions arise from automatic and subjective evaluations of events (Lazarus, 1991). That is, individuals appraise an event's meaning in accordance with their own relationship with their surroundings, and various appraisals of the environment combine to bring about discrete emotional states (Lazarus, 1991; Smith & Ellsworth, 1985). For instance, fear arises from appraising a situation as threatening and uncertain, whereas a situation that offers the possibility of reaching a goal despite current obstacles results in hope. Once evoked by automatic cognitive appraisals, discrete emotions are accompanied by unique action tendencies; these are motivational states that promote certain types of behaviors over others (Frijda, Kuipers, & ter Schure, 1989). For example, the action tendency of fear is to escape from a threat, while that of hope is to approach or move toward one's goal (Lazarus, 1991). These unique action tendencies are a crucial link between emotions and subsequent behavior (Roseman, 2011). As such, analyzing multiple emotional reactions that occur after online health information seeking is an important step for understanding the psychological processes that facilitate post-search outcomes.

A thorough review of extant health information seeking theories is beyond the scope of the present work (see Galarce, Ramanadhan, & Viswanath, 2011; Kahlor, 2010). However, it is important to note that many of the existing frameworks include an affective component, often related to personal risk assessments (e.g., Griffin, Dunwoody, & Neuwirth, 1999; Kahlor, 2010). But, these models typically only test anxiety or fear (and not other discrete emotions) as antecedents (and not outcomes) of seeking (for exceptions, see Afifi & Morse, 2009; Brashers, Goldsmith, & Hsieh, 2002; Yang & Kahlor, 2013). Additionally, many existing models focus on motivations for, or antecedents of, seeking, with information seeking itself the primary outcome variable. Less work has developed models of what happens *after* a search.

Moreover, viewing health information has been shown to elicit multiple emotions in audiences (e.g., Carrera, Muñoz, & Caballero, 2010; Dillard, Plotnick, Godblod, Freimuth, & Edgar, 1996; Myrick & Oliver, 2015). Therefore, it is likely that the information viewed during an online health information search would evoke multiple discrete emotions in users.

In particular, expanding research on positive emotional outcomes of consuming health information may lead to better models of how to display online health information to improve health behaviors. The functions of positive emotions are to broaden one's horizons and build skills and relationships that promote long-term wellbeing (Fredrickson, 1998, 2001). Health messages laced with positive affect can attract attention, foster receptiveness, prompt reconsideration of an issue, facilitate recall, and improve attitudes (Monahan, 1995). While individuals often avoid negative or threatening information about themselves in order to maintain a positive self-image (Baumeister, 2010), positive emotions can motivate them to attend to self-relevant threats, which can ultimately foster self-improvement (Das & Fennis, 2008; Raghunathan & Trope, 2002; Trope & Neter, 1994; Trope & Pomerantz, 1998). Experiencing positive emotions after an online health information search may encourage Internet users to continue learning about ways to prevent health threats in order to build resources for the future, but it may also lead them to share information as a way to build relationships with others.

1.2. Tailoring and health information seeking

Another consideration in predicting outcomes of health information searches is how well the content found in that search fulfills the user's needs and desires. Matches or mismatches between a search engine user's current emotional state and the emotional tone of the information found in that search could impact that user's psychological and behavioral responses. The literature has shown that a match between an individual's emotional state and the emotional tone of a message increases message persuasiveness (Petty, Fabrigar, & Wegener, 2003; Rucker & Petty, 2004). Additionally, Nabi (2003) found that individuals experiencing fear or anger reported a stronger desire to seek information related to the action tendencies of their respective emotions and were less likely to search for information that did not match the action tendencies of their present state.

This type of matching between a user's emotional state and the emotional tone of subsequent message content can be labeled *emotion-based message tailoring*. In an online health information seeking context, each search engine result is presenting users with a short message, often with emotional and action-oriented undertones. For instance, fearful individuals who are using a search engine may have more positive attitudes toward search results that give them options to evade a health threat because the action tendency of fear is to escape. When health messages, such as online search results, correspond with some aspect of the self—be it demographics, individual differences, or psychological states—they are often more effective in changing health behaviors than generic messages (Noar, Benac, & Harris, 2007; Noar, Grant Harrington, Van Stee, & Shemanski Aldrich, 2011). Research on human-computer interaction has also shown that tailored messages can improve attitudes toward websites (Kalyanaraman & Sundar, 2006). These findings suggest that the act of tailoring can potentially motivate users to take action in response to the health information they find during an online health-related search, prompting the following hypotheses:

H1. Emotion-based message tailoring will lead to more positive attitudes toward the search engine than will mismatches between search engine results and initial emotional state.

H2. Emotion-based message tailoring of search engine results will lead to stronger behavioral intentions (i.e., to seek vaccination and early treatment if necessary) than will mismatches between search engine results and initial emotional state.

The psychological mechanisms behind tailoring effects are also of interest (Noar et al, 2011). Research shows that audiences typically view tailored health messages as more relevant than non-