

SEARCHING FROM THE HEART:  
THE INTERPLAY BETWEEN EMOTIONS AND CUSTOMIZATION IN ONLINE  
HEALTH INFORMATION SEEKING

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## **ABSTRACT**

**JESSICA GALL MYRICK: Searching from the heart:  
The interplay between emotions and customization in online health information seeking  
(Under the direction of Sriram Kalyanaraman)**

The prospect of a threat to one's health or an opportunity for improved health can spark emotional reactions—the fear of an illness or the hope of a healthier life. People are increasingly turning to the Internet to search for information related to such health issues. However, the dizzying amount of online health information—some of it of dubious quality—makes the task of finding trustworthy and relevant health information difficult. One way to address this dilemma is to utilize technology's ability to provide users with customized content based on their unique desires and preferences. Grounded in the literatures on emotions, health information seeking, and customization, one approach to improving the efficiency and effectiveness of the health information seeking process would be to craft customized search engine results based on the user's situational emotion state. Further customizing of health search results based on dispositional aspects of the user's identity—in addition to the situational emotion—is a conceptually promising approach to improving the health information seeking process.

This dissertation examined the relationship between types of emotional experiences and health information seeking as well as the interplay of emotion states and customization in the health information seeking process. The results revealed that discrete emotions have an important impact on multiple steps in the health information seeking process, from search query generation to post-search cognitions, attitudes, and behaviors.

Additionally, the results indicate that customizing health-related search results based on situational factors may not be as effective as customizing search results based on dispositional aspects of a user's identity. Theoretical, methodological, and public health implications are discussed and directions for future research in this domain are offered.

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“I can no other answer make, but thanks, and thanks, and ever thanks.”

- William Shakespeare

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## CHAPTER 1

### INTRODUCTION

Imagine the following scenario:

*Allen sits down at his desk at the beginning of the day, but decides to peruse the news before starting his work. His browser's homepage takes him straight to his favorite news website, CNN.com, where a featured story about the latest influenza outbreak catches his eye. Allen clicks on the story and reads through it. The article reports on the impact of the flu—up to 49,000 deaths in any given year in the U.S. (Centers for Disease Control and Prevention, 2012). By the end of the article, he is worried about his own chances of getting a bad case of the flu this season and is concerned that the slight scratchy feeling in his throat may be the onset of something worse. Feeling uncertain about his situation and wanting to avoid the dangers and discomforts of the flu, Allen quickly opens a new tab in his browser and points it to a search engine. He types the query “flu.” In less than .30 seconds, Google.com provides him with more than 147,000,000 results. Allen is likely looking for some information about how much of a threat the flu is for him. He clicks a link “flu.gov.” He still can't tell, based on this information, if he may have the flu, and if so, whether he should go to the doctor to get anti-viral medication to lessen its impact. So, he decides to move on from searching for information and get to work.*

*Another employee at the same company, Lesa, also starts her day with a visit to CNN.com. She notices the same flu story, clicks on the link, and reads it. Lesa finds inspiration in quotes from a woman whose son died from the flu and now wants others to know the importance of prevention and early treatment. Feeling hopeful, she decides to search online for more information about influenza. She, too, enters “flu” into Google’s search box and stares at a screen promising her the same thousands of pages of results Allen saw. Lesa also clicks on the link to “Flu.gov.” On that website, she finds information about how to prevent the flu, and she decides to take a quick break and go wash her hands. She also emails a link to the website to a friend, who she knows has not received a flu shot this season.*

As these juxtaposed scenarios illustrate, Allen and Lesa viewed the same search results despite their differing emotional states. Their emotions—fear and hope, respectively—made information about the flu particularly salient to them. However, these emotions likely also made different types of information more attractive than others. If the search results were consonant with the motivations prompted by their current emotional states, how would the search process have differed for Allen and Lesa? Would they think and feel differently about flu prevention or treatment if they had viewed search results matched to the motivations spurred by specific emotional states? Would they have acted differently after searching? Are there features of the search engine that could be modified to help them get the information they desire and then to share it with others?

Although steeped in the psychology literature (see Lewis, Haviland-Jones, & Barrett, 2008), emotions have also received considerable attention in the media effects (e.g., Bryant, Roskos-Ewoldsen, & Cantor, 2003; Cantor, Bryant, & Zillmann, 1974;

Dillard & Anderson, 2004; Dillard & Peck, 2001; Lang, 2000; Nabi, 2002, 2003, 2009; Oliver, 1993, 2008; Zillmann, 1971, 1991; Zillmann & Bryant, 1985), information seeking (e.g., Afifi & Morse, 2009; Afifi & Weiner, 2004; Arapakis, Jose, & Gray, 2008; Brashers, 2001; Brashers, Goldsmith, & Hsieh, 2002; Griffin, Dunwoody, & Neuwirth, 1999; Kahlor, 2010; Kalyanaraman & Ivory, 2009; Kuhlthau, 1991; Nahl, 2004; Yang & Kahlor, 2012), and health communication (e.g., Agrawal, Menon, & Aaker, 2007; Bandura, 2004; Cameron & Chan, 2008; Dillard & Nabi, 2006; Dunlop, 2008; Hale & Dillard, 1995; Lang & Yegiyian, 2008; Lee, Hwang, Hawkins, & Pingree, 2008; S. W. Smith et al., 2010) literatures as well as in interdisciplinary works that cross these fields. This growing body of research demonstrates the many ways emotions shape the human experience.

Human-computer interaction scholars have long recognized the important role of emotions in shaping attitudes and behaviors related to media and information consumed via technology (Picard, 1997). The notion of affective computing, a term coined by Picard, embodies the perspective that computers can be programmed to recognize emotions and respond to users in an appropriate manner. Because computers store and utilize large amounts of information, and affect is an important form of information that people utilize when making judgments (Schwarz & Clore, 1983, 1988, 2003), computer programs can take advantage of affective information in deciding how to respond to various inputs (Clore & Palmer, 2009).

Just as computers can be programmed to recognize human emotions and respond accordingly, people will respond naturally when technology sparks emotional reactions within them (Nass & Yen, 2010; Reeves & Nass, 1996). The media equation (Reeves &

Nass) states that interacting with media technology has the same effects on people as if they were interacting with other people or experiencing a natural environment. Just as when in the midst of a real event or dealing with another human being, people will identify what they believe to be good or bad, react differently to positive and negative stimuli, and encounter various levels of arousal when interacting with digital media.

In response to the availability and frequent use of technology among the public, a growing number of researchers and practitioners are utilizing modern technology as a tool for promoting positive health behavior change (Sundar, Rice, Kim, & Sciamanna, 2011). An understanding of message-relevant emotions is important for fostering positive health outcomes because emotional messages capture the audience's attention and help motivate people to health-related actions (Dillard & Nabi, 2006). In an article titled "Rethinking communication in the e-health era," Neuhauser and Kreps (2003) list a number of points of guidance for health communication researchers. First on their list is the following axiom: "Health communication is more effective when it reaches people on an emotional as well as rational level" (p. 10). This statement is a call for researchers and health communication practitioners alike to attend to the influences and consequences of emotional reactions to digital health messages.

One action related to health communication that may be motivated by emotions is information seeking. Eighty percent of American Internet users report searching online for health information (Fox, 2013), making information search an area of health communication particularly ripe for scholarly inquiry. Rutten, Squiers, and Hesse (2006) define health information seeking as an effort to reduce or manage the uncertainty or the stress associated with health concerns. While many researchers have studied health

information seeking, the psychological mechanisms—including the full range of possible emotional reactions to a health threat—and relationships between these mechanisms are yet to be fully explored.

Why do people search online for health information? Researchers posit that a desire for knowledge or a desire to control levels of uncertainty are strong motivations to seek health information (for a review of health information seeking theories, see Kahlor, 2010). Many scholars argue this discrepancy between current and desired levels of knowledge or of uncertainty leads individuals to feel anxious, which further motivates the search for health information (Kahlor). Although many studies have examined the role of anxiety—a negative emotion—in motivating health information seeking, researchers have paid less attention to the ways positive emotions, such as hope, may also motivate and shape subsequent searches for health information (cf. Afifi & Morse, 2009; Brashers, 2001).

Given the amount of health information seeking conducted online, a systematic investigation of the role of emotions throughout the search process is a critical step for achieving a deeper understanding of this phenomenon. The World Wide Web is indeed very wide, and when searching for information online, users must make decisions about what content to consume from among a dizzying amount of results. Without gatekeepers to imbue credibility and relevance to the information, the task of sifting through search engine results can be onerous (see Kalyanaraman & Sundar, 2008). Any number of frustrations or various search habits (e.g., only looking at links on the first page of search results) can prematurely stop a search (Browne, Pitts, & Wetherbe, 2007). In the case of health information seeking, specifically, individuals could miss out on important benefits,



such as increased knowledge or social support if they stop searching before they find high quality health information (Galarce, Ramanadhan, & Viswanath, 2011).

One possible way to filter out irrelevant search results that may prevent effective online health information seeking is to customize search engine results based on the unique attributes of individual users. By creating messages that treat each audience member as an individual, customized content is often more persuasive than its generic counterpart (see Kalyanaraman & Sundar, 2006; Kreuter, Strecher, & Glassman, 1999; Noar, Grant Harrington, Van Stee, & Shemanski Aldrich, 2011; Petty, Barden, & Wheeler, 2002; Rimer & Kreuter, 2006; Wheeler, Petty, & Bizer, 2005). Applying the above hypothetical scenarios, one could argue that Allen and Lesa would have perceived search results matched to their unique emotion states as more relevant than the mostly generic ones Google produced for them.

An increase in perceived relevance could, in turn, make the subsequent online content about actions to prevent the flu (e.g., the need to get a vaccine or use antiviral medications) appear more persuasive than content emanating from generic search results. Because this hypothetical customized search catered to the specificity of their situations, Allen and Lesa may expect their future searches for health information to also be efficient and effective, therefore improving their attitudes toward the search engine. If they are pleased with the information they found during this hypothetical search, they may also experience greater levels of self-efficacy for searching for health information and for preventing and/or dealing with the flu.

The overarching premise of this dissertation is that one common way people manage the emotions evoked by a health threat is to search online for more information

about that health threat. Once people who chose to look for more information arrive at a search engine website (likely still experiencing the emotion that prompted the search) they will selectively attend to certain aspects of the search results over others. Based on theories of emotion and mood management, the fundamental prediction is that the aspects of the interface and its content most likely to draw the user's attention are those that match the motivational goals and action tendencies of their current emotional state.

This dissertation attempts to explore the relationship among emotions, customization, and health information seeking with three experiments. Study 1 endeavors to understand the role of fear and hope on subsequent online information seeking in a naturalistic setting. Study 2 examines the relationship between initial emotion states and matching search results to emotional action tendencies and motivations. Finally, Study 3 attempts to replicate the findings of Study 2 in a separate population. It also attempts to further tease apart the nuances of customization by examining differences between situational (i.e., emotion-based) customization and customization based on more stable dispositional user traits.

This dissertation examines the relationship between emotional experiences and health information seeking as well as the ways in which search results can be matched (or mismatched) to the motivations associated with specific emotional states. In examining these variables and their interplay, this dissertation hopes to make several contributions to the literature. First, it seeks to distinguish the ways different emotions stimulate and shape the health information seeking process. Second, it attempts to shed conceptual light on the relationship between the emotions and customization. Besides the methodological

novelty of proposing search engine results customized to the user's emotional states, it also seeks to uncover boundary conditions of customization effects.

A third broad contribution of this dissertation is its examination of the nuances of customization. Customized content based on ephemeral emotions may seem subtle compared to customization based on more enduring aspects of a user's identity. However, the juxtaposition of two types of customization—situational and dispositional—will contribute insights into the psychological mechanisms driving customization effects in an online health information seeking context.

The findings from this dissertation may help health communication researchers and practitioners disseminate messages in the modern media environment. The findings may be especially useful for researchers who design online applications and interventions for health behavior change. Those who disseminate health information online—from researchers to journalists to commercial health and medical content providers—will be able to apply these findings as well. By understanding the role of emotions and customization in the health information seeking process, it is likely that message creators will gain a better understanding of what variables might direct users to their content and what they may do with the information after exposure.

This dissertation first outlines the literature on emotions and health information seeking. It then discusses Study 1 before addressing the issue of customization and conceptual questions arising from Study 1. Next, it proposes a follow-up study to test the effects of situational customization in the online health information seeking context. It outlines the findings and implications from Study 2 before detailing a third study. Study 3 tests both situational and dispositional customization along with emotional and cognitive

reactions to the search process. After reviewing the findings from Study 3, a review of the implications of these experiments and directions for future research are given.

## **Literature Review**

### **Emotions**

Emotion, broadly defined, is a psychological construct representing internal mental states of evaluative reactions to events, objects, or agents (Nabi, 2009; Ortony, Clore, & Collins, 1988). Five general components comprise the experience of an emotion: (1) cognitive appraisals of the situation; (2) physiological arousal; (3) a subjective feeling state; (4) a motivational component—including action readiness and behavioral tendencies; and (5) motor expression (see Fiske & Taylor, 1991; Nabi; Roseman, Wiest, & Swartz, 1994; Scherer, 1984; C. A. Smith & Ellsworth, 1985). The motivational component of emotions is the focus of this dissertation because of its relevance to motivating and shaping health information searching and sharing behaviors.

Emotions provide feedback to help guide humans in situations that pertain to their goals and impact their lives (Lazarus, 1991). For example, when experiencing fear, one is motivated to escape, and when feeling happiness, one is motivated to approach the source of such happiness and share it with others (Lazarus). Each discrete emotion has its own unique tendency to motivate people to take certain types of action (Lazarus). These emotional motivations and tendencies toward action have proved useful throughout human evolution (Panksepp, 2007). In fact, emotions are so useful to humans that it is nearly impossible to change one's emotional state without first changing thoughts or behaviors (Baumeister, Vohs, Nathan DeWall, & Zhang, 2007). As Tice (2009) stated,

“you cannot control your emotions because the purpose of your emotions is to control you” (p. 202).

Although there is debate about the exact nature of the link between emotions and behavior, scholars generally agree the link exists largely due to the motivational and informational properties of emotions (see Baumeister, et al., 2007; Roseman, 2011). According to appraisal theories of emotion, emotions arise when individuals appraise the implications of a situation in relation to their personal goals (Scherer, Schorr, & Johnstone, 2001). It is the congruence or incongruence of a personally relevant situation with a personal goal that determines the valence of an emotion: Incongruent situations lead to negative emotions and congruent situations to positive emotions. Appraisals of emotions go beyond valence, though. Although researchers have slight differences in the number and nature of appraisal dimensions, emotional appraisals generally include goal relevance, goal congruence, ego-involvement, attribution of blame/credit, coping potential, and future expectancies (Lazarus, 1991). Appraisal theorists argue that combinations of different appraisals result in experiences of different discrete emotions.

Each discrete emotion is accompanied by inclinations to act in certain ways, called action tendencies (Fredrickson, 2001; Frijda, Kuipers, & ter Schure, 1989; Lazarus, 1991). The action tendency of fear, for example, is to avoid or escape danger, while the action tendency of hope is to approach and make a yearned-for goal happen (Lazarus). Features of the physical and social environment as well as emotion regulation (Gross, 2002; Gross & Thompson, 2007) and self-regulation (Tice, 2009; Vohs & Baumeister, 2011) all influence the precise action taken by individuals experiencing certain emotions (Roseman, 2011). Nonetheless, action tendencies are families of similar actions that are

consistent reactions to the experiences of specific emotions. These proclivities have an influence on likely courses of action taken by those experiencing certain emotions.

Because emotions can motivate people to take action, emotional appeals are commonly used in health-related messages (Dillard & Nabi, 2006; Hale & Dillard, 1995). As Nabi (1999) stated; “[I]t can be argued that if a message elicits an emotion, its concomitant action tendency sets a goal” (p. 304). Two specific emotions scholars cite as motivations to search for health information are fear and hope (cf. Afifi & Morse, 2009). Both fear and hope are emotions based on uncertainty about the future. If one were certain of future outcomes, there would be no need to be afraid of them. One would not be hopeful they would turn out okay, either, nor would they feel compelled to look up more information that might help influence those future outcomes. Relatedly, researchers have tied the idea of possible selves, which are images of the self in the future (Markus & Nurius, 1986), to health outcomes. Research shows it is common to have hoped for and feared possible selves related to possible future health statuses, and these emotion-based possible selves can influence present health behaviors activity (Frazier, Hooker, Johnson, & Kaus, 2000; McGinty, Dark-Freudeman, & West, 2012).

Fear appeals, in particular, have captured the interest of many health advocates and researchers who use or study emotions in health messages (Witte & Allen, 2000). However, the effectiveness of fear appeals in inspiring behavior change depends on the level of fear induced (Hale & Dillard, 1995) and on a number of moderators and individual differences (Nabi, Roskos-Ewoldsen, & Carpentier, 2008). The experience of fear can lead to “tunnel vision;” when experiencing fear, people attend mainly to threat-

relevant details (Izard, 1993). Fear leads people to move away from and avoid whatever they perceive to be causing the fear (Roseman, 2011; Roseman, et al., 1994).

In a world rife with negative media content, one underexplored alternative to fear appeals are hope appeals aimed at inducing positive emotions in audiences in order to encourage long-term behavior changes. Although fear appeals share this goal of changing health behaviors for the best, the evidence of their efficacy—especially outside of laboratory settings and without supplemental efficacy messages—is mixed (see Hale & Dillard, 1995; Hastings, Stead, & Webb, 2004; Janis & Feshbach, 1953). Even though fear appeals in public health messages have been found to be persuasive, they also have been found to induce maladaptive responses in audiences, such as defensive avoidance or reactance (Witte & Allen, 2000).

Despite the prolific body of literature on negative emotions, scholarly understanding of the mechanisms and effects of health messages espousing positive emotions is more nascent (see Fredrickson, 1998). Negative emotions are intuitively useful for humans—fear keeps people away from predators and other dangers, while anger helps them defend their mates from competition—but what good are positive emotions? The broaden-and-build theory of positive emotions attempts to answer that question (Fredrickson, 1998, 2001). The theory posits that, unlike negative emotions, positive emotions exist in order to broaden the scope of attention, cognition, and action, while also helping people build skills for the future. Both of these outcomes may prove useful for people attempting to change health behaviors for the better and for the long term.

In support of the “broaden” portion of the hypothesis, Fredrickson and Branigan (2005) found that the experience of positive emotions (versus negative emotions) led participants to exhibit a global (versus local) bias in a visual processing task and to produce a longer and broader array of responses to an open-ended question. In an online search environment, the ability to generate more search queries and think broadly when looking for suitable websites could help users find quality health information instead of merely clicking on the first search result or the search result with the most sensationalized title. Building skills and support for the future would also help those seeking to improve their health. Online social support related to health issues is an oft-cited contributor to better health and wellbeing (Klemm & Wheeler, 2005; White & Dorman, 2001).

There are advantages to using positive emotions in health messages. For one, health messages laced with positive affect can gain the audience’s attention, lead to greater receptiveness, prompt reconsideration of an issue, facilitate recall, and lead to more positive attitudes toward the message (Monahan, 1995). People have an inclination to avoid threatening information about themselves in order to maintain a positive self-image (Baumeister, 2010). However, positive emotions have been shown to motivate people to attend to self-relevant threats—information that will help them improve and benefit in the long run (Das & Fennis, 2008; Raghunathan & Trope, 2002; Trope & Neter, 1994; Trope & Pomerantz, 1998).

Hope is a positive emotion that is especially pertinent in a health communication context. Preliminary work on the effects of hope in health messages is encouraging, showing that the experience of hope can increase motivation, lead to the creation of sub-goals for achieving target behavior, and reinforce commitments to health goals (de Mello



& MacInnis, 2005). The core relational theme of hope is effortful optimism and potential for success (Lazarus, 1991; C. A. Smith & Lazarus, 1993). Hope results in an action tendency to approach and to anticipate, and, in turn, leads to the formation of a goal to make something happen (Roseman, 2011; Roseman, et al., 1994). These action tendencies, combined with the tendency to think broadly and build for the future associated with positive emotions, make hope an emotion well suited for promoting health behaviors that may take a long time to change or may not be immediately satisfying.

### **Health Information Seeking and Emotions**

Humans (and animals) are hardwired with basic neurological mechanisms that encourage them to hunt through their surrounding environment for information (Panksepp, 2007). While information technology has changed since the time of ancient humans, our need and desire for information has not. Particularly in the realm of health, information seeking has taken a more central role in healthcare as patients are now expected to play an active role in their own health (Galarce, et al., 2011). Fifty-nine percent of adults in the United States report having used the Internet to look for health information (Fox, 2013). According to the Pew Internet & American Life Project, two-thirds of American Internet users who look online for health information want to know more about a specific disease or medical problem, while more than half (56%) are searching for information about certain medical treatments or procedures (Fox). Online health information seeking has been found to help searchers fill an information void and to also enhance coping abilities and self-efficacy (Morahan-Martin, 2004).

Researchers have compared the search for information in digital environments to foraging for food in the wild. Pirolli and Card (1999) posit that when people have a goal to find information, they will forage for it much like human ancestors hunted prey and looked for food in the wild. Based on principles of evolutionary ecology, information foraging theory argues that people follow an “information scent” to promising patches of information (Pirolli & Card). A strong information scent occurs when a user perceives information as highly relevant to one’s information goals (Pirolli & Fu, 2003). The perceived relevance of information in any one “patch” of information improves user attitudes toward the information source (Kalyanaraman & Ivory, 2009). Given the importance of appraisals of personal relevance for emotion elicitation, information foraging and information scents are likely to be tied to at least some degree of emotional arousal.

Information foraging theory relies on notions of cost-benefit analysis and the utility of information for the user. However, such cognitive factors are not the only variables that influence the information search process, as noted previously. Indeed, Kuhlthau’s (1991) study of information seeking led her to conclude that the process is an integration of the affective, cognitive, and physical aspects of the human experience. The affective component of the information search process can help regulate cognitive processing of information by prioritizing certain search goals over others (Nahl, 1998, 2004). Affect has also played a prominent role in modeling of health information seeking behaviors, specifically.

Many models of health information seeking rely on the premise that feelings of uncertainty about a health issue spark anxiety and/or greater risk perceptions, which in

turn motivate people to search for more health information (Afifi & Morse, 2009; Afifi & Weiner, 2004; Freimuth, Stein, & Kean, 1989; Griffin, et al., 1999; J. D. Johnson & Meischke, 1993; Kahlor, 2010; Rimal & Real, 2003). According to Brashers (2001), uncertainty exists when “details of the situation are ambiguous, complex, unpredictable, or probabilistic; when information is unavailable or inconsistent; and when people feel insecure in their own state of knowledge or the state of knowledge in general,” (p. 478). When individuals have not met the threshold for desired knowledge or uncertainty, these models predict that users will continue to search for information until they surpass their knowledge and/or uncertainty threshold.

Afifi and Morse (2009) posit that a discrepancy in the desired amount of uncertainty an individual faces sparks an emotional response. The appraisals and action tendencies associated with this response will influence perceptions of the outcomes of the search process as well as an individual’s feelings of efficacy related to searching. Outcomes and efficacy then directly influence the decision as to if and how to search for information. Uncertainty management—as opposed to uncertainty avoidance—embraces the notion that both positive and negative emotions can result from uncertainty and motivate people to search for health information (Afifi & Morse, 2009; Brashers, 2001). In the Theory of Motivated Information Management (Afifi & Morse, 2009; Afifi & Weiner, 2004), as in Brashers’ conceptualization of information search, emotions are a key component for both motivating and shaping the amount and type of information search.

Another way the emotional state of the user may influence preferences for certain types of content is explained by the mood-as-resource hypothesis (Ragunathan & Trope,

2002; Trope & Pomerantz, 1998). This framework argues that positive affect serves as a resource for approaching potentially threatening information that may help the user in the long term. For example, Trope and Neter (1994) found that participants in a positive mood were more likely to seek information about their own weaknesses than their strengths. This line of research indicates that positive emotions serve as a buffer one can use to better deal with negative information, which can be used to improve one's future situation.

Similarly, Kustubayeva, Matthews, and Panganiban (2011) showed that the affective state of a video game player influenced what types of information the player sought from the program during a decision-making task. Participants who were induced to experience a negative mood were more likely to sample positive information than were those who were induced to feel positively. Likewise, those induced to experience a positive mood were more likely to ask the game for negative information about their performance. Considering these findings, if users of a search engine perceive search results to be self-relevant, then the mood-as-resource framework would predict that those participants experiencing hope would be more engaged in learning self-threatening information about their risks of a certain health condition. On the other hand, those experiencing fear would be less likely to pursue potentially self-threatening health information based on the mood-as-resource framework.

While the aforementioned literature points to the ability of emotions to motivate health information searches, it is less clear as to exactly which emotions will have what impact on searches. One consideration is that hope is an emotion associated with an approach motivation while fear is an avoidance emotion (Roseman, et al., 1994). In

discussing the impact of fear on message processing, Nabi (1999) noted that “it can be asserted generally that those experiencing message-induced fear should be the least willing to closely process the remainder of a message...” (p. 305). Given the nature of hope and fear in relation to approach/avoid motivations as well as the inclination for experiencing positive emotions to broaden one’s perspective, a formal prediction may be forwarded:

**H1:** Those participants who are induced to feel hope will think of more search query terms related to the flu than those induced to feel fear or in a neutral state.

Given the ability of emotions to shape cognitions, it is also likely the emotional states of users will influence the nature of the search queries they decide to use at the beginning of a search process. Recent developments in computerized text analysis have revealed that what people write can be used to predict a number of psychological outcomes, from attentional focus and emotionality to social relationships and thinking styles (Tausczik & Pennebaker, 2010). The Linguistic Inquiry and Word Count (LIWC) software program (Pennebaker, Booth, & Francis, 2007) can analyze the cognitive, affective, and valenced components of words and provide a composite number of each of these types of words in any writing sample. Searchers experiencing different emotions are likely to think of different types search query terms to use to search for more information about the flu due to the different motivations sparked by those emotions. Research has also shown that the experience of an emotion stimulates cognitive reflection (see Baumeister, et al., 2007), giving rise to the following hypothesis:

**H2:** Those induced to feel hope or fear will include more affective and cognitive words in their search queries than will those in a neutral state.

It is nearly impossible to create health messages without mentioning the threat, be it influenza, obesity, cancer, or even cancer soars. Health messages concerning conditions that may lead to death—the ultimate threat—may evoke anxiety or fear even without focusing on the threat. Experimental evidence indicates people experience both conscious and unconscious death-related thoughts in the presence of perceived threats (Pyszczynski, Greenberg, & Solomon, 1999). In a health information-seeking context, the generation of search queries may very well be influenced by conscious or unconscious thoughts related to death. Because the action tendency of hope is to approach a goal while the action tendency of fear is to escape a threat—death being the ultimate threat—the following hypotheses are proposed:

**H3:** Those participants who are induced to feel hope will be less likely to think of search query terms related to death than will those not induced to feel hope.

**H4a:** Participants experiencing hope will search for information about the flu for a longer amount of time than will those experiencing fear or in the neutral emotion condition.

However, a competing hypothesis can easily be imagined under this scenario. Perhaps those feeling fearful would search longer for information about the flu than those feeling hopeful because of fear's action tendency to seek protection from relevant threats (Lazarus, 1991). If fear leads to a greater drive to find protection from the threat of the flu, it is possible participants will spend more time searching for relevant flu-related information. Fear and/or anxiety are also prominent motivations for searching according to a number of health information seeking theories (e.g., Afifi & Weiner, 2004; Griffin, et al., 1999; Kahlor, 2010). Therefore, a competing hypothesis is offered:

**H4b:** Participants experiencing fear will search for information about the flu for a longer amount of time than will those experiencing hope or in the neutral emotion condition.

Researchers have also found that individuals report higher estimated likelihoods for events that match the valence of their mood states (E. J. Johnson & Tversky, 1983). DeSteno, Petty, Wegener, and Rucker (2000) demonstrated that this effect held true for discrete emotions as well, with sad (angry) individuals more likely to expect future sad (angering) events to happen. The researchers found the informational value of discrete emotions mediated the relationship between emotional state and outcome expectancies. Because of this relationship between affect and outcome expectancies, Afifi and his colleagues (Afifi & Morse, 2009; Afifi & Weiner, 2004) included a direct link between emotions and outcome expectancies in the Theory of Motivated Information Management.

Social Cognitive Theory (Bandura, 1986, 2004) also places a strong emphasis on the ability of outcome expectancies to influence behavior. For example, negative outcome expectancies (e.g., emotional distress will occur if I quit smoking) predict lower rates of smoking cessation among adolescents (Solomon, Bunn, Pirie, Worden, & Flynn, 2006), while positive outcome expectancies (e.g., sunscreen will prevent painful sunburns) predict higher rates of sunscreen use by farm youth (Turk, Parrott, Martin, Steiner, & Lewis, 1997). These outcome expectancies themselves can be the result of emotional states, with negative affect corresponding to negative outcome expectancies and positive affect associated with positive outcome expectancies (Bandura, 1986; Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Pajares, Prestin, Chen, & Nabi, 2009).

While emotions have a direct impact on outcome expectancies, they also can influence how confident individuals are in their ability to take on certain behaviors (Bandura, 1986). The experience of positive emotions can increase self-efficacy while experiencing negative emotions can lower levels of self-efficacy (Bandura, 1986; Bandura, et al., 2003). Higher levels of self-efficacy for conducting health-related behaviors is correlated with an increase in the likelihood that people will seek health information (Bass et al., 2006). Self-efficacy is also an important mediator between emotional reaction to a situation and searching for more information in the Theory of Motivated Information Management (Afifi & Morse, 2009; Afifi & Weiner, 2004). Based on the theoretical links between emotions, outcome expectancies, self-efficacy, behaviors, and health information seeking, the propose the following hypothesis:



**H5:** Outcome expectancies and self-efficacy will mediate the relationship between emotional state and attitudes toward the search engine as well as health-related behavioral intentions.

### **Mood Management**

The concept of emotion regulation, or the process of change in emotional states, is an important factor in determining the links between emotions and their effects on those experiencing them. Emotion regulation is a broad term for the many ways people attempt to regulate or control their own emotions (Gross & Thompson, 2007). Emotion regulation may be automatic or controlled, and emotion regulation also plays an important role in media processes and effects. In a media context, emotions can lead audiences to selectively attend to some aspects of a message, or to certain types of messages, instead of others (Zillmann & Bryant, 1985). Zillmann (1988) posited that “the consumption of messages ... is capable of prevailing mood states, and the selection of specific messages for consumption often serves the regulation of mood states” (p. 327). Goals related to mood management can motivate audiences to choose certain genres of media over others in hopes that they will be able to manage their moods or to cultivate desired emotional states (for a review, see Oliver, 2003).

The original conceptualization of mood management prescribed that people seek certain types of media in order to distract themselves from aversive affective states (Zillmann & Bryant, 1985). However, mood management theory expanded to acknowledge that people seek certain types of media not only to distract from negative states but also to repair negative moods. Experiencing positive emotions has been found

to down-regulate a previous experience of negative emotions (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000). Mastro, Eastin, and Tamborini (2002) also extended mood management principles to Internet use by showing how high levels of stress resulted in participants viewing fewer Web sites while high levels of boredom resulted higher numbers of Web sites visited within the same amount of time.

The process of emotion regulation via media use has important implications for understanding searches for health information that are motivated by emotional states. The ways emotion shape media selection and user responses to media can vary across situations and time (Zillmann, 1988). Although the majority of the research on mood management via media focuses on entertainment media, the ability of emotion to impact media selection across contexts makes the theory applicable to the selection of—and engagement with—health-related online media.

If media use can regulate, or manage, one's emotional state, it follows that emotions arising from media use may be regulated by continued media use. For example, Holbert and Hansen (2008) demonstrated that anger generated by viewing the movie *Fahrenheit 9/11* prior to watching a presidential debate mediated the relationship between partisan preferences and audiences' perceptions of the debate. This research demonstrates how an emotional state evoked by one mediated experience can carry over and influence how audiences experience subsequent messages, therefore changing the end emotional state. If a media message about a health issue spurs an emotional response that motivates someone to search online for more health information, then the initial emotional reaction will likely influence emotional reactions to the online material. Therefore, the emotional state of someone who has just finished searching online for

health information is likely the result of emotional regulation. This end emotional state is also likely to influence post-search cognitions and behaviors.

Theory and empirical evidence indicate that emotions should impact the actual search process (i.e., types of search queries, time spent searching, number of websites visited). However, the emotional states users experience *after* searching are more likely to influence post-search cognitions and behaviors than initial emotions due to temporal proximity. Emotions and their associated motivations are short in duration (Ekman, 1992) and can change via regulation (Gross & Thompson, 2007; Gyurak, Gross, & Etkin, 2011), which likely occurs throughout the search process. Measuring post-search emotions in addition to manipulating emotional state prior to searching allows for analysis of the role of emotions at different points in the online health information seeking process. This broader look is important for understanding the multiple ways in which emotions likely impact this process.

Given that hope is an emotion associated with positive future expectancies while fear is not (Roseman, 2011; Roseman, et al., 1994), the following hypotheses are proposed:

**H6:** Post-search feelings of hope will be positively related to positive outcome expectancies and self-efficacy related to health information seeking.

**H7:** Post-search feelings of fear will be negatively related to positive outcome expectancies and self-efficacy related to health information seeking.

By influencing outcome expectancies related to searching and searching self-efficacy, post-search feelings of hope and fear are likely to also influence user attitudes toward the search engine itself. If users come away from the search feeling more confident in their abilities to search for health information (i.e., searching self-efficacy is high) and they think their next search will work out well (i.e., outcome expectancies are positive), then the logical conclusion is they will evaluate the search engine favorably. Attitudes and emotions are connected conceptually in that affect is considered one component of an emotion (Bagozzi, Tybout, Craig, & Sternthal, 1979) and that emotions that turn into more lasting sentiments become chronic attitudes (Frijda, 2008). Given these interconnections between emotions and attitudes as well as the aforementioned predictions of the influence of hope and fear, respectively, on social cognitive variables, the next two hypotheses are proposed:

**H8:** Post-search feelings of hope will be positively related to attitudes toward the search engine via outcome expectancies and self-efficacy.

**H9:** Post-search feelings of fear will be negatively related to attitudes toward the search engine via outcome expectancies and self-efficacy.

It is less clear how post-search feelings of hope or fear will influence behavioral intentions. If a user feels hopeful after searching and then has the motivation to pursue flu vaccine this would demonstrate how post-search emotions could impact behavioral intentions. However, if the user who feels hopeful after searching is actually just hopeful

he or she won't get the flu. Perhaps that type of hopeful user would not think the vaccine is necessary. On the other hand, someone feeling fearful after searching may also be motivated to escape from the dangers of the flu and get a vaccine. This user experiencing fear may also still be afraid because he or she is uncertain if the flu shot will work, and therefore would not be as motivated to get the vaccine. Because of the many possible relationships between post-search hope and post-search fear and behavioral intentions related to the flu, the following research question is offered:

**RQ1:** How will post-search hope and post-search fear impact behavioral intentions?

### **Sharing What is Found**

The sharing of health information amplifies the amount and rate of exposure to of health communications. When people find health information, either through active seeking or by passive scanning (M. Shim, Kelly, & Hornik, 2006), they can either keep the information to themselves or they can share it. Rice (2006) suggested that seeking health information online is a form of social capital because it allows groups of people to accomplish more than individuals could alone, because they pool their resources and share information. Social capital – conceptualized as a set of shared values and trust – increases faster than the number of individual participants grows thanks to the multiple possible relationships and potential resources available to each member of the network (Katz & Rice, 2002).

One of the goals sparked by the experience of positive emotions is to build resources for the future (Fredrickson, 1998). By forging social connections through the sharing of information, people can build support networks and gain health-relevant knowledge (Eysenbach, 2008). Emotional states are often short-lived (Lazarus, 1991), making the link between emotions and subsequent behaviors difficult to trace (Baumeister, et al., 2007). However, in a hyper-connected online environment, users can share information almost instantly while the present emotion is still salient. This technological affordance means that the sharing of information with others could be one of the more common behaviors to result from experiencing emotions while using the Internet, as opposed to behaviors that take longer to implement or would occur after the initial emotion had dissipated.

In a diary study of consumers' information sharing via mobile phones, more than 40 percent of all shared information contained expressions of emotions, with positive emotions dominating (Goh, Ang, Chua, & Lee, 2009). As discussed above, the broaden-and-build hypothesis promotes the idea that people want to build skills that will foster future opportunities and help with future challenges (Fredrickson, 1998, 2001). Hope is considered a contact emotion, meaning people experiencing hope are motivated to increase their proximity or interaction with interpersonal stimuli, whereas fear is in the family of distancing emotions that motivate people to increase decrease their proximity to a stimulus and to reduce contact with it (Roseman, 2011).

In an empirical examination of the most-shared online *New York Times* articles, Berger and Milkman (2012) found that stories with positive emotional overtones were more likely to be shared than negative content. However, the researchers also found that

physiological arousal was also driving the viral nature of stories such that stories evoking high-arousal positive or negative emotions were more likely to be shared than stories generating lower levels of arousal. This relationship between emotional arousal and sharing of stories indicates that emotionality itself, regardless of valence, is an important consideration when trying to predict the sharing of online information. However, functional theories of emotion and the broaden-and-build hypothesis imply that hope, as a positive emotion, would be more likely than fear, a negative emotion, to promote sharing. Therefore, the following hypotheses are proposed:

**H10a:** Those participants experiencing emotions after an online search for health information will be more likely to share the information they find than will those in a neutral state.

**H10b:** Those participants who are induced to feel hope will be more likely to share the online health information they find with others than will those induced to feel fear.

**H11:** Post-search feelings of hope will be positively related to intentions to share information.

**H12:** Post-search feelings of fear will be negatively related to intentions to share information.

## CHAPTER 2

### STUDY 1

A three-condition (emotion induction: hope, fear, or neutral) between-subjects experiment was designed to provide insights into the effects of hope and fear on health information seeking in a naturalistic environment. The “Choose You Over the Flu” public service announcement (PSA) was chosen as the stimulus material based on the results of a pre-test.<sup>1</sup>

#### **Participants**

Participants were recruited from Amazon’s Mechanical Turk (MTurk) online platform. The sample consisted of 122 U.S. participants ranging in age from 18 to 63 years ( $M = 33.97$ ,  $SD = 11.63$ ). The majority of participants were female (62.30%) and White (82.00%). Nearly half of the sample (47.50%) had at least a bachelor’s degree.

#### **Stimulus Material**

A PSA titled “Choose You Over the Flu,” produced by the nonprofit organization Families Fighting Flu, served as the stimulus material for Study 1. The video PSA is 1 minute and 3 seconds long and details the experience of a young man who nearly died from influenza. His parents appear in the video and discuss the importance of vaccination.

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<sup>1</sup> A sample of 80 members of Amazon’s Mechanical Turk online community participated in a pre-test where they watched one of three videos about the flu. The “Choose You Over the Flu” video was judged to be appropriate based on near equal amounts of hope and fear elicited by the emotional prime manipulations. The PSA can be viewed on YouTube at [http://www.youtube.com/watch?v=dH4ldid\\_7fM](http://www.youtube.com/watch?v=dH4ldid_7fM)



The video also shows pictures of people who did die from influenza, and lists statistics about the impact of influenza as part of a plea for others to get vaccinated against the flu. Music plays throughout the PSA.

### **Procedure**

The MTurk interface displayed a short description of the study; “You will watch a short video and also browse some websites and provide feedback about them.”

Participants who chose to continue were directed to a link to the stimulus material and questionnaire, which were displayed using Qualtrics software. Participants were told this study was examining the way people react to different types of online media. After indicating they were at least 18 years old and giving their consent to participate, participants were told the first type of media the researchers were studying was online video. Participants then watched the “Choose You Over the Flu” PSA.

The emotion manipulation took place after watching the video. A priming manipulation was used, based on work by Nabi (2003), in order to induce either hope or fear, while a distractor writing task was used to dissipate emotions in the neutral condition. Those in the hope prime condition responded to a set of questions about how hopeful, optimistic, etc. the video made them feel; those in the fear prime condition responded to questions about how fearful, scared, etc. the video made them feel; and those in the neutral condition were asked to write about the aesthetics (music choice, visual choices, tempo, etc.) of the video for at least a few minutes.

After watching the video and partaking in the emotional prime manipulation, participants were told the second type of media the researchers were studying was online search engine results. Participants were then asked to think of as many search query

terms related to the PSA they just watched for use in a search engine. Subsequently, participants were directed to an actual search engine website ([www.google.com](http://www.google.com)) and asked to search for more information about the flu for as long as they wished. The Qualtrics software measured how long participants spent on this task. Qualtrics then directed participants to the questionnaire where they responded to the remaining dependent, intervening, and control measures. At the end of the questionnaire, participants were given a code to enter into the MTurk interface in order to receive their payment of USD 1.00.

### **Independent Variable**

**Type of emotion.** Participants in every condition viewed the same YouTube video PSA about the flu; however, after viewing the same video, those in the hope prime condition were primed with hope-related words, those in the fearful condition were primed with fear-related words, and those in the neutral condition completed a writing task designed to dissipate emotions that the video may have evoked. This emotion manipulation avoided confounding accessibility of information with emotions, as is common in emotion inductions that ask participants to recall an event in their lives that made them feel a certain way (Nabi, 2009). The hope prime involved asking participants to respond from 1 (*not at all*) to 9 (*very much*) about how the video made them feel for each of nine hope-related words or phrases: hopeful, optimistic, encouraged, yearning for the best, the future is promising, anticipating a good outcome for yourself, reassured, looking forward, and feeling positive about your future ( $M = 5.35$ ,  $SD = 2.39$ ). The fear prime used the same scale but asked participants to respond to the following nine fear-related words: fearful, afraid, scared, anxious, worried, apprehensive, frightened, uneasy,

and alarmed ( $M = 4.97$ ,  $SD = 2.11$ ). For the neutral condition, participants watched the same video, but were asked to spend at least three minutes writing about the editing and aesthetics of the video while ignoring the actual content.

### **Dependent Measures**

**Number of search queries generated.** Participants were told: “Imagine that after you saw this video, you decided to search online for more information about the flu. What are some search terms you might enter into an online search engine (i.e., what you would type into the blank space in a search engine like Google or Yahoo!) in order to find more information about the flu? Please type as many unique search terms as come to mind in the boxes below. These terms can be individual words or they can be phrases.” The number of queries generated by this task served as a dependent variable ( $M = 5.86$ ,  $SD = 2.43$ ).

**Type of search queries generated.** The LIWC software was used to measure the number of cognitive, affective, positive, and negative words generated by each participant in the search query generation task. The software also measured the number of death-related words generated by each participant in the search query generation task.

**Time spent searching.** Qualtrics software measured how long, in seconds, participants spent searching their chosen website for more information about influenza. This measure operationalized depth of the online search ( $M = 71.21$ ,  $SD = 84.83$ ).

**Health information sharing goals.** Participants’ goals to share information found while searching were operationalized as intentions to provide others with information about the flu. Participants were asked how likely they would be, from 1 (*not at all likely*) to 9 (*extremely likely*), to share information about the flu with the following: Entire

online social network (e.g., post information on your Facebook wall or Twitter feed); Selected members of your online social network (e.g., post it on a friend's wall or send a direct Twitter message); Family members – offline communication; Friends (including roommates and significant others) – offline communication; Healthcare providers via online communication; Healthcare providers via online communications. These six items formed a composite measure of intentions to share online health information ( $\alpha = .91$ ,  $M = 3.59$ ,  $SD = 2.22$ )

**Attitude toward the search engine.** A measure adapted from Kalyanaraman and Ivory (2009) served as the dependent variable representing attitude toward the search engine (www.google.com). Participants were asked how well 11 different adjectives (e.g., “appealing,” “favorable,” “high quality”) described the search engine, with responses ranging from 1 (*describes very poorly*) to 9 (*describes very well*) ( $\alpha = .95$ ,  $M = 7.07$ ,  $SD = 1.47$ ).

**Behavioral Intentions.** Participants were asked to rate how likely, on a scale from 1 (*very unlikely*) to 9 (*very likely*) they were to take each of the following actions: Get the influenza vaccine (shot or nasal mist) every year from here on out; Wash your hands or use hand sanitizer after coming into contact with other people or shared surfaces (e.g., a door knob); Always cough or sneeze only into a tissue or your elbow; See a doctor for anti-viral medication upon noticing the early symptoms of the flu; Stay home and avoid all contact with others if you suspect you have the flu; Drink lots of fluids (clear liquids) if you come down with the flu. These measures were based on recommended actions to prevent the spread of influenza found on the Centers for Disease Control's website ( $\alpha = .73$ ,  $M = 6.83$ ,  $SD = 1.52$ ).

## **Intervening Variables**

**Post-search emotions.** Measures from Dillard and Shen (2007) were used to assess participants' emotional states of fear after searching for health information. Participants were asked to rate how much of each emotion—1 (*none of this emotion*) to 9 (*a great deal of this emotion*)—they were experiencing after their search experience: fearful, afraid, and scared ( $\alpha = .92$ ,  $M = 3.82$ ,  $SD = 2.11$ ). This same format was used to measure post-search hope, using two items: hopeful and optimistic ( $r = .73$ ,  $p < .01$ ,  $M = 4.66$ ,  $SD = 2.37$ ).

**Searching self-efficacy.** A scale adapted from Raines (2008) and based on Eastin and LaRose's (2000) measure of Internet self-efficacy was used to measure self-efficacy specifically for seeking online information about influenza. Participants were asked to rate their confidence using the Web to accomplish the following tasks: understanding different procedures for accessing information about influenza, using different search engines to gather information about influenza, evaluating the quality of different influenza websites, locating a variety of perspectives on information about influenza prevention and/or treatment, finding high quality information about influenza, locating high quality websites about influenza, and learning how to use the Internet to gather information about influenza. Participants rated their confidence in their abilities to do each of the tasks on a scale ranging from 1 (*not at all confident*) to 9 (*extremely confident*) ( $\alpha = .93$ ,  $M = 7.99$ ,  $SD = 1.08$ ).

**Searching outcome expectancies.** Using measures adapted from Afifi and Weiner (2006), participants were asked to imagine what outcomes will occur if they were to continue searching for information about influenza. Participants rated the extent to

which they expected that an online search for information about the flu would produce results that were 1 (*extremely negative*) to 9 (*extremely positive*) and 1 (*extremely bad*) to 9 (*extremely good*) ( $\alpha = .73$ ,  $M = 6.16$ ,  $SD = 1.43$ ).

### **Control Measures**

Control measures included whether or not participants had already received an influenza vaccination (27.87% already had), as well as age and gender. No manipulation check was used to gauge emotional responses to the stimulus because such a measure could reduce the impact of the manipulated emotional states on participants' responses to subsequent items in the questionnaire (see Gorn, Goldberg, & Basu, 1993; Keltner, Ellsworth, & Edwards, 1993; Raghunathan & Pham, 1999).

### **Study 1 Results**

H1 proposed that those participants who are induced to feel hope would think of more search terms related to the flu than those induced to feel fear or in a neutral state. An ANCOVA with number of search terms as the dependent variable, emotional prime condition as the factor, and age, gender, and already having an influenza vaccine as covariates, was not significant,  $F(2, 116) = .95$ ,  $p = .45$ ,  $\eta^2 = .04$ . Therefore, the data do not support H1.

H2 predicted that those induced to feel hope or fear will include more affective and cognitive words in their search queries than will those in a neutral state. A one-way ANCOVA with number of affective words as the dependent variable and the emotional prime as the factor, with age, gender, and having a flu vaccination as covariates, was not significant,  $F(2, 116) = 1.29$ ,  $p = .28$ ,  $\eta^2 = .05$ . Pairwise comparisons between the three emotional prime groups were likewise non-significant. Another one-way ANCOVA with

the number of cognitive mechanisms used in the search queries as the dependent variable was also not significant,  $F(2, 116) = .23, p = .95, \eta^2 = .01$ , as were the subsequent pairwise comparisons. Therefore, the data do not support H2.

H3 predicted that participants who were induced to feel hope would be less likely to think of search query terms related to death than will those not induced to feel hope. An ANCOVA with number of references to death was performed, with the same factor and control variables as above. The overall ANCOVA was not significant,  $F(2, 116) = 1.19, p = .32, \eta^2 = .05$ , however, the effect of the emotional prime in the ANCOVA approached significance,  $F(2, 116) = 2.68, p = .07, \eta^2 = .04$ . Pairwise comparisons revealed a significant difference ( $p < .05$ ) between the means of the hope condition ( $M = 2.89, SE = 1.06$ ) and the neutral condition ( $M = 5.98, SE = 1.00$ ). The difference between the means of the hope condition and the fear condition ( $M = 5.73, SE = 1.02$ ) approached significance ( $p = .06$ ). These data support H3 and indicate that being primed with hope significantly reduced the use of search queries related to death in this sample compared to those primed with fear or in the neutral condition.

H4a predicted that participants experiencing hope would search for information about the flu for a longer amount of time than would those experiencing fear or in the neutral emotion condition. Meanwhile, the competing hypothesis, H4b, predicted that those experiencing fear would search for the longest amount of time. An ANCOVA with time spent searching as the dependent variable and the emotional prime as the factor, with age, gender, and having a flu vaccination as covariates, was not significant,  $F(2, 116) = .96, p = .45, \eta^2 = .04$ . Pairwise comparisons between the three emotional prime

conditions were not significant, either (all  $ps > .7$ ). Therefore, neither H4a nor H4b were supported.

H5 posited that positive outcome expectancies and self-efficacy for searching would mediate the relationship between emotional state and attitudes toward the search engine as well as health-related behavioral intentions. To test this hypothesis, the PROCESS macro (Hayes, 2012) was used. Specifically, Model 4 using 2,000 bootstrap samples and 95% CI, tested for both direct and indirect effects from the two emotional prime conditions and the outcomes of attitudes toward the search engine and behavioral intentions, with outcome expectancies and self-efficacy serving as multiple mediators (see Figure 1).

First, the model was run to test the indirect effects of the hope prime on attitudes via outcome expectations and self-efficacy. The direct effects of the hope prime on outcome expectations (point estimate =  $-.37$ ,  $p = .19$ ), self-efficacy (point estimate =  $-.15$ ,  $p = .46$ ), and on attitudes (point estimate =  $-.03$ ,  $p = .91$ ) toward the search engine were all non-significant. The indirect effects of the hope prime on attitudes toward the search engine were also not significant (the bootstrap confidence intervals overlapped with 0), via either outcome expectancies (point estimate =  $-.06$ , Boot SE =  $.06$ , CI [ $-.22$ ,  $.02$ ]) or self-efficacy (point estimate =  $-.08$ , Boot SE =  $.12$ , CI [ $-.35$ ,  $.13$ ]).

The same analysis was run testing the effects of the fear prime on attitudes via outcome expectancies and self-efficacy. The direct effects of the fear prime on outcome expectations (point estimate =  $.26$ ,  $p = .34$ ), self-efficacy (point estimate =  $.31$ ,  $p = .12$ ), and on attitudes (point estimate =  $.27$ ,  $p = .28$ ) toward the search engine were also non-significant. The indirect effects of the fear prime on attitudes toward the search engine



were also not significant, via either outcome expectancies (point estimate = -.04, Boot SE = .05, CI = -.02, .20) or self-efficacy (point estimate = .17, Boot SE = .11, CI = -.02, .44).

Next, the multiple mediation model was run to test the indirect effects of the hope prime on behavioral intentions via outcome expectations and self-efficacy. The direct effects of the hope prime on behavioral intentions was not significant (point estimate = .14,  $p = .60$ ). The indirect effects of the hope prime on behavioral intentions were also not significant, via either outcome expectancies (point estimate = -.09, Boot SE = .09, CI = -.31, .03) or self-efficacy (point estimate = -.03, Boot SE = .05, CI = -.21, .03). This same procedure was repeated to test effects of the fear prime. The direct effects of the fear prime on behavioral intentions was also not significant (point estimate = .10,  $p = .70$ ). The indirect effects of the fear prime on behavioral intentions were, again, not significant, via either outcome expectancies (point estimate = .06, Boot SE = .07, CI = -.05, .26) or self-efficacy (point estimate = .05, Boot SE = .06, CI = -.03, .23).

Together, these findings demonstrate that H5 were not supported. To test H6, H7, H8 and H9—that post-search feelings of hope and fear would influence attitudes toward the search engine via the mechanisms of outcome expectations and self-efficacy—the same Model 4 tests of indirect effects with multiple mediators were rerun using post-search hope and post-search fear, respectively, as the independent variables.<sup>2</sup> Using this approach, post-search hope did not have a significant direct effect on attitudes toward the

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<sup>2</sup> A one-way between-subjects ANCOVA was run with post-search hopefulness as the outcome variable, emotional prime as the factor, and already having the flu shot, gender and age as the control variables. The results were not significant,  $F(2, 116) = 1.38, p = .24, \eta^2 = .06$ , as were the results for the same ANCOVA with post-search fearfulness as the outcome variable,  $F(2, 116) = 1.30, p = .27, \eta^2 = .05$ . The lack of direct relationship between the emotional prime condition and post-search emotions indicates that the search process served to regulate emotions and analysis of emotions at different points in the process may have different results.

search engine (point estimate = .03, SE = .05, *ns*). Post-search hope did, however, have a significant and positive indirect effect on attitudes toward the search engine via outcome expectancies, partially supporting H6 and H8 (point estimate = .02, Boot SE = .01, CI = .0053, .0774,  $p < .05$ ). The other part of H8, which stated that self-efficacy would mediate the relationship between post-search hope and attitudes toward the search engine, was not supported as post-search hope did not have an indirect effect on attitudes toward the search engine via self-efficacy (point estimate = .02, Boot SE = .02, CI = -.02, .07).

Post-search fear also did not have a direct effect on attitudes toward the search engine (point estimate = .07, SE = .06, *ns*) nor indirect effects (outcome expectancies: point estimate = -.00, Boot SE = .01, CI = -.04, .01; self-efficacy: point estimate = -.03, Boot SE = .03, CI = -.10, .01). Therefore, H7 and H9 were not supported.

RQ1 asked about the relationship between post-search emotions and behavioral intentions. Feeling hopeful after searching did have direct and indirect effects on behavioral intentions (direct effect: point estimate = .15, SE = .05,  $p < .01$ ). The indirect effects operated through post-search hope's effects on outcome expectancies (point estimate = .02, Boot SE = .02, CI = .003, .07,  $p < .05$ ). Indirect effects of post-search hope on behavioral intentions via self-efficacy were not significant (point estimate = .01, Boot SE = .01, CI = -.01, .04).

Feeling fearful after searching also had a direct effect on behavioral intentions, (point estimate = .16, SE = .06,  $p < .01$ ). Post-search fear did not, however, have indirect effects on behavioral intentions via either outcome expectancies (point estimate = -.004, Boot SE = .02, CI = -.05, .03) or self-efficacy (point estimate = -.01, Boot SE = .01, CI = -.06, .003).

H10a predicted that those participants experiencing emotions after an online search for health information would be more likely to share the information they find than would those in a neutral state. The central argument of H10a is that emotional arousal itself, regardless of valence, is more likely to motivate the sharing of information than is a neutral state. An ANCOVA with intention to share as the dependent variable and emotional prime as the factor, with age, gender, and having a flu vaccine as covariates, was significant  $F(2, 116) = 4.07, p < .01, \eta^2 = .15$ . The significant omnibus  $F$  was driven by the significance of the control variable of having had the flu vaccine,  $F(1, 116) = 11.36, p < .01, \eta^2 = .09$ . The effect of the emotional prime approached significance,  $F(2, 116) = 2.61, p = .08, \eta^2 = .04$ . Pairwise comparisons showed the effect of the emotional prime was driven by a significant difference ( $p = .03$ ) between the neutral ( $M = 3.21, SE = .32$ ) and fear prime ( $M = 4.20, SE = .33$ ) conditions on intention to share. The difference between the hope prime ( $M = 3.37, SE = .34$ ) and fear prime conditions approached significance ( $p = .09$ ). There was not a significant difference between the hope prime and the neutral condition in predicting sharing intentions; however, the mean differences between the hope prime and neutral condition were in the suggested direction. This finding along with the significant difference between the fear prime and neutral condition in intentions to share information indicated conditional support for H10a.

H10b predicted that those participants primed with hope would be more likely to share the online health information they found with others than would those in the fear prime or neutral conditions. As demonstrated in the test for H10a, the fear prime was a better predictor of intentions to share than was the neutral manipulation; however, there were no significant differences between the hope prime and fear prime or between the

hope prime and the neutral manipulation. Therefore, H10b was not supported, as participants exposed to the hope prime did not express greater intentions to share information about influenza than did those participants in the other conditions.

In order to address the predictions made in H11 and H12 regarding the relationships between post-search hope and post-search fear on intentions to share information, a hierarchical multiple regression was run. Intentions to share information served as the dependent variable, with fear prime, hope prime, time spent searching, perceived involvement, searching outcome expectancies, searching self-efficacy, post-search hope, post-search fear, behavioral intentions, and attitudes toward the search engine as the independent variables, and gender, age, and previous influenza vaccine as the control variables. Gender, age, and previous influenza vaccine were entered in Step 1 and explained 11.1% of the variance in sharing intentions.

The dependent variables were entered in Step 2 and they predicted an additional 40.1% of the variance in sharing intentions (beyond that predicted by the control variables),  $R$  squared change = .40,  $F$  change (10, 107) = 8.80,  $p < .001$ . In the final model, the following variables predicted sharing intentions: the fear prime ( $\beta = .17, p < .05$ ), post-search hope ( $\beta = .25, p < .01$ ), post-search fear ( $\beta = .22, p < .01$ ), and behavioral intentions ( $\beta = .24, p < .01$ ). Because post-search hope was positively related to intentions to share, H11 was supported. However, because post-search fear was also positively related to intentions to share (although not as strongly as post-search hope), H12 was not supported.

## **Study 1 Discussion**

The hypotheses related to the effects of the emotional primes were largely unsupported by the data collected for Study 1. However, H3 was supported in that participants primed with hope were less likely to think of search query terms related to death. This finding indicates that pre-search emotions can impact the shape of a subsequent search.

The lack of support for the other hypotheses related to the emotional primes could possibly be due to methodological issues or to emotion regulation occurring between the time of the prime and the measurement of the dependent variables. The emotion manipulation was chosen because it had been successful in prior studies of emotion and communication and it avoids confounding emotions with message content (Nabi, 2003). However, this study used different emotions (hope and fear) than the ones used by Nabi (anger and fear), and could have influenced the effectiveness of the manipulation.

Searching self-efficacy did not mediate the relationship between the emotional primes (or post-search emotions) and outcomes of interest. However, searching outcome expectancies did serve as a conduit for indirect effects from emotions to attitudes toward the search engine and behavioral intentions. The role of outcome expectancies in predicting attitudes and behaviors is in line with predictions of social cognitive theory about the possible impact of affect and outcome expectancies on outcomes (Bandura, 1986, 2004; Pajares, et al., 2009). Of note, this study did not test self-efficacy or outcome expectations related to the targeted health behavior (influenza prevention and early treatment) because the focus was on the communication process of searching for information. The ability of social cognitive variables related to this particular

communication process to predict health-related behavioral intentions points to areas for possible theory development in integrating social cognitive variables into models of information seeking processes.

Contrary to H4a and the competing H4b, neither the hope prime nor the fear prime impacted time spent searching for information about influenza. Because of the naturalistic environment of Study 1, participants viewed various types of websites about influenza. This could have mitigated the effects of the emotional prime as different websites may have varying levels of readability, interactivity, navigability, or other factors that influence how long participants stayed on the pages and therefore their time spent searching.

While the emotion prime manipulation did not lead to differences in the affective or cognitive nature of the search queries generated by participants about influenza, there was an interesting finding regarding language use. Those in the hope prime condition were less likely to use words related to death as search terms. The stimulus video did discuss the death of children from the flu, and for those in the fear and neutral conditions that fact seems to have influenced their choice of search terms. The ability of hope to temper search queries toward less extreme influenza-related outcomes is one way positive emotional reactions to messages may alter the health information search process.

Multiple emotion variables in Study 1 were related to intentions to share information with others. While the fear prime approached significance in being associated with greater intentions to share information, the hierarchical regression revealed that both post-search fear and post-search hope predicted higher (and statistically significant) intentions to share. Of these three variables, post-search hope was

the best predictor of intentions to share information with others. These results indicate that the final emotional state is more influential than the initial emotional state in influencing intentions to share. This finding is also congruent with the broaden-and-build hypothesis in that a positive emotion—hope—encourages users to make connections with other people by sharing information. These results, alongside previous research, signify that emotions are likely an important part of the process leading Internet users to share health information with others. Future studies should examine a wider swath of emotional primes as well as post-search emotions to better understand the influence of emotionality on sharing.

The multiple mediation model revealed that attitudes toward the search engine were impacted indirectly by post-search hope via positive outcome expectancies. While fear appeals and fear reactions related to health may also drive people to search online for health information, promoting feelings of hope may be a better way to foster comfort with a digital interface that keeps users returning throughout the long-term process of changing health behaviors for the better. Additionally, the hierarchical multiple regression revealed that age negatively predicted attitudes (younger participants held more positive attitudes toward the search engine). It also predicted that involvement and self-efficacy positively predicted attitudes. Therefore, both emotional and cognitive reactions impacted attitudes, and should be considered when trying to direct users to return to a search engine when they are seeking health information.

### **Study 1 Conclusion**

Study 1 was designed to test the effects of fear and hope on health information seeking outcomes, as well as evaluate possible mechanisms for these effects, in a

naturalistic setting. We chose to use Amazon's Mechanical Turk service in order to insure greater participant heterogeneity than would be found in a university participant pool. We found the emotional primes had little effect on the outcomes of interest. However, post-search emotions and social cognitive variables such as self-efficacy and outcome expectancies played an important role in predicting attitudes toward the search engine, health-related behavioral intentions, and intentions to share health information with others. A second study, Study 2, may help elucidate the findings of Study 1 by introducing conditions where participants see search results matched to the primed emotional states on the basis of emotional action tendencies. Study 2 will also build up on Study 1 by measuring a broader array of post-search emotions in order to better analyze the many ways in which emotions may influence post-search outcomes.



## CHAPTER 3

### EMOTION-BASED CUSTOMIZATION

In their list of basic tenets of effective health communication in the e-health era, Neuhauser and Kreps (2003) argue “Tailored communication is more effective than generic messages” (p. 11). After considering the role of emotions in health information seeking, a logical follow-up question to ask is: How would tailoring search results to the present emotion states of the users influence the search process and its outcomes? Matching messages to user characteristics or traits has proven to be a reliable way to improve attitudes toward websites (Kalyanaraman & Sundar, 2006) as well as promote healthy behavior changes (Noar, Benac, & Harris, 2007; Noar, et al., 2011). Given the increasing sophistication of technology and ease with which algorithms can tailor online content to the individual user, it is not unreasonable to assume that websites will continue to provide increasingly customized content to users. A better understanding of the impact of customization based on the present emotional states of users is one promising avenue for improving the health information seeking process.

Businesses, government agencies, and public health practitioners have all utilized the power of customization to increase the relevance and persuasive powers of health-related messages. The literature on customization and tailoring of health information has demonstrated the overwhelmingly positive effects of this type of manipulation on user attitudes and also on compliance with advocated health behaviors. A term with many

synonyms—matching, tailoring, personalization—customization can be conceptually defined as the act of incorporating some aspect of the self into a message (Petty, Wheeler, & Bizer, 2000).

People tend to like others who are similar to them, often because they share similar attitudes, values, or personality traits (Ajzen & Fishbein, 1980; Byrne & Clore, 1966). When discussing computerized customization, this is a key point because people treat computers as social actors (Reeves & Nass, 1996). If people are treating computers as social actors, then computerized messages that are similar to the user should be more likeable. By customizing messages, content that was once relegated to mass communication can instead be made to feel more like interpersonal communication between individuals in a shared community (Beniger, 1987). Kreuter, Farrell, Olevitch, and Brennan (2000) defined tailoring as the process of providing each individual unique content based on feedback/results and personal needs. It is the reflexive and interactive relationship between the message producer and the message receiver that is the conceptual core of customization.

When messages are customized, the result is an “audience of one” that typically improves user attitudes toward the message source (Kalyanaraman & Sundar, 2006). Indeed, as meta-analytic reviews have shown, when health messages correspond with some aspect of the self—be it demographics, individual differences, or theoretical considerations—they are more effective in changing behaviors than generic messages (Noar, et al., 2007; Noar, et al., 2011). With customized health messages, it is common to tailor materials based on participants’ stage of change (from the Transtheoretical Model) on one or more constructs from prominent behavior change theories, such as the Health

Belief Model, Theory of Reasoned Action/Theory of Planned Behavior, or Social Cognitive Theory (Kreuter, et al., 2000; Noar, et al., 2007; Rimal & Adkins, 2003).

Given their motivational qualities and omnipresence in the human experience, discrete emotions are one promising variable for customizing health messages. Just as people are more likely to remember self-relevant information, emotion-congruent information is more easily recalled (Levine & Pizarro, 2004). People who have anxious personalities are more likely to remember threat-related information than non-threatening information (Russo, Fox, Bellinger, & Nguen-Van-Tam, 2001). Information that is congruent with an individual's emotions also leads to biases in perception, judgment, encoding, and retrieval of information (Eich & Forgas, 2003). Although individuals tend to process messages less carefully if the message includes negative self-relevant information—such information could threaten one's self-image—those experiencing positive moods display the opposite behavior (Das & Fennis, 2008), in accordance with the aforementioned mood-as-resource hypothesis. However, it is not yet clear how discrete emotions—as opposed to diffuse moods—influence users faced with possibly threatening health information in an online environment.

The construct of matching proposed in the psychology literature (see Petty, et al., 2000) is an analogue of customization. In the realm of emotional matching, the individual's current emotion state is the aspect of the self under examination. Those experiencing specific emotional states are more likely to be persuaded by emotionally framed messages that match rather than mismatch their own emotions (Nabi, 2003). Nabi also found that people experiencing specific emotions after reading a news article reported stronger intentions to search for policy information about the issue in the article

if that information was related to their same emotion state. DeSteno and his colleagues (2004; 2000) demonstrated that emotion-congruent expectancies mediate the relationship between current emotional state and the persuasiveness of an emotionally framed message. An increase in the perceived likelihood of future events representing the same emotion mediated the relationship between the initial emotion and the persuasiveness of the emotion-matched message.

Although this research demonstrated that matching a message to the emotional tone of a receiver's emotional state can increase persuasion (DeSteno, et al., 2004; DeSteno, et al., 2000), the operationalization did not consider the action tendencies or motivations sparked by the initial emotion induction. By providing information couched in terms of actions and motivations that match those experienced by users, they may express more positive attitudes toward the search engine and the websites linked to by the search engine. While much research has focused on how matching messages to stable individual differences (e.g. personal preferences, need for cognition, regulatory focus of prevention or promotion, etc.) can improve persuasion, less is known about how the current context of a situation influences customization outcomes. Given the many different types of situations in which someone maybe searching online for health information, this is a critical consideration for anyone hoping to improve the search process.

Emotions have played a role in research about matching. For example, matching messages to the original basis of an attitude (affective versus cognitive) proves more persuasive than providing individuals with mismatched messages (Fabrigar & Petty, 1999). Scholars have also matched the content of messages with content that evokes the

same discrete emotional states that individuals were experiencing and found those to also be more persuasive than messages matched to other emotions (DeSteno, et al., 2004; DeSteno, et al., 2000). However, these operationalizations of emotional matching do not capture the concepts of action tendencies and motivational goals sparked by discrete emotions. Matching messages to emotional action tendencies and motivations in the context of web-based matching is an important addition to this body of literature because of the behavioral implications. If people find information that's underlying theme matches their motivations to take certain types of action, then chances are perhaps higher they will embark on those actions than if they received information that does not conform to their motivations.

Based on the literature on emotions, individuals may be more likely to gravitate toward messages that help them make progress toward their goal. Therefore, search engine results matched to emotional action tendencies and motivations should prompt more favorable attitudes toward the search engine itself. The literature on customization and health communication points to similar effects of customized messages on behavioral intentions, leading to the following two hypotheses:

**H13:** Matching the action tendency and motivation conveyed in the link descriptions of the search engine results to the induced emotional state of the users will produce more positive attitudes toward the search engine than will mismatches between link descriptions and emotion state.

**H14:** Matching the action tendency and motivation conveyed in the link descriptions of the search engine results to the induced emotional state of the users will lead to greater behavioral intentions than will mismatches between link descriptions and emotion state.

How might hopeful participants react to search results embodying the action tendencies and motivations of fear, and how might fearful participants react to those embodying the same properties of hope? The aforementioned literature on emotion regulation and mood-as-resource point to evidence that positive emotions serve as a buffer to self-threatening information (e.g., Das & Fennis, 2008) and that the experience of positive emotions can down-regulate the experience of negative ones (e.g., Fredrickson, et al., 2000). This indicates that feeling hopeful may protect users from maladaptive responses to a later message that elicits fear. However, social psychology research also indicates that messages matched to aspects of the same emotion are more persuasive than those that are mismatched (e.g., DeSteno, et al., 2004; Nabi, 2003). These studies might suggest that attitudes toward the search engine would be hurt by mismatches. Given the lack of concurrence in the extant literature, we propose the following research question:

**R2:** How will hope-fear and fear-hope mismatches between initial emotion and the emotional action tendencies and motivations embedded in search engine results impact participant attitudes toward the search engine?

Although many tailored health interventions have been effective, less is known about exactly why they were effective (Noar, et al., 2011). Perceived relevance is one likely mechanism behind customization effects (Kalyanaraman & Sundar, 2006). Perceived self-relevance is also a primary appraisal that determines emotional experiences (Lazarus, 1991). Functional theories of emotion posit that once an emotion is activated by appraisals of one's situation as goal relevant, the individual is motivated to take action in specific ways in order to adapt to the situation and make progress toward emotion-induced goals (Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008). Therefore, the evocation of emotions occurs in an inherently self-relevant manner, making emotions and their associated action tendencies and motivations key for understanding the effects of self-relevant customization on users.

Rimal and Adkins (2003) defined relevance as the extent to which a message fulfills the individual's desires, needs, or motivations. Kalyanaraman and Sundar (2006), in their investigation of the effects of different levels of customization of a web portal on users' attitudes and behaviors, found that perceived relevance, perceived interactivity, perceived involvement, and perceived novelty all mediated the relationship between customization and attitudes toward the portal. Of these four mediators, personal relevance is an oft-cited mechanism of customization's effects on audiences in the health communication realm (Rimal & Adkins, 2003).

Research in health communication has found that tailored messages are perceived as more relevant than non-tailored messages (Resnicow et al., 2009; Strecher, Shiffman, & West, 2006). In a study of tailored breast cancer materials, Jensen, King, Carcioppolo, and Davis (2012) found participants who viewed tailored illustrated pamphlets had higher

intentions to get a mammogram than other participants, and this effect was fully mediated by perceived relevance of the material in the pamphlet. The literature on customization and perceived relevance lead to the following hypothesis:

Customization may also influence how involved users are with the search engine. Involvement is related to perceived personal relevance. However, the concept also encapsulates both affective and cognitive connections with a stimulus (Zaichkowsky, 1985, 1994). Zaichkowsky describes involvement as a motivational construct akin to engagement, and one that occurs when a stimulus connects with the self. In a communication context, Tal-Or and Cohen (2010) define involvement as “the degree to which we invest emotional and mental efforts in decoding the text and making sense of the story” (p. 402). Customized health content is likely to increase users’ perceived involvement because the users are already invested emotionally and mentally in the content. Kalyanaraman and Sundar (2006) found involvement to be one significant mediator between customization of web portals and attitudes toward the portal. This and the aforementioned literature related to perceived relevance lead to the following hypothesis:

**H15:** The relationship between customization and attitudes toward the search engine will be mediated by perceived relevance and perceived involvement.

Although it is likely that emotions influence intentions to share information (see the discussion of Study 1), the existing literature provides little guidance for making predictions about the ways emotions and message customization may interact to



influence intentions to share information found while searching. Therefore, we propose the following research question:

**R3:** How will the interaction of emotions and customization influence sharing intentions?

While many health messages evoke fear, they often simultaneously evoke other emotions, such as sadness, anger, or guilt (Dillard, Plotnick, Godblod, Freimuth, & Edgar, 1996). For example, Williams-Piehot, Pizarro, Schneider, Mowad, and Salovey (2005) observed that individuals experienced fear, hope, and reassurance after seeing a message about mammography screening. The mix of emotions that may result from viewing health messages has the potential to influence the processing of health messages and also behavioral intentions because of the mix of action tendencies associated with the emotional reactions (Frijda, et al., 1989). Carrera, Muñoz, and Cabellero (2010) found that in the context of anti-drinking persuasive appeals, the experience of mixed emotion (some combination of sadness, fear, joy, and relief) lowered post-message discomfort and decreased intentions to binge drink more so than negative emotions alone.

Because mixed emotional appeals contain both positive and negative emotional components, they may also prevent defensive reactions that sometimes accompany negative-only emotional appeals. Under the mood-as-resource framework (Raghunathan & Trope, 2002; Trope & Pomerantz, 1998), positive emotions can serve as a buffer for bad news, allowing individuals to better attend to self-threatening messages that might help them improve in the long run (Raghunathan & Trope). Feeling tender, moved,

inspired, or compassionate is a type of mixed emotional blend of negative and positive affect, one that can spur further cognitions about the message and that can be understood by thinking of media messages as meaningful (Oliver & Bartsch, 2010; Oliver, Hartmann, & Woolley, 2012).

Researchers have conceptualized and tested this meaningful (as apposed to purely pleasurable) approach to understanding media enjoyment in the realm of entertainment. However, the high value society places on health and wellbeing makes the mixed emotional framework—one that emphasizes human values, morality, and compassion—an approach that may also apply to reactions to nonfiction health messages, too. Choosing to consume media that evoke mixed emotions is one way for people to connect with others and to seek the truth about the human experience (Oliver & Raney, 2011), and health is an integral part of the human experience.

Online searches for health information often return thousands of pages of results. If one link points the user to a website that results in her feeling hopeful, but the next link she looks at provides information that has her feeling anxious, the experience of mixed emotions is likely a common result of health information searches. Another consideration is that the media message that spurs on the initial search may leave users feeling tender, inspired, or moved, and, if strong enough, this sentiment could last throughout the search, perhaps even be fostered by a search. These two probable scenarios illustrate the need to investigate the role of mixed emotions in a health information seeking context.

In particular, if mixed emotions motivate people to connect with others as a result of feeling moved, inspired, tender, or compassionate, then sharing health information with others may be one logical outcome of experiencing mixed emotions after a health

information search. Sharing after an online search is an important consideration for health communication researchers as it can greatly amplify the effects of online health messages beyond the initial audience. The literature on mixed emotions and media suggest the following hypothesis:

**H16:** Feeling inspired/moved after searching for health information will be positively related to intentions to health share information with others.

The search process is likely to generate other emotions in addition to feeling moved or inspired. One emotion that might be evoked by an online search for health information is that of interest, a positive emotion. Silvia (2008) categorizes interest as a knowledge emotion, along with confusion, surprise, and awe. He also contends that appraisals of a situation as novel-complex as well as comprehensible result in feelings of interest (Silvia, 2005). Interest serves as intrinsic motivation to explore and seek new knowledge. Silvia describes interest as a counterweight to anxiety. That is, interest serves to motivate people to approach the unfamiliar—while fear and anxiety motivate people to avoid possibly dangerous stimuli. The approach motivation of interest is evolutionarily adaptive because one never knows when new pieces of knowledge may be helpful for survival.

For someone who takes the time to search for health information, the topic of one's search is likely either novel or complex—the appraisals that precede feelings of interest—such that the searcher wants more information about it. When searching for online health information, if the searcher finds information she comprehends, then the

search will likely spark feelings of interest. In relation to the online health information seeking context, feelings of interest may increase the perceived relevance of information. Consider that the feeling of any emotion is preceded by an appraisal of relevance of the situation to the individual's goals. If searchers feel interested then they might perceive the information they are finding as even more relevant to their personal goals not only for health but also for gaining knowledge.

**H17:** Experiences of interest after searching online for health information will be positively related to perceived relevance of the search.

It is also likely that feelings of interest after searching would increase positive outcome expectancies about future searches. If a searcher is interested in the subject and finds information she understands, then she would have good reason to expect future searches for health information to go well, too. This proposed scenario leads to the following hypothesis:

**H18:** Experiences of interest after searching online for health information will be positively related to outcome expectancies.

In addition to feeling inspired and interested, the process of searching may lead users to feel contented. Returning to the earlier discussion of health information seeking as a form of emotion regulation, the process of searching may down-regulate feelings of hope and fear and help users meet emotion-motivated goals, thereby resulting in less

intense positive emotions, such as a feeling content. Content signals the absence of threat and its function is to help conserve resources (Dillard & Shen, 2007). If searchers have gained enough information during their online search they feel less threatened, then they are likely to feel less uncertain and may deem the search a success. This supposition leads to the following hypothesis:

**H19:** Feelings of contentedness after searching online for health information will be positively related to attitudes toward the search engine.

Based on the aforementioned mechanisms and possible outcomes related to health information seeking, a general model of the interplay between emotions and customization in the health information seeking can be created (see Figure 2). Study 2 attempts to empirically test the relationships proposed in this model.

## **Study 2**

### **Purpose**

Study 2 advances this line of inquiry beyond what was found in Study 1 by testing the impact of manipulated search results on the outcomes of interest. Study 2 also measures a broader array of post-search emotions and cognitive intervening variables that are likely to influence the health information seeking process than did Study 1. A 3 (emotion induction: hope, fear, or neutral) X 3 (emotion-matched search results: hope, fear, or generic) between-subjects factorial experiment tested the ways search engine results that are either matched or mismatched to emotional action tendencies and motivations influence user perceptions and search decisions.

## **Participants**

Participants were again recruited from Amazon's Mechanical Turk (MTurk) online platform. The sample for Study 2 consisted of 380 U.S. participants ranging in age from 18 to 65 years ( $M = 32.07$ ,  $SD = 10.85$ ). Slightly more than half of the participants (53.40%) were female and the majority of participants were White (81.60%). Nearly half of the sample (47.50%) had at least a bachelor's degree.

## **Stimulus Material**

The same "Choose You Over the Flu" PSA used in Study 1 was used as the initial stimulus in Study 2. Additionally, a mock search engine named "SearchForHealth.org" was created for the purpose of this dissertation. The search engine interface had a simple white background with the "SearchForHealth.org" logo at the top of the page and a text entry box for search queries below the logo. Users could click on a magnifying glass icon to the right of the text entry box or hit "enter" on their keyboards to advance to the results page of the search engine. The results pages on the mock search engine were also simple, with the search engine logo at the top and black text results listed vertically on a white background.

## **Procedure**

Amazon Mechanical Turk directed participants who clicked on a link to participate to the URL of a Qualtrics survey in return for a payment of USD 1.10. Participants were told the purpose of the study was to examine the way people react to different types of online media. After they indicated they were at least 18 years old and gave consent to participate, participants partook in the same emotion-induction prime used in Study 1. Participants were told the video used in the emotion manipulation was

the first type of online media the researchers were studying. Following the emotion induction, participants were told the second type of media the researchers wanted to study was an online search engine. The search engine presented to the participants was described as the beta version of a new search engine designed specifically for helping people find quality information about health issues.

Participants were then directed to a mock search engine, “SearchForHealth.org,” and asked to search for the term “flu.” The mock search engine then automatically loaded a page of results. The “SearchForHealth.org” page randomly linked participants to one of three predefined results pages, one manipulated to reflect the action tendencies of fear, one manipulated to reflect the action tendencies of hope, and a neutral/generic results page. The links on each page were based on a Google search for the query term “flu”. In the emotional action tendencies conditions, the link titles and link descriptions used words and phrasing to reflect the appropriate action tendencies. Hope’s action tendency is to approach and move toward a goal while fear’s action tendency is to avoid threats and seek protection. The neutral condition used non-emotional, straightforward titles and descriptions, avoiding verbs/action words and using mostly nouns.

Participants were asked to thoroughly review the results page and read through the link descriptions for approximately five minutes. After participants reviewed the search results page, they were told the researchers also wanted to gather user opinions on the first link retrieved by the new search engine. Participants were then asked to spend approximately five minutes browsing this website (the Centers for Disease Control’s dedicated influenza website, see Figure 4 for a URL and screenshot) in order to evaluate if the search engine provided them with a high-quality web link. Qualtrics software timed

how long the participants spent on the CDC website until they clicked the “next” button. After they finished browsing the website, Qualtrics took participants through the questionnaire containing the remaining outcome variables.

### **Independent Variables**

**Type of emotion.** The same emotion manipulation used in Study 1 was used in Study 2 (Hope prime:  $M = 5.02$ ,  $SD = 2.15$ ; Fear prime:  $M = 4.22$ ,  $SD = 2.36$ ).

**Type of link description/customization.** The names of the websites and their URLs remained constant across conditions with only the link titles and descriptions changing. The link descriptions in the two hope- and fear-matched conditions portray each linked website as meeting the action tendencies and motivations associated with hope and fear, respectively. (see Appendix A).

### **Dependent Variables**

**Attitude toward the search engine.** The same measure used in Study 1 was used in Study 2 ( $\alpha = .96$ ,  $M = 6.57$ ,  $SD = 1.59$ ).

**Behavioral Intentions.** The same items used in Study 1 were used in Study 2 ( $\alpha = .73$ ,  $M = 6.83$ ,  $SD = 1.52$ ). Because the coefficient alpha level did not reach an ideal level, a principal components analysis with Promax rotation was conducted to assess the nature of the relationships between the items comprising behavioral intentions. Promax rotation was used based on the assumption that different types of flu prevention- and treatment-related behaviors would likely be correlated. The analysis revealed two factors with eigenvalues greater than 1, and these two factors explained a total of 63.87% of the variance in behavioral intentions. The first factor (eigenvalue = 2.62, 43.60% of variance) was comprised of the items related to self care and individual actions to prevent flu



transmission, such as staying home when sick, coughing or sneezing into a tissue or elbow, drinking fluids if sick, and washing hands. The second factor (eigenvalue = 1.22, 20.28% of variance included the two items pertaining to medical professionals: receiving a flu vaccine every year from here on out and seeing a doctor for anti-viral medications if one suspects the flu. Because the flu vaccine was the behavior of most interest to the present study, and most able to prevent pandemic flu across populations, the two items from the second factor were used in subsequent analyses ( $M = 4.96$ ,  $SD = 2.65$ ,  $r = .59$ ,  $p < .01$ ).

**Health information sharing goals.** Goals to share information participants found while searching for more information about the flu were operationalized as intentions to provide others with information about the flu. Participants were asked how likely they would be (1, *not at all likely*, to 9, *extremely likely*) to share information about the flu with the following: Entire online social network (e.g., post information on your Facebook wall or Twitter feed); Selected members of your online social network (e.g., post it on a friend's wall or send a direct Twitter message); Family members – offline communication; Friends (including roommates and significant others) – offline communication; Healthcare providers via online communication; Healthcare providers via online communications ( $\alpha = .88$ ,  $M = 3.94$ ,  $SD = 2.10$ ).

### **Intervening Variables**

**Post-search emotions.** The same measures for post-search hope and fear as were used in Study 1 were used in Study 2. Measures from Dillard and Shen (2007) were used to assess participants' emotional state of content after searching for health information. Participants were asked to rate how much of each emotion—1 (*none of this emotion*) to 9

(*a great deal of this* emotion)—they were experiencing after their search experience: contented, peaceful, mellow, and tranquil. To measure the emotion of interest (Silvia, 2008), a measure was adapted from Schmidt, Tinti, Levine, and Testa (2010) and asked participants, on the same scale as the other emotion measures, how interested and curious the search experience made them feel. To ascertain meaningful emotional responses to the search experience (e.g., feeling inspired or moved by the search process), a scale from Oliver, Hartmann, and Woolley (2012) was adapted for this study. Participants were asked to rate (on the same scale as the other emotion measures) the extent to which they felt touched, moved, emotional, meaningful, inspired, and tender after the search. A confirmatory factor analysis revealed acceptable fit with five separate emotion factors: hope ( $r = .71, p < .01, M = 4.70, SD = 2.12$ ), fear ( $\alpha = .95, M = 3.31, SD = 2.22$ ), inspired/moved ( $\alpha = .92, M = 3.96, SD = 2.04$ ), contented ( $\alpha = .85, M = 4.41, SD = 1.87$ ), and interested ( $r = .76, p < .01, M = 5.89, SD = 2.07$ ). Model fit statistics were as follows:  $\chi^2(DF = 109) = 374.70, p < .001, CFI = .95, RMSEA = .08, SRMR = .06$ .

**Involvement.** Participant involvement was measured by adopting Zaichkowsky's (1985, 1994) Modified Personal Involvement Inventory to evaluate involvement with the search engine results. Participants were asked to rate the "SearchForHealth.org" search engine based on 10 7-point semantic differential items (e.g., "important/unimportant," "means a lot to me/means nothing to me"). ( $\alpha = .93, M = 6.46, SD = 1.55$ ).

**Perceived relevance of the search engine results.** The same items used in Study 1 were used in Study 2 ( $\alpha = .91, M = 6.54, SD = 1.80$ ).

**Searching self-efficacy.** The same items used in Study 1 were used in Study 2 ( $\alpha = .93, M = 7.99, SD = 1.08$ ).

**Searching outcome expectancies.** The same items used in Study 1 were used in Study 2 ( $\alpha = .75$ ,  $M = 6.23$ ,  $SD = 1.47$ ).

### **Control Measures**

Of the 375 participants who responded to the question, 73 (19.5%) had already received the influenza vaccine prior to participating in Study 2. Age and gender also served as control variables.

### **Study 2 Results**

H13 predicted that customization based on emotional action tendencies would lead to positive attitudes toward the search engine. Additionally, RQ2 asked how hope-fear and fear-hope mismatches between initial emotion and the action tendencies embedded in search engine results would impact participant attitudes toward the search engine. To test this hypothesis and research question, a two-way between subjects ANCOVA was run with attitudes toward the search engine as the dependent variable, emotion condition and action tendency condition as the two factors, and age, gender, and previous flu vaccine as control variables. The ANCOVA was not significant,  $F(10, 364) = 1.03$ ,  $p = .41$ ,  $\eta^2 = .03$ . None of the factors, interactions, or covariates was a significant predictor of attitudes in the ANCOVA. Therefore, H13 was not supported. The answer to RQ2 appears to be the mismatches had no discernable effects in this particular data set as the interactions between the emotional prime factor and the action tendency of search results factor were not significant.

To address H14, which predicted customization would be positively related to behavioral intentions, a two-way between-subjects ANCOVA was used with behavioral intentions as the dependent variable. The two factors were the emotional prime and the

action tendencies of the search results, controlling for participant age, gender, and previous flu vaccine. While the omnibus  $F(11, 363) = 9.66$ , was significant,  $p < .001$ ,  $\eta^2 = .23$ , neither emotion condition [ $F(2, 363) = .44$ ,  $p = .65$ ,  $\eta^2 = .00$ ], action tendency condition [ $F(2, 363) = .53$ ,  $p = .59$ ,  $\eta^2 = .00$ ], nor the emotion condition by action tendency condition interaction [ $F(4, 363) = .92$ ,  $p = .4$ ,  $\eta^2 = .01$ ] were significant. No pairwise comparisons between the three levels of each independent variable and their interactions were significant.

The significant omnibus  $F$  was driven by the effects of previously having the flu vaccine [ $F(1, 363) = 93.86$ ,  $p < .001$ ,  $\eta^2 = .21$ ]. Those who already had the flu vaccine for the concurrent flu season ( $M = 7.44$ ,  $SE = .28$ ) were significantly more likely than those who did not ( $M = 4.36$ ,  $SE = .14$ ) to intend to get the vaccine in the future and to see a doctor for anti-viral medication if they were to come down with a case of the flu. Because customization based on emotional action tendencies did not have a significant relationship with behavioral intentions, H14 was not supported.

H15 predicted that the relationship between customization and attitudes toward the search engine would be mediated by perceived relevance and perceived involvement. Using the PROCESS Macro (Hayes, 2012), Model 4, with 2,000 bootstrap samples and 95% CI, this prediction was tested. The match between primed emotion and emotional action tendencies of the search engine was dummy coded and then used as the independent variable, with attitudes toward the website serving as the dependent variable. Perceived relevance and perceived involvement were entered as the multiple mediators while participant age, gender, and previous flu vaccine were also entered into the equation as control variables.

Results revealed that the matching variable had no direct effect on perceived relevance (point estimate =  $-.18$ ,  $p = .34$ ), perceived involvement (point estimate =  $-.08$ ,  $p = .66$ ), or attitudes toward the search engine (point estimate =  $-.10$ ,  $p = .42$ ). The indirect effects from search engine result customization based on emotions to attitudes toward the search engine was not significant via perceived relevance (point estimate =  $-.07$ , Boot SE =  $.07$ , CI =  $-.22$ ,  $.06$ ) nor via perceived involvement (point estimate =  $-.03$ , Boot SE =  $.06$ , CI =  $-.16$ ,  $.09$ ). Therefore, H15 was not supported.

RQ3 asked how emotions and customization would influence sharing intentions. A two-way between-subjects ANCOVA was used with online sharing intentions as the dependent variable. The two factors were the emotional prime and the action tendencies of the search results, controlling for participant age, gender, and previous flu vaccine. While the omnibus  $F(11, 363) = 2.07$ , was again significant,  $p < .05$ ,  $\eta^2 = .06$ , neither emotion condition [ $F(2, 363) = 1.90$ ,  $p = .15$ ,  $\eta^2 = .01$ ], action tendency condition [ $F(2, 363) = .83$ ,  $p = .44$ ,  $\eta^2 = .01$ ], nor the emotion condition by action tendency condition interaction [ $F(4, 363) = 1.07$ ,  $p = .37$ ,  $\eta^2 = .01$ ] were significant. No pairwise comparisons between the three levels of each independent variable and their interactions were significant.

The significance of the ANCOVA with online sharing intentions as the dependent variable was driven by the significant impact of previously having had a flu vaccine [ $F(1, 363) = 12.81$ ,  $p < .001$ ,  $\eta^2 = .03$ ]. Those who already had the flu vaccine for the concurrent flu season ( $M = 4.01$ ,  $SE = .26$ ) were significantly more likely than those who did not ( $M = 3.00$ ,  $SE = .13$ ) to intend to share flu information with others online.

To address the hypotheses about the effects of feeling moved/inspired (H16), interested (H17, H18), and content (H19) on health information seeking outcomes, as well as to see if post-search feelings of hope and fear (instead of the non-significant emotional prime manipulations) influenced the dependent variables, a structural equation model was constructed. IBM's statistical package SPSS Amos 19 was used to run latent-variable structure modeling with the variables of interest. Preliminary tests of the data found that skewness and kurtosis were not problematic. To adjust for missing data, a missing data analysis was first run in PASW 18.0. It was determined that no variables had greater than 5% of their data missing, so missing data points were corrected for with expectation maximization in PASW 18.0 before data were uploaded into AMOS.

A latent variable model based on the general model (see Figure 2) as well as the aforementioned hypotheses was constructed using the measures from Study 2 (N = 380). Because the manipulated independent variables (i.e., emotional prime and matching of emotional primes with search result action tendencies) were not significant predictors of intervening or outcome variables, they were not included in the final model for the sake of parsimony. Therefore, post-search emotions were treated as exogenous latent variables. An initial model allowed each of the exogenous post-search emotions to predict cognitive reactions to the search engine (perceived relevance, perceived involvement, searching outcome expectations, and searching self-efficacy), and these intervening variables to all predict the main outcomes (attitudes toward the search engine, intentions to share online, and behavioral intentions). Additionally, certain predicted direct relationships from the exogenous emotion variables to the outcome variables were added to the initial model. In

the interest of parsimony, this initial model was then revised by dropping all non-significant paths to produce a final model.

The final model (see Figure 3) had a significant  $\chi^2(DF = 1,849) = 4,480.50, p < .001$ . However, other indices indicate acceptable fit for the final model. The model demonstrated an acceptable error of approximation (RMSEA = .061; confidence interval at 90% = .059 and .064,  $p$ -close = .000) and the standardized root mean square residual was also acceptable (SRMR = .08). The values of these two fit indices satisfy Hu and Bentler's (1999) two-index presentation strategy suggesting an RMSEA value of .06 or lower and a SRMR value of .09 or lower for acceptable model fit.

All paths in the final model were significant (see Figure 3 for the standardized regression coefficients). The five measured emotional reactions—inspired, contented, interested, fearful, and hopeful—each influenced the main outcome variables—attitudes toward the search engine, behavioral intentions, or sharing intentions—either directly or indirectly via their influence on the intervening variables in the model—perceived relevance, perceived involvement, searching outcome expectancies, and searching self-efficacy (see Figure 3 for the exact nature of the paths between these variables). Errors were allowed to correlate for reverse coded measures loading onto the same latent variables (i.e., reverse coded items loading onto perceived involvement, searching outcome expectancies, and perceived relevance). Tests of indirect effects in the model utilized a bootstrapping procedure with 2,000 bootstrap samples and 95% bias-corrected confidence intervals (Preacher & Hayes, 2008).

In this model, both feeling hopeful ( $\beta = .15, p < .05$ ), and feeling fearful ( $\beta = .15, p < .01$ ), after searching directly predicted increased intentions to take behaviors to prevent

and/or treat the flu. Feeling fearful also had a significant negative relationship with searching outcome expectancies ( $\beta = -.16, p < .01$ ). Feeling fearful also had a significant (albeit small) negative total indirect effect on attitudes ( $\beta = -.01, p < .01$ ).

For the outcome of sharing intentions, two direct effects and one indirect effect influenced this variable in the model. The path between feeling moved/inspired after searching and intentions to share information online with others was positive in direction and significant ( $\beta = .30, p < .001$ ), supporting H16. Sharing was also predicted by behavioral intentions ( $\beta = .56, p < .001$ ). The bootstrapping procedure revealed a significant total indirect effect for feeling hopeful on intentions to share ( $\beta = .09, p < .05$ ), therefore supporting H11's proposition that feeling hopeful after searching would increase intentions to share.

H17 predicted that feelings of interest after searching online for health information would lead to an increase in perceived relevance of the information found during the search. The model supports this hypothesis with a significant and positive direct path between feeling interested and perceived relevance ( $\beta = .64, p < .001$ ). Using the same bootstrapping procedure as above, it was found that post-search feelings of interest also had a significant total indirect effect on involvement ( $\beta = .55, p < .001$ ). Post-search feelings of interest were also significantly and positively related to searching outcome expectancies ( $\beta = .40, p < .001$ ), supporting H18.

H19 predicted that feelings of contentedness after searching online for health information would induce users to hold more positive attitudes toward the search engine. This hypothesis was supported as the path from feeling contented to attitudes toward SearchForHealth.org was significant and positive ( $\beta = .14, p < .001$ ).



## **Study 2 Discussion**

A number of the hypotheses related to the relationship between the emotional primes and outcome variables were not supported by the present data. This could be because the emotional motivations of users are not the most important factor in directing users' online health information seeking behavior. Future research should investigate alternative ways of matching search results to the users' situation or to stable features of the individual users that may be more salient in the context of health information seeking.

Additionally, one must consider whether it is possible for one to experience positive emotions without concomitant negative emotions after consuming messages about diseases or other physically uncomfortable and mentally stressful phenomena. Therefore, even if the hope prime worked initially, the process of examining the SearchForHealth.org website and then searching through the CDC website may have sparked mixed and/or more negative emotions prior to participants responding to the questionnaire with the intervening and dependent variables.

Despite these methodological questions regarding the efficacy of the emotion manipulations, there was significant variance in the measured psychological states of the participants to provide insights into the processes at play. Analysis of intervening psychological processes have been notably absent in many media effects studies, but especially studies about fear appeals (O'Keefe, 2003). While emotional reactions to the same stimuli vary greatly based on individual and contextual differences (Roseman, 2011), each specific affective response is part of the process leading to the outcomes of interest. As linchpins in the bridge between media messages and media effects, emotional reactions and other intervening variables did predict the outcome variable in Study 2,

both directly and indirectly. The findings of Study 2 make a number of important contributions to our understanding of the processes involved in health information seeking.

Study 2 demonstrates that emotions as well as variables associated with social cognitive theory do predict important outcomes related to health information seeking. Feeling fearful decreased positive outcome expectancies, whereas feeling interested increased them. Outcome expectancies, as predicted by social cognitive theory and the Theory of Motivated Information Management, increased self-efficacy for searching, which in turn led to more positive attitudes toward the search engine. Likewise, feeling interested after searching resulted in increased perceived relevance, which both directly and indirectly (through perceived involvement) also predicted attitudes toward the search engine.

The model's only other predictor of attitudes toward the search engine was feelings of contentedness after searching. These findings demonstrate that both emotions and cognitive perceptions influence attitudes toward the search engine. Considering that changes in health behavior may take sustained attempts and many return visits to an online search engine for more or different types of information, improving attitudes toward a health-focused search engine is one way to help foster long-term behavior change. As both this study and previous studies on the boomerang effects of fear-evoking messages demonstrated, unnecessary anxiety may have deleterious effects on post-search behaviors. Positive attitudes toward a search engine dedicated to health information, however, may help lessen fear or anxiety about searching for health information (or about

any unfortunate news one may find while searching) by providing searchers with a reliable and likeable source of health information.

For the outcome of behavioral intentions, feelings of both hope and fear increased intentions to prevent and/or treat influenza. While this study only measured immediate intentions and not actual behavior, it remains to be seen how these two post-search emotions impact actual behavior changes, including longer-term behavior changes. The only other influence on behavioral intentions in the model was perceived relevance (which was itself influenced by post-search feelings of interest). The impact of perceived relevance on increased intentions to take action points to the importance of providing users relevant health information in order to impact individual health and public health.

As discussed previously, sharing is another important outcome when studying health communication. In Study 1, the fear prime led to greater intentions to share than did the hope prime. However, in Study 2, feelings of hope after searching had an indirect positive effect on sharing intentions, whereas feelings of fear after searching did not predict sharing intentions. In both studies, though, there was no relationship between the manipulated emotional prime and post-search emotions. These findings not only suggest that searching for information can regulate emotion in ways that impact post-search behaviors, but also that the impact of emotions on the information search process varies based on the stage of the process. The communicable nature of influenza may have contributed to participant intentions to share the information—the more informed one's associates are, the more likely they are to take action, too, which improves herd immunity. Future work should test the health information seeking process on non-communicable diseases to see if this factor impacts intentions to share.

Study 2 had a number of limitations. The period between the emotional prime and the measures of interest—a time that included participants interacting with both a mock search engine and a website with information about the flu—likely produced enough noise to overshadow possible effects of a subtle emotional prime on outcomes of interest. The searching of the CDC flu website in particular may have differentially impacted outcomes depending on how the content of that website shifted participant emotions and cognitions. The inclusion of this activity was meant to introduce ecological validity in the procedures and to gain insight into parts of the health information seeking process beyond merely looking at search results. Nonetheless, this additional step in the experimental procedure makes it difficult to tell if outcome measures were truly tied to the search engine or may have been influenced by the CDC website. Future research could include measures of emotional reactions throughout the process, perhaps by using psychophysiological measures that can be matched in time with exposure to specific sections of the communication process (Lang, Potter, & Bolls, 2009).

Additionally, a number of the items that formed latent variables in the structural equation model overlapped with items on other latent variables in the same model. For example, the perceived involvement scale included a semantic differential item of “relevant/not relevant” that is conceptually identical to the measure of construct of perceived relevance. The perceived involvement scale also included an item of “not needed/needed” that is very similar to the “useful” item used to measure attitudes toward the search engine, while the attitudes measure included an “interesting” item that was the same as one of the items measuring post-search emotion of interest. Although none of the latent variables exhibited unacceptable levels of tolerance when tested for

multicollinearity in separate regressions, modification indices indicate these overlaps decreased the fit of the structural equation model. This overlap was inadvertent as it was the result of using scales from previous studies. Future work on scale development may be needed to operationalize the variables of interest without confounding them empirically.

## **Study 2 Conclusion**

The findings of Study 2 reveal important insights into the role of emotions in the health information seeking process. While many current models of health information seeking limit the broad swath of possible emotions in response to health situations to anxiety, they also fail to consider the role of post-search emotions in influencing the important outcomes related to health communication: attitudes toward the messenger, information sharing and health-related behaviors. Study 2's findings reveal that many emotions—hope, fear, interest, content, and inspiration—have important implications for information seeking, information sharing, and health.

This study indicates further explorations of how best to manipulate emotion and present results based on action tendencies maybe needed. It is entirely possible that this form of situational customization might not be the most effective in an online environment, especially given the results of Study 2. Alternatively, trait emotional tendencies, such as trait anxiety or trait optimism, may have hindered the effectiveness of matching based on emotional action tendencies. Nonetheless, these data provide many insights into what might actually occur when people search for health. Emotional reactions to searching for information about the flu began a chain of psychological processes that predicted important outcomes of interest: attitudes toward the search

engine, health-related behavioral intentions, and willingness to share health information with others online.

The aim of Study 2 was to test the interplay of emotions and customization in an online health information seeking context. The data presented no main or interaction effects of customization of search results based on emotional action tendencies. At the heart of customization is the assumption that user “preferences are dispositional, and not contextual, and thus are stable” (Kalyanaraman & Sundar, 2006, p. 114). Since emotions are not dispositional but instead situational, adding a layer of customization—a layer based on the user’s stable sense of identity—to search engine results for a health query may lead to stronger effects, such as more positive attitudes toward the website, higher levels of perceived relevance of the search results, and stronger behavioral intentions related to influenza prevention.

Study 2 examined the ways situational variables and emotional reactions to searching online for health information influence outcome variables. A third study comparing the effects of customization of emotional state—a situational variable—to customization of stable traits—a dispositional variables—may help elucidate ways in which customization may be able to improve the health information seeking process. This study would also provide insights into the boundary conditions of customization effect. A third study would also help uncover the nature of the relationship between emotions and different types of customization.

## CHAPTER 4

### SITUATIONAL VERSUS DISPOSITIONAL CUSTOMIZATION

Given the conceptualization of the self as a multifaceted psychological representation with implications for users of technology, it is important to consider all types of self-relevant variables to which messages may be matched in a digital environment. While certain aspects of the self are largely stable facets of one's identity or disposition (e.g., name, hometown, racial identity, etc.), other aspects of the self vary with the situation (e.g., emotional state, context-specific self-efficacy, etc.). Online interfaces that hope to improve user attitudes, especially those aiming to promote positive health behavior changes, should consider the variety of ways in which content may be tailored to the various selves held by individuals.

What exactly is this "self" that customized messages are supposed to match? Sedikides and Gregg (2003) define the self as the group of psychological phenomena that depend on reflexive consciousness. Baumeister (2010) describes the self as the set of mental representations an individual has of him or herself. The self is the controller of the controlled processes in dual-process theories (Tice, 2009). Some scholars have envisioned the self to be a crystal because it has many unique sides, and looks different depending on which face of the crystal you examine, but it still forms one overarching whole (Tracy & Trethewey, 2005). The self can also be conceptualized as a source of information in customized environments (Sundar, 2008). Customized media content

based upon both the user's dispositional selves and situational selves may be perceived more favorably than will content that does not match important aspects of the situational context.

Extant literature supports the supposition that context can be an important component of effective customization strategies. Meta-analysis of customized health messages have shown that customizing messages using multiple constructs leads to larger effects sizes than does customization based on fewer aspects of the self (Noar, et al., 2007). In a consumer behavior setting, Aaker (1999) found that individuals preferred brands that appealed to both their self-schemata and situation-specific schemata. Additionally, disposition-based self-schema matching has been found to be moderated by situational variables, such as the strength of message arguments (Wheeler, et al., 2005).

In the digital realm, Kim and Sundar (2012) found both customizing a travel website and personalizing the online advertisements to be relevant to the site's travel theme improved users' attitudes toward the website. They also found that contextually relevant ads (i.e., ads that matched the travel theme of the website by promoting travel-related products) had an equally positive influence on user attitudes toward the website regardless of whether the site was customized or generic (i.e., not customized based on the individual users' name or specific travel interests). The authors posit that when the website ads were contextually relevant, this form of customization helped users achieve their goals (to find appropriate information for a trip they planned to take in the summer). The relationship between contextual customization and goal pursuit suggests other situational states that are related to goals, such as experiencing an emotion, may also prove useful in shaping web content that improves users' attitudes toward the website.



In an online health information seeking context, it is possible that customizing messages based on emotional action tendencies as well as more stable aspects of identity could increase elaboration and the persuasiveness of messages, as well as improve attitudes toward the search engine. As with the use of the travel website in the aforementioned study, using a search engine to look up health information carries with it a goal to find specific information that may help either prevent illness or improve one's health. The presence of situational emotions felt by the users who are searching for information also begets inherent goals unique to each discrete emotion. Therefore, the combination of both situational and dispositional customization applied to online health information seeking may be one way to improve the health information seeking process.

These considerations, and the aforementioned empirical support for them, lead to the following hypothesis:

**H20:** Participants who view search results customized to situational and dispositional factors will report more positive attitudes toward the search engine than will those participants in other conditions.

**H21:** The effects will be stronger for participants who are exposed to search engine results customized to user dispositions than for those users viewing search engine results solely customized on a situational factor (emotional state).

Study 3, as described below, was conducted to test these hypotheses.

## Study 3

### **Purpose**

The purpose of Study 3 is to investigate the interaction of emotions and both situational- and dispositional-based customization in an online health information seeking environment. Study 3 also aims to replicate the findings in Study 2 in a different population—university-age students.

### **Participants.**

Participants were 286 members of the School of Journalism and Mass Communication's Research Participant Pool who participated in exchange for course credit. The sample consisted of 122 U.S. participants ranging in age from 18 to 52 years ( $M = 20.79$ ,  $SD = 2.60$ ). Fourteen participants did not report their gender. Of the remaining 272 participants, the sample was 82.4% female. Fourteen participants also declined to report their race. Of the remaining participants, the majority in the sample was White (79.8%).

### **Stimulus Materials**

The stimulus materials were the same video ("Choose You Over the Flu"), SearchForHealth.org mock search engine, and the CDC influenza website as used in Study 2.

### **Procedure**

This experiment took part in two steps during a three-week span in November 2012. The first involved participants filling out an online pre-questionnaire. This pre-questionnaire asked for informed consent for the entire experiment and then asked participants for personal information used to customize the search engine for those

participants randomly assigned to the dispositional customization condition (see Appendix A). The pre-questionnaire also asked participants questions related to control variables.

Participants came to a campus computer laboratory at their assigned date and times in groups of 4 to 20 and were asked to sit at the assigned individual computer workstation with their designated user identification number on it. Prior to the arrival of the participants, the researcher randomly assigned participants to a search engine action tendencies condition (i.e., neutral, hope action tendencies, or fear action tendencies) and set up the individual computer terminals based on the conditions randomly assigned to the user identification number. Once everyone was seated at his or her individual computer terminal, the researcher instructed all participants to carefully read through and follow the instructions on the Qualtrics website (Qualtrics randomly assigned participants to the emotional prime conditions—neutral, hopeful, or fearful—and the dispositional customization conditions—generic or customized).

### **Independent Variables**

**Type of emotion.** The same emotion prime manipulation used in Study 1 and Study 2 were used in Study 3 (Hope prime:  $M = 5.01$ ,  $SD = 1.83$ ; Fear prime:  $M = 4.52$ ,  $SD = 1.83$ ).

**Type of search result description.** The same search result manipulations as used in Study 2 were used in Study 3 (see Appendix A).

### **Dependent Variables**

**Attitude toward the search engine.** The same measures used in Study 1 and Study 2 were used in Study 3 ( $\alpha = .95$ ,  $M = 5.80$ ,  $SD = 1.44$ ).

**Behavioral intentions.** The same two items used to measure behavioral intentions in Study 2 were used in Study 3. However, the two items were not strongly correlated ( $r = .27, p < .001$ ). Therefore, the one item related to intentions to get the flu vaccine from now on was retained as the sole behavioral intention measure for Study 3 ( $M = 4.75, SD = 2.99$ ).

**Health information sharing goals.** The same items used in Study 1 and Study 2 were used in Study 3 ( $\alpha = .83, M = 3.15, SD = 1.50$ ).

### **Intervening Variables**

**Post-search emotions.** The same measures used in Study 2 were used in Study 3. A confirmatory factor analysis revealed acceptable fit with five separate emotion factors: hope ( $r = .76, p < .01, M = 4.16, SD = 1.89$ ), fear ( $\alpha = .94, M = 3.34, SD = 1.81$ ), inspired/moved ( $\alpha = .91, M = 3.18, SD = 1.59$ ), contented ( $\alpha = .88, M = 4.09, SD = 1.70$ ), and interested ( $r = .77, p < .01, M = 5.17, SD = 1.89$ ). Model fit statistics were as follows:  $\chi^2(DF = 109) = 270.10, p < .001, CFI = .96, RMSEA = .07, SRMR = .06$ .

**Involvement.** The same measures used in Study 2 were used in Study 3 ( $\alpha = .89, M = 5.92, SD = 1.22$ ).

**Perceived relevance of the search engine results.** The same measures used in Study 1 and Study 2 were used in Study 3 ( $\alpha = .87, M = 6.28, SD = 1.36$ ).

**Searching self-efficacy.** The same measures used in Study 1 and Study 2 were used in Study 3 ( $\alpha = .88, M = 7.35, SD = 1.06$ ).

**Searching outcome expectancies.** The same measures used in Study 1 and Study 2 were used in Study 3 ( $\alpha = .75, M = 5.54, SD = 1.26$ ).

## **Control Variables**

Previously having received the flu vaccine served as a control variable for Study 3 (47 of the 239 participants who responded to the question had already received the flu vaccine prior to their participation). Additionally, during the pretest, measures of trait anxiety (20 items,  $\alpha = .92$ ,  $M = 3.84$ ,  $SD = 1.15$ ) from the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) and of trait optimism (six items,  $\alpha = .84$ ,  $M = 8.83$ ,  $SD = 6.21$ ) from the Life Orientation Test (Scheier, Carver, & Bridges, 1994) were measured to see if individual differences in traits related to emotional reactions may be influencing the outcomes of interest. Gender also served as a control variable in this study. Unlike the previous studies, the variance in the age of the participants was minimal due to the homogenous nature of the participant pool, and therefore this variable was not used as a control measure in Study 3.

## **Manipulation Check**

To test the dispositional customization mechanism, a pretest was run using 80 members of the MTurk online community (46 male, 28 female, 6 not reporting gender; 43 White, 13 African-American, 12 Asian, 4 Latino(a)/Hispanic, 2 another race, and 6 not reporting race; Age:  $M = 31.71$ ,  $SD = 9.52$ ). Participants were told they would be viewing screen shots of a results page of a new search engine. They were told to imagine the following scenario before viewing the search results: “Johnny Chapple, a junior at the University of North Carolina at Chapel Hill, is curious about the flu and wondering if he really needs to get his flu shot this year. Johnny is a 21-year-old Caucasian male who lives in a fraternity house in Chapel Hill with 60 other guys.” Participants then viewed a screenshot of search results they were told were intended for Johnny. Those in the non-

customized condition viewed the neutral generic search results while those in the customized condition viewed the neutral customized results (see Appendix A).

The Qualtrics software surreptitiously recorded how long (in seconds) participants viewed the screen shot before moving onto the next page of the questionnaire. To measure perceived customization, participants were then asked to evaluate two statements adapted from Kalyanaraman and Sundar (2006) on a scale from 1 (*Strongly Disagree*) to 9 (*Strongly Agree*): “These search results were personalized for Johnny;” and “These search results targeted Johnny as a unique individual.” The items were summed and averaged to form a perceived customization scale ( $M = 4.19$ ,  $SD = 2.31$ ). An ANCOVA with dispositional customization condition as the fixed factor, perceived customization as the dependent variable, and time spent viewing the search results as a covariate was significant,  $F(1, 77) = 3.94$ ,  $p < .05$ ,  $\eta^2 = .09$ . Those in the customized condition ( $M = 4.63$ ,  $SD = 2.20$ ) perceived the results to be significantly more customized to Johnny than did those in the non-customized condition ( $M = 3.75$ ,  $SD = 2.35$ ).

### **Study 3 Results**

H20 predicted that participants who view search results customized to situational and dispositional factors would report more positive attitudes toward the search engine than would those participants in other conditions. Additionally, H21 stated that the effects would be stronger for participants who were exposed to search engine results customized to user dispositions than for those users viewing search engine results solely customized on emotional action tendencies. To test these hypotheses, a two-way between-subjects ANCOVA was run with attitudes toward the search engine as the dependent variable, emotional prime condition, action tendency condition, and dispositional customization as

the factors, and gender, previous flu vaccine, trait anxiety, and trait optimism as control variables. The overall ANCOVA was significant,  $F(21, 249) = 1.73, p < .05, \eta^2 = .13$ .

The main effects for emotion prime condition,  $F(2, 249) = .54, p = .58, \eta^2 = .00$ , and action tendency condition,  $F(2, 249) = 2.31, p = .10, \eta^2 = .02$ , were not significant, while dispositional customization condition was,  $F(1, 249) = 4.58, p < .05, \eta^2 = .02$ , indicating a lack of support for H20 but supporting H21. None of the interactions between dispositional customization and the emotional prime condition,  $F(2, 249) = 1.83, p = .16, \eta^2 = .02$ , or the action tendency condition,  $F(2, 249) = .63, p = .54, \eta^2 = .01$ . Neither was the three-way interaction between dispositional customization, emotional prime condition, and action tendency condition,  $F(4, 249) = .45, p = .77, \eta^2 = .01$ .

The interaction between emotional prime condition and action tendency condition was marginally significant,  $F(4, 249) = 2.30, p = .06, \eta^2 = .04$ . After controlling for gender, previous flu vaccine, trait optimism, and trait anxiety, a simple effects test with Bonferroni adjustment revealed a significant difference ( $p < .01$ ) for those in the neutral prime condition between the attitudes of participants viewing generic search engine results ( $M = 6.15, SE = .26$ ) and those viewing search engine results embodying hope's action tendencies ( $M = 5.05, SE = .26$ ). Additionally, for those participants in the neutral prime condition, there was a marginally significant pairwise difference after the Bonferroni adjustment ( $p = .08$ ) between the attitudes of participants viewing generic search engine results ( $M = 6.15, SE = .26$ ) and those viewing search engine results embodying fear's action tendencies ( $M = 5.86, SE = .24$ ). No other pairwise differences between conditions were significant. Because the only matching effects occurred between non-emotional conditions, H13 was not supported.

To further probe the relationships between the variables in Study 3, and to compare them with the findings in Study 2, a structural equation model was created. IBM's statistical package SPSS Amos 19 was used to run latent-variable structure modeling with the variables of interest. Preliminary tests of the data found that skewness and kurtosis were not problematic. To adjust for missing data, a missing data analysis was first run in PASW 18.0. It was determined that no variables had greater than 5% of their data missing, so missing data points were corrected for with expectation maximization in PASW 18.0 before data were uploaded into AMOS.

A model based on the general model (see Figure 2) was constructed using the latent variables from Study 3 (N = 286). As with Study 2, the manipulated independent variables of the emotional prime and the matching of emotional primes with search result action tendencies were not significant predictors of intervening or outcome variables. Therefore, these variables were not included in the model. However, dispositional customization did predict one of the main outcome variables and was consequently kept in the model as an exogenous variable. The other exogenous variables included in the model were the latent measures of post-search emotions.<sup>3</sup>

An initial model allowed each of the exogenous variables (post-search emotions and dispositional customization) to predict cognitive reactions to the search engine (perceived relevance, perceived involvement, searching outcome expectations, and searching self-efficacy), and these intervening variables to all predict the main outcomes (attitudes toward the search engine, intentions to share online, and behavioral intentions).

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<sup>3</sup> A series of regressions revealed dispositional customization did not predict any of the post-search emotions in this model. All exogenous variables (post-search emotions and dispositional customization) were allowed to correlate.



Additionally, certain predicted direct relationships from the exogenous variables to the outcome variables were added to the initial model, including a direct link from dispositional customization to attitudes toward the search engine. In the interest of parsimony, this initial model was then revised by dropping all non-significant paths to produce a final model. Additionally, all error terms on reverse coded measures loading on the same latent factor were allowed to correlate.

The final latent variable model for Study 3 (see Figure 6) had a significant  $\chi^2$  (DF = 1843) = 3875.08,  $p < .001$ . However, other indices indicated acceptable fit for the final model. The model demonstrated an acceptable error of approximation (RMSEA = .062; confidence interval at 90% = .059 and .065,  $p$ -close = .000) and the standardized root mean square residual was acceptable (SRMR = .08). The values of these two fit indices satisfy Hu and Bentler's (1999) two-index presentation strategy suggesting an RMSEA value of .06 or lower and a SRMR value of .09 or lower for acceptable model fit.

In the final model, feeling inspired after searching was associated with heightened intentions to share information ( $\beta = .19, p < .01$ ) as well as more positive attitudes toward the search engine ( $\beta = .18, p < .01$ ). Post-search feelings of content were positively related to attitudes toward the search engine, but the relationship only approached significance ( $\beta = .11, p = .06$ ). Positive attitudes toward the search engine were also predicted by dispositional customization ( $\beta = .13, p < .01$ ). This was the only significant direct relationship between the exogenous variables and the main outcome variables (attitudes toward the search engine, sharing intentions, and behavioral intention).

Post-search feelings of interest, fear, and hope did, however, affect the intervening variables and also had indirect effects on the outcome variables. Post-search

feelings of interest positively predicted both perceived involvement ( $\beta = .17, p < .01$ ) and perceived relevance ( $\beta = .56, p < .001$ ). These two variables in turn both positively predicted attitudes toward the search engine (Perceived involvement:  $\beta = .26, p < .01$ ; Perceived relevance:  $\beta = .29, p < .01$ ). Perceived relevance was also associated with higher levels of perceived involvement ( $\beta = .73, p < .001$ ). Bootstrapping procedures revealed a significant total indirect effect of post-search interest on behavioral intention, ( $\beta = .06, p < .001$ ), while post-search hope was the only other emotion that had a significant total indirect effect on attitudes, although a small one ( $\beta = .01, p < .05$ ).

Post-search feelings of fear were negatively associated with searching outcome expectancies ( $\beta = -.14, p < .05$ ), while post-search feelings of hope were positively associated with outcome expectancies ( $\beta = .33, p < .001$ ). Outcome expectancies, in turn, positively predicted searching self-efficacy ( $\beta = .32, p < .001$ ), which then positively predicted attitudes toward the search engine ( $\beta = .11, p < .05$ ). Post-search fear did not have a significant indirect effect on self-efficacy, attitudes, behavioral intentions, or sharing intentions. However, post-search feelings of hope did indirectly affect self-efficacy ( $\beta = .11, p < .001$ ), attitudes ( $\beta = .01, p < .05$ ), behavioral intentions ( $\beta = .05, p < .05$ ), and sharing intentions ( $\beta = .02, p < .01$ ).

Searching outcome expectancies ( $\beta = .14, p < .05$ ) and attitudes toward the search engine ( $\beta = .18, p < .01$ ) were the only variables in the model that predicted intentions to get a flu vaccine. Bootstrapping procedures revealed that in addition to post-search, post search feelings of interest ( $\beta = .06, p < .001$ ), post-search feelings of inspiration ( $\beta = .03, p < .01$ ), dispositional customization ( $\beta = .02, p < .01$ ), searching outcome expectancies ( $\beta = .1, p < .05$ ), and perceived relevance ( $\beta = .09, p < .001$ ) had positive total indirect effects

on behavioral intentions. Behavioral intentions also predicted intentions to share information about the flu with other ( $\beta = .28, p < .001$ ).

### **Study 3 Discussion**

As in Study 2, matching emotional states to search results embodying the corresponding action tendencies of the emotional state did not produce discernible effects on the outcomes measured in Study 3. This replication of a lack of an effect indicates this may not be an effective form of customization for improving user attitudes and health-related behavioral intentions, at least not in the context of online search results related to influenza. Future research could examine if these results hold true for different emotional primes or mixes of emotions, as well as in the context of different health conditions.

Post-search emotions did (again) have a significant impact on cognitive reactions and attitudes, behavioral intentions, and sharing intentions. Unlike the situational manipulation of customization, dispositional customization had a significant and positive relationship with attitudes toward the search engine. However, dispositional customization did not work via perceived relevance or perceived involvement, unlike in previous tests of the processes behind customizations effects (Kalyanaraman & Sundar, 2006; Kreuter, Farrell, Olevitch, & Brennan, 2000). Instead, it directly impacted attitudes and indirectly influenced behavioral intentions (although, by a very small amount) via its impact on attitudes. Given that the type of dispositional customization in Study 3 was automated and passive, it is likely that the personalized information at the top of the search results page merely acted as a heuristic that prompted participants to evaluate the search engine more favorably without many deeper cognitive processes at play. Future research could test this assumption by measuring participants' elaboration of and memory

for the customized information provided on the search results page. If elaboration and recall are low, it is likely the customized information would be serving as a cue.

Although no post-search emotions directly impacted behavior in Study 3, post-search feelings of interest, hope, and inspiration did have positive indirect effects on behavior. Two emotions (post-search content and inspiration) directly predicted more positive attitudes toward the search engine emotions while post-search interest and post-search hope had an indirect effect on attitudes. Contentedness was a marginally significant predictor of positive attitudes toward the search engine, demonstrating that finishing a search and experiencing positive or mixed emotions has ramifications for the user evaluations of the search engine.

Post-search fear and hope both impacted outcome expectancies, but in opposite directions: Feeling fearful after searching led to more negative outcome expectancies while post-search hope led to more positive outcome expectations. Outcome expectancies is an important component of social cognitive theory, with positive outcome expectancies more likely to result in adaptive health behaviors (Bandura, 1998), the negative impact of post-search fear on these expectancies underscores the possible negative consequences of evoking fear in order to promote public health. Conversely, the positive impact of hope on social cognitive variables in the model (directly on outcome expectancies and indirectly on self-efficacy) should encourage health communicators and health website developers to consider creating content that can inspire hope in users.

Although post-search emotions led to a variety of outcomes in both Study 2 and Study 3, the relationships between post-search emotions, cognitive reactions, and outcome variables were not identical between those two studies. These studies took place

in diverse populations (MTurk for Study 2 and a Southeastern university's participant pool for Study 3), which may at least partially explain the differences. The average of the participants in Study 2 ( $M = 32.07$ ) was about 11 years more than those in Study 3 ( $M = 20.79$ ). The younger participants in Study 3 may have identified more with the young man in the stimulus video who nearly died from the flu, and that could have impacted emotional reactions. Of course, the additional manipulation of dispositional customization for half of the participants in Study 3 also contributes to the differences between the results of the two similar studies.

The limitations of Study 3 are very similar to that of Study 2. The time between the emotion prime and the questionnaire likely dampened the impact of emotional primes on intervening and outcome variables. Additionally, the search of the website after viewing the search engine results likely differentially impacted the intervening and outcome variables, depending on how the individual participants were impacted by the content of the site and the act of navigating through and interacting with it. As with Study 2, one limitation of this study was the overlap in items measuring different latent constructs (e.g., the relevance of the search results was an item in both the perceived relevance variable and the perceived involvement variable). Also, as with Study 2, the variables with overlapping items (involvement, attitudes, and perceived relevance) did not exhibit unacceptable measures of multicollinearity when used in regressions. However, modification indices in the structural equation model indicated that this overlap in items likely lowered the model fit.

### **Study 3 Conclusion**

Study 3 revealed, again, that emotional reactions to a search for health information are important in understanding the process connection health information seeking and important outcomes such as attitudes and behaviors. Particularly meaningful were the findings related to the role of positive and mixed emotional states in promoting adaptive health and communication behaviors. Future research would be wise to improve emotion manipulation procedures and how best to embody discrete emotional action tendencies into media content in order to gain a more precise understanding of the relationship between emotions sparked by an initial media message and the beginning of the health information seeking process (i.e., the choosing of links on a search results page).

In addition to the findings on post-search emotions, Study 3 demonstrated that customized search results could also help improve attitudes, particularly toward the search engine used for the health information search. Because this relationship was direct and not mediated by perceived relevance or perceived involvement as customization has been in previous studies (e.g., Kalyanaraman & Sundar, 2006), passive dispositional customization may have served as a heuristic cue to participants. This type of customization may have signaled to the participants that the search engine was good, without evoking much elaboration. Future research could measure depth of information processing to test this supposition. However, given the ease with which computer algorithms can perform such customization, health communicators would be wise to consider including such personal touches in their online messages.

## **Chapter 5**

### GENERAL DISCUSSION

This dissertation set out to test the ways emotions and different types of customization impact the health information seeking process. Broadly speaking, this dissertation found that emotions could impact multiple stages of the health information seeking processes, from the generation of search query terms to post-search behaviors. This dissertation, particularly Study 2 and Study 3, revealed the following sequence of events: Emotional reactions to a media message prompt online health information seeking, which regulates the emotions, spurs search- and health-related cognitions, and eventually may result in the sharing of information with others and partaking in health-related behaviors. It also revealed that dispositional customization of search results, rather than situational customization based on emotional action tendencies, may be the best way to improve user attitudes toward the search engine.

#### **Theoretical Implications**

This dissertation was an attempt to provide new insights to the study of emotions, customization, and health information seeking. This attempt was grounded in theoretical considerations and previous empirical work. Nonetheless, the results provide little support for the efficacy of customizing results for online searches about the flu based on emotional action tendencies of the users. It is possible that automatic or even conscious emotion-regulation altered the participants' emotional states before they viewed the

search results, making the matched results no longer appropriate for the emotional state. More precise measurement of emotional responses would help test the conceptual connections between emotions and action tendencies in an online search environment.

Future work could also test these form of situational customization with different populations and different health topics. Specifically, the flu is a widely covered news event each year and participants may have had firm attitudes about the flu vaccine prior to their participation. Users searching for information about health conditions that are perceived as more uncertain, are more emotion arousing, or for which there is less general consensus on prevention and treatment options may respond more positively to search results based on emotional action tendencies.

The search process also results in positive and mixed emotions that have a large impact on the outcome of a search for health information. While post-search fear does impact post-search outcomes, models of health information seeking that fixate on fear and anxiety are clearly missing an important part of the process. For example, the ability of hope to temper search queries away from the most extreme and rare consequence of the flu—death—is one way in which positive emotional reactions to messages may alter the health information search process.

Feeling inspired after searching for information improved user attitudes toward the search engine and led to stronger intentions to share flu information with others. This type of mixed emotional (i.e., both positive and negative in valence) experience can motivate users to further reflect on the situation at hand (Bartsch & Oliver, 2011; Oliver & Woolley, 2011). Because a healthy lifestyle cannot be achieved through one Google search alone, it is important that health communication research include the study of



emotional responses that foster further elaboration and reflection. Evoking mixed emotions is one way to encourage such a response, and future work should continue to test the processes and effects related to mixed emotions in health messages.

In Study 2 and Study 3, behavioral intentions predicted sharing intentions, pointing to a possible reinforcement effect: Deciding to take action may motivate people to share information with others as a way of reinforcing and communicating their intentions with others. Given the infectious nature of influenza, it is also likely that those who intend to take action understand the contagious nature of the virus and the importance of others' actions in preventing and containing the disease. Future research could test this association between behavior and sharing with non-communicable diseases as well in order to explore further processes that may lead to wider dissemination of health information.

### **Methodological Implications**

The lack of results related to the emotion manipulations could have been due to the subtle nature of the primes. Although these manipulations likely created variation in emotional states as indicated by the pretest, they may not have primed high enough levels of hope or fear to result in matching effects when viewing the search engine results. Or, some participants may have regulated feelings of hope or fear automatically in the time between the emotional prime and the introduction of the manipulated search results. Future work using real-time emotion measures, such as facial muscle analysis, would be ideal for more precisely gauging current emotional states. More precise measurement would help reveal if the search results were truly matched to the action tendencies of the present emotional state.

Another consideration in interpreting these results is the difficulty of evoking singularly positive emotions in a health context. Because the possible negative health outcomes (e.g., enduring a case of influenza and possible complications, including death) are almost always salient in health messages, perhaps the power of a short positive emotion prime is not enough to overcome the salience of negative emotions associated with diseases or maladies. In this particular context of communicating about possible health dangers, perhaps mixed emotional states—the simultaneous experience of both positive and negative emotions—need to be measured and considered in analysis in order to better grasp the process through which emotions influence health information seeking.

It is also possible that the subtle emotional prime manipulations resulted in low levels of emotional arousal. These levels may not have motivated participants to take actions based on their present emotional state. However, the priming of emotions could work as an experimental manipulation with some tweaking, especially since they have worked before (Nabi, 2003). Perhaps a more ambiguous stimulus that leaves more room for emotional interpretation by the participants (unlike the “Choose You Over the Flu” video that discussed the statistics related to death from the flu and had music running underneath it) would be more suitable for use in an emotion prime manipulation.

Future work could improve the operationalization of matching emotions to action tendencies by measuring emotions in a more precise way, such as with psychophysiological measures. This would allow researchers to tell if matches are occurring in real time versus based solely on experimental design and self-reports of emotion. Future work could also refine the embodiment of action tendencies in search results. Existing literature promotes the idea that discrete emotions spur specific action

tendencies, and search results that more fully capture those tendencies may be preferred over other types of search results.

An additional methodological concern is that the participants who were randomly assigned to the neutral condition rarely followed the directions to spend a few minutes writing about the aesthetics of the video. Instead, many participants wrote only one or two short sentences and move onto the next portion of the experiment. Without dampening the natural emotional reactions sparked by the video by spending time writing about a superfluous aspect of the message, those in the neutral condition who did not follow directions may have experienced levels of hope and fear, depending on their individual appraisals and traits, that helped mask the differences between emotional prime conditions in the subsequent statistical analyses. Future research could utilize experimental controls, such as software features to prevent premature questionnaire advancement, which may improve the effectiveness of this type of neutral manipulation.

While all of the aforementioned limitations could explain the lack of results directly associated with the emotional primes, the manipulation still helped create variance in post-video emotional states. This variance in initial emotional reactions likely allowed for variance in searching behaviors, focus of attention during the search, cognitions while searching, followed by emotional reactions to the search process, ensuing cognitive reactions, and finally behavioral outcomes. The variance in psychological responses to the health information seeking process still allowed for modeling of a wide array of emotional reactions to the search process. Additionally, the wide array of emotional responses to the search stimulus measured in Study 2 and Study

3 may be a good representation of how health information searches work outside of a controlled experiment.

These methodological considerations related to the emotion prime manipulations and emotion measures used in this dissertation dovetail with discussions in the field about the disadvantages of defining manipulations in terms of their effects on audiences.

O’Keefe (2003) argued that the use of effect-based definitions of manipulations impedes a deeper understanding of the mechanisms involved and ignores variance within groups, an argument echoed by Tao and Bucy (2007). In his piece, O’Keefe specifically targets a large body of fear appeal research that failed to use measures of fear as a mediator of the effects of fear appeals on audiences as an example of flawed research. This dissertation did, indeed, measure post-message emotional reactions in an attempt to better understand the ways emotions may serve as mechanisms in the health information seeking process. However, future work more directly linking message characteristics to these emotional reactions and their effects on information seeking would likely aid in further understanding this process.

### **Public Health Implications**

The use of the influenza vaccination as message component and a target behavior likely influenced the nature of the results. Less than 30% of all adults aged 18 to 64 years and only 41.4% of those with a high-risk condition received an influenza vaccine during the 2008-2009 influenza season (Williams, Lu, Lindley, Kennedy, & Singleton, 2012).

This lack of vaccination may be due to the prevalence of myths about the flu vaccine, such as the false beliefs that the vaccine does not work or that it can cause the flu (Talbot & Talbot, 2013). The resistance of a majority the public to embrace the vaccine as a

worthwhile health behavior may have lessened the ability of flu-related media to evoke emotions. It may have also lessened participants' motivation to search for more information about the flu or its vaccine if their attitudes were based on a firm belief in a myth about the vaccine.

The high lack of compliance with suggested influenza prevention behavior makes this topic an important one, as the effects on the population are large, and even deadly. The annual economic cost of influenza on the American economy is approximately \$87 billion (Williams, et al., 2012), while 3,000 to 49,000 people die each year from the virus (Centers for Disease Control and Prevention, 2012). Perhaps measuring strength of beliefs in flu vaccine myths as well as perceived knowledge would result in greater insight into the way emotions and customized search results influence the way people use the Internet to search for flu-related information.

Additionally, work in behavioral economics has demonstrated that altruistic motivations may increase the likelihood people will be vaccinated against influenza (E. Shim, Chapman, Townsend, & Galvani, 2012). The relationships found in this dissertation between emotions related to human connectedness (i.e., inspiration, feeling moved) and intentions to share influenza-related information also point to the importance of thinking beyond self-directed messages and motivations for fostering vaccination compliance. Using messages to help motivate the public to consider their connections to other may be one of the more promising ways to increase low vaccination rates.

Because influenza vaccination is a prevention behavior, the emotions aroused by vaccination messages may be of a different intensity or a different type than would messages discussing treatment for those already diagnosed with a disease, such as cancer

or chronic diseases like multiple sclerosis or arthritis, for example. The public health implications for audiences having different intensity and types of emotional reactions to prevention versus treatment messages are many. A better understanding of these differences in audience's emotional reactions based on target health behaviors could aid in the creation of more effective communication technologies that would help users find relevant prevention or treatment information.

## **Conclusion**

This dissertation provided a number of insights into the relationship between emotions, customization, and health information seeking. Unlike much of the literature on health information seeking, which investigates motivations for seeking but not always the effects of seeking, the present results reveal the many ways in which post-search emotional reactions influence communication- and health-related attitudes and behaviors. Importantly, this dissertation demonstrated that anxiety and fear are not the only emotions related to health information seeking outcomes. While fear still motivated behaviors in two of the three studies, positive- and mixed-emotional reactions predicted outcomes of interest in the studies, often in ways that avoided the defensive or avoidant reactions that may accompany fear reactions.

This dissertation contributed to the literature on health information seeking by gaining insight into how aspects of the search process inspire users to share what they have found. Neuhauser and Kreps (2003) state in their list of necessities for health communication in the e-health era that “A combination of the effectiveness of interpersonal communication and the reach of mass media communication is needed to change population behavior” (p. 11). Both forms of sharing—online and offline—are

likely to involve the interpersonal communication Neuhauser and Kreps include in combination with mass media. The ability of mixed and positive emotional states to promote online and offline sharing in both Study 2 and Study 3 are an important finding of this study.

The findings of this dissertation can help researchers better understand the complex, multistep process connecting mass media, emotions, information seeking, attitudes, behavior change, and interpersonal communication. As Holbert and Hansen (2008) argue, inter-media emotional reactions are an important part of understanding the communication processes. The increasing interconnectedness of our digital worlds, where we can watch television while using Google from our tablet and then text our friends about something interesting we saw using a nearby smartphone, only points to the need to study inter-media emotional processes. This dissertation takes an important first step in investigating these processes as they relate to health information seeking, but much work remains to be done to better understand this phenomenon.

Table 1

*Correlations Between Variables and Descriptive Statistics for Study 1*

	1.	2.	3.	4.	5.	6.	7.	8.
1. Fear Prime	1							
2. Hope Prime	-.48 <sup>***</sup>	1						
3. Self-efficacy	.13	-.08	1					
4. Outcome Exp.	.08	-.12	.26 <sup>**</sup>	1				
5. Post-search Fear	.04	.03	-.12	-.04	1			
6. Post-search Hope	.01	.01	.07	.23 <sup>**</sup>	.23 <sup>*</sup>	1		
7. Behavioral Intentions	.05	.03	.18 <sup>*</sup>	.25 <sup>**</sup>	.26 <sup>**</sup>	.34 <sup>***</sup>	1	
8. Search Engine Attitudes	.17	-.06	.42 <sup>***</sup>	.23 <sup>*</sup>	.09	.10	.28 <sup>**</sup>	1
9. Sharing Intentions	.19 <sup>*</sup>	-.03	.04	.26 <sup>**</sup>	.42 <sup>***</sup>	.48 <sup>***</sup>	.51 <sup>***</sup>	.19 <sup>*</sup>

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$



Table 2

*Hypotheses and Research Questions*

	Dependent Variable	Hypothesis	Supported?
H1	Number of search query terms	Those participants who are induced to feel hope will think of more search query terms related to the flu than those induced to feel fear or in a neutral state.	Study 1: No
H2	Type of search query terms	Those induced to feel hope or fear will include more affective and cognitive words in their search queries than will those in a neutral state.	Study 1: No
H3	Type of search query terms	Those participants who are induced to feel hope will be less likely to think of search query terms related to death than will those not induced to feel hope.	Study 1: Yes
H4a	Time spent searching	Participants experiencing hope will search for information about the flu for a longer amount of time than will those experiencing fear or in the neutral emotion condition.	Study 1: No
H4b	Time spent searching	Participants experiencing fear will search for information about the flu for a longer amount of time than will those experiencing hope or in the neutral emotion condition.	Study 1: No
H5	Attitudes Toward the Search Engine, Behavioral Intentions	Positive outcome expectancies will mediate the relationship between emotional state and attitudes toward the search engine as well as health-related behavioral intentions.	Study 1: No
H6	Outcome Expectancies, Self-efficacy	Post-search feelings of hope will be positively related to positive outcome expectancies and self-efficacy related to health information seeking.	Study 1: Partially
H7	Outcome Expectancies, Self-efficacy	Post-search feelings of fear will be negatively related to positive outcome expectancies and self-efficacy related to health information seeking.	Study 1: No

H8	Attitudes Toward the Search Engine	Post-search feelings of hope will be positively related to attitudes toward the search engine via outcome expectancies and self-efficacy.	Study 1: Partially
H9	Attitudes Toward the Search Engine	Post-search feelings of fear will be negatively related to attitudes toward the search engine via outcome expectancies and self-efficacy.	Study 1: No
RQ1	Behavioral Intentions	How will post-search hope and post-search fear impact behavioral intentions?	N/A
H10a	Sharing	Those participants experiencing emotions after an online search for health information will be more likely to share the information they find than will those in a neutral state.	Study 1: Yes
H10b	Sharing	Those participants who are induced to feel hope will be more likely to share the online health information they find with others than will those induced to feel fear.	Study 1: No
H11	Sharing	Post-search feelings of hope will be positively related to intentions to share information.	Study 1: Yes
H12	Sharing	Post-search feelings of fear will be negatively related to intentions to share information.	Study 1: No
H13	Attitudes Toward the Search Engine	Matching the action tendency and motivation conveyed in the link descriptions of the search engine results to the induced emotional state of the users will produce more positive attitudes toward the search engine than will mismatches between link descriptions and emotion state.	Study 2: No Study 3: No
H14	Behavioral Intentions	Matching the action tendency and motivation conveyed in the link descriptions of the search engine results to the induced emotional state of the users will lead to greater behavioral intentions than will mismatches between link descriptions and emotion state.	Study 2: No Study 3: No
RQ2	Attitudes Toward the Search Engine	How will hope-fear and fear-hope mismatches between initial emotion and the emotional action tendencies and motivations embedded in search engine results impact participant attitudes toward the search engine?	N/A

H15	Attitudes Toward the Search Engine	The relationship between customization and attitudes toward the search engine will be mediated by perceived relevance and perceived involvement.	Study 2: No Study 3: No
RQ3	Sharing	How will the interaction of emotions and customization influence sharing intentions?	N/A
H16	Sharing	Feeling inspired/moved after searching for health information will be positively related to intentions to health share information with others.	Study 2: Yes Study 3: Yes
H17	Perceived Relevance	Experiences of interest after searching online for health information will be positively related to perceived relevance of the search.	Study 2: Yes Study 3: Yes
H18	Outcome Expectancies	Experiences of interest after searching online for health information will be positively related to outcome expectancies.	Study 2: Yes Study 3: Yes
H19	Attitudes Toward the Search Engine	Feelings of contentedness after searching online for health information will be positively related to attitudes toward the search engine.	Study 2: Yes Study 3: Yes
H20	Attitudes Toward the Search Engine	Participants who view search results customized to situational and dispositional factors will report more positive attitudes toward the search engine than will those participants in other conditions.	Study 3: No
H21	Attitudes Toward the Search Engine	The effects will be stronger for participants who are exposed to search engine results customized to user dispositions than for those users viewing search engine results solely customized on a situational factor (emotional state).	Study 3: Yes

Figure 1.

*Study 1 Multiple Mediation Model*

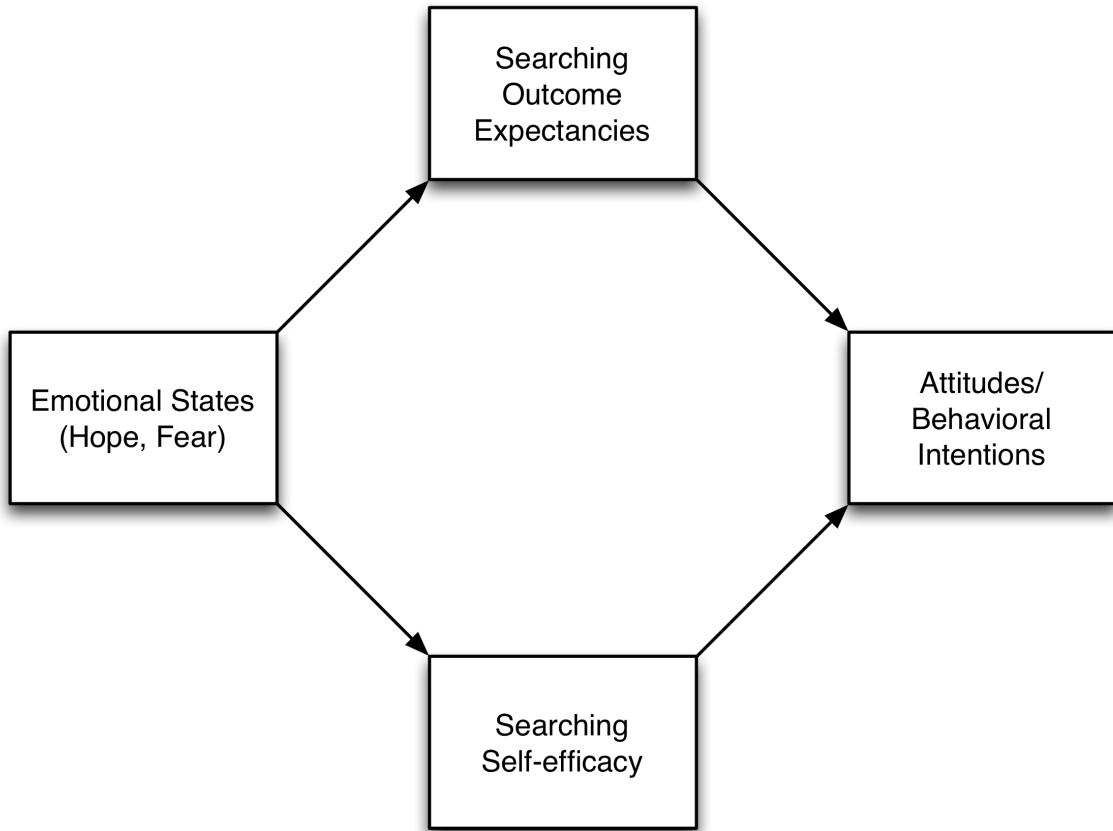


Figure 2.

*General Model*

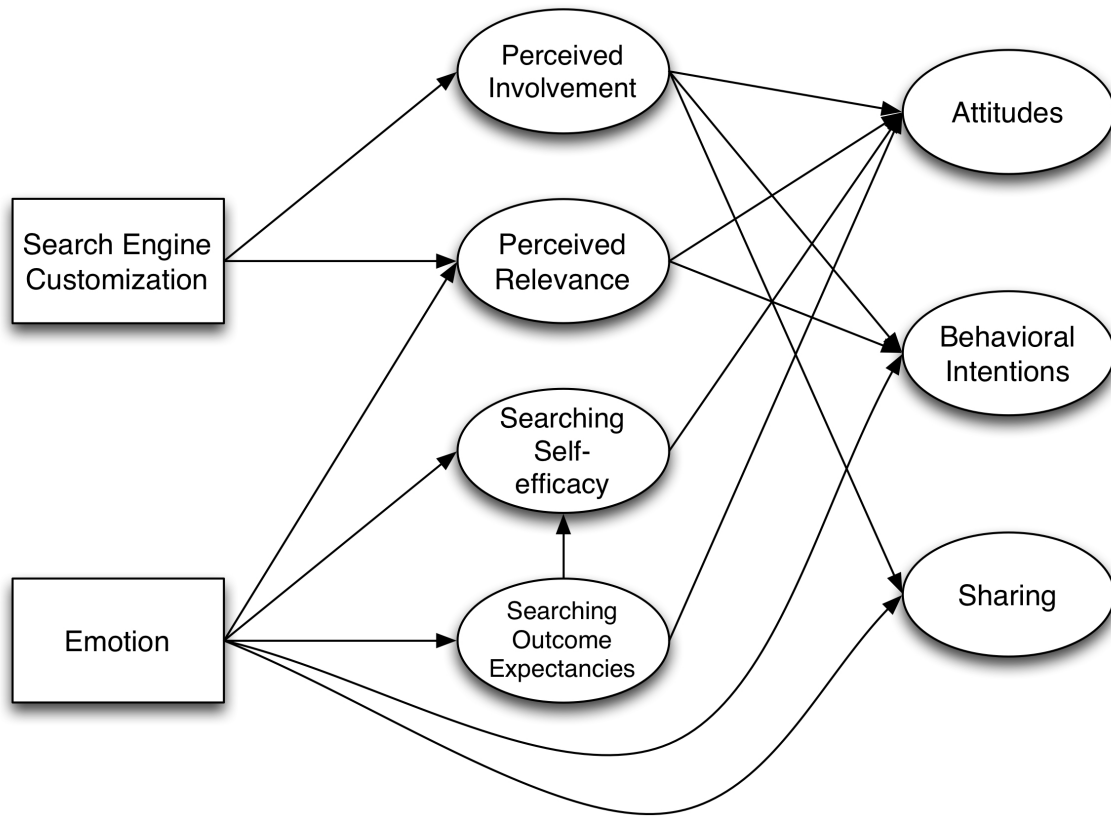


Figure 3.

Screenshot of “Choose You Over the Flu” PSA



Figure 4.

Screenshot of the Centers for Disease Control and Prevention's Influenza Homepage

CDC Home  
**CDC** Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People.™

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### Seasonal Influenza (Flu)

Influenza activity is early this season and is increasing in the United States. Further increases are expected in the coming weeks. CDC urges you to get a flu vaccine now if you have not done so already this season. Vaccination is the single most important step you can take to protect yourself and others against infection. It's not too late to get vaccinated.

**CDC Influenza Application**  
for Clinicians and Health Care Professionals  
[Learn More »](#)

Available on the App Store

Email page link  
Print page  
CDC on Facebook  
CDC Flu on Twitter  
Get email updates  
Subscribe to RSS  
Listen to audio/Podcast

View page in:  
Español

**Flu Basics**  
Symptoms, How Flu Spreads, Higher Risk Groups, Past and Current Flu Season...

**Prevention - Flu Vaccine**  
Vaccine Safety, Vaccination Coverage, Influenza VIS, "Take 3" Actions, NIVW, Infection Control...

**Treatment - Antiviral Drugs**  
Drugs to Treat Flu Virus, Stay Home When Sick, Caring for Someone Sick With Flu...

**News & Highlights**  
Flu Spotlights, Press Releases...

**Health Professionals**  
Vaccination, Antiviral Drugs, Infection Control, Diagnostic Testing, Patient Education, and Training...

**Free Resources**  
Printable Materials, Photos, Podcasts, Videos, PSAs, eCards, Badges & Buttons, Articles...

**Information For Partners**  
Campaign Highlights, Partner Activity Entries, Media Briefings, Promotional and Educational Tools...

**PHIL Influenza Images**  
Public Health Image Library, Photographs, Illustrations, Multimedia Files...

**Flu Activity & Surveillance**  
Check where flu is active near you.  
[More »](#)

**International Flu**  
2011 International Program Report  
[More »](#)

**Supply & Distribution**  
**New! FDA Approves Use of GSK 4-strain Flu Vaccine**  
[Contact CDC-INFO](#)  
Seasonal Flu Vaccine: Total

**FLU.GOV**  
Know what to do about the flu.  
[VISIT FLU.GOV](#)  
SHARE THIS WIDGET

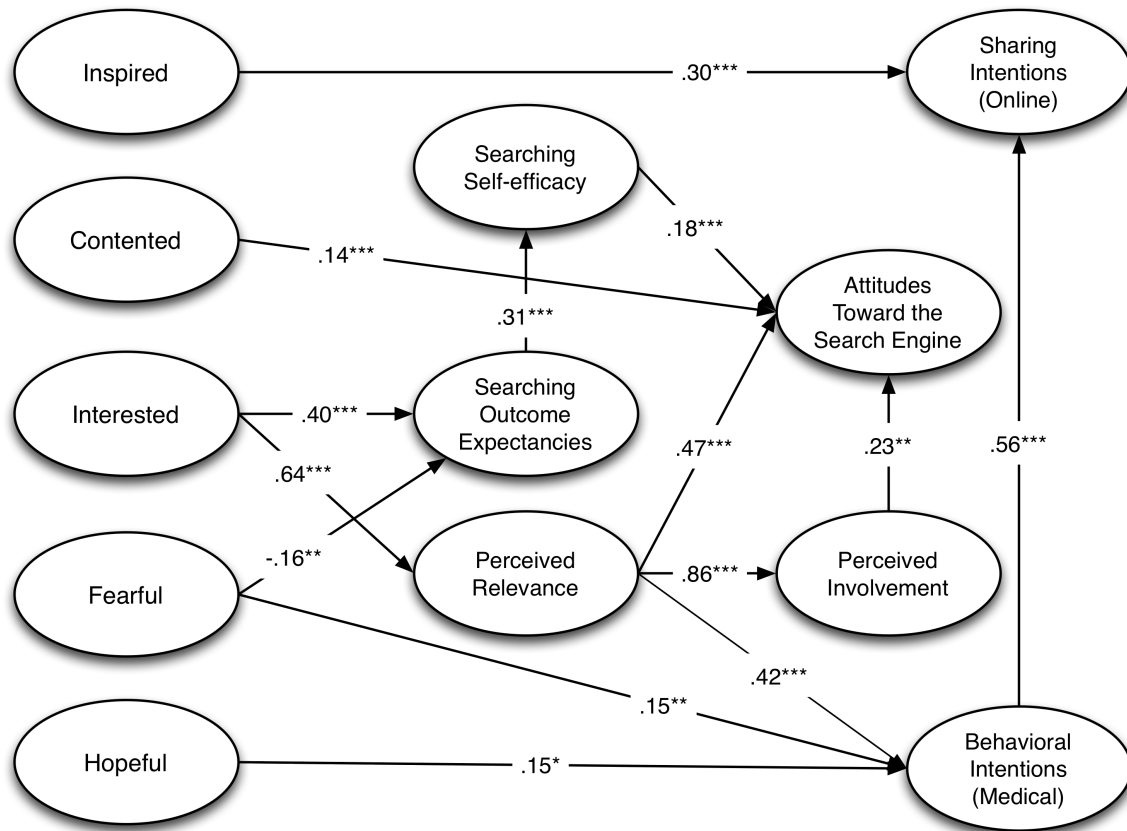
**Contact Us:**  
Centers for Disease Control and Prevention  
1600 Clifton Rd  
Atlanta, GA 30333  
800-CDC-INFO (800-232-4636)  
TTY: (888) 232-6348  
[Contact CDC-INFO](#)

**Other Flu Web Sites**  
[Avian](#) [H3N2v](#) [Swine](#) [Pandemic](#) [Bat](#) [Canine](#) [Other](#)

**Avian**  
There are many different influenza A Viruses; some are found in humans

Figure 5.

Study 2 Final Model

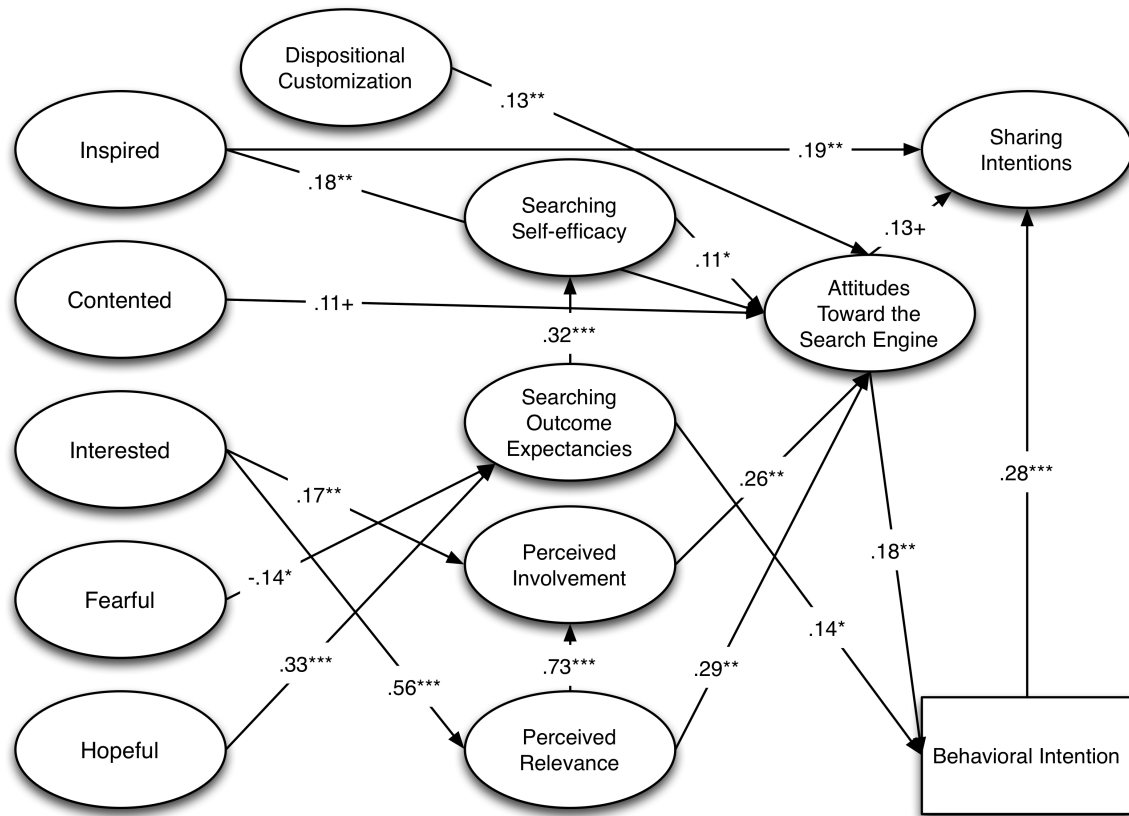


+  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



Figure 6.

Study 3 Final Model



+  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

## Appendix A: Search Engine Stimulus Materials

### *Hope-matched search results*



We retrieved these results for your search for "flu":

**Take Action to Stay Healthy — Flu.gov**

<http://www.flu.gov/>

Get the seasonal and pandemic flu information you need to meet your health goals this flu season at Flu.gov.

**CDC — Let's Beat Seasonal Influenza (Flu)**

<http://www.cdc.gov/flu/>

CDC Centers for Disease Control and Prevention  
Influenza Flu Homepage - Everything you need to know make out on top this flu season, including...

**How to Stay Healthy This Flu Season —  
Influenza Causes, Prevention, Symptoms,  
Treatments**

<http://www.webmd.com/cold-and-flu/default.htm>

How to recognize the symptoms of cold and flu in order to fight back fast, learn which treatments work best, and advice on staying healthy during cold and flu season.

**Influenza — Wikipedia, the free encyclopedia**

[www.en.wikipedia.org/wiki/influenza](http://www.en.wikipedia.org/wiki/influenza)

Influenza, commonly known as the flu, is an infectious disease of birds and mammals caused by RNA viruses of the family Orthomyxoviridae, the influenza ...

**Approach a Healthier Flu Season —  
Mayoclinic.com**

[www.mayoclinic.com/health/influenza/DS00081](http://www.mayoclinic.com/health/influenza/DS00081)

Yearning for a winter without influenza — Comprehensive overview covers symptoms, treatment, prevention and self-care of the flu.

**Google Flu Trends — The Information You Need  
to Escape the Flu's Wrath**

[www.google.org/flu/trends/](http://www.google.org/flu/trends/)

We've found that certain search terms are good indicators of flu activity. Google Flu Trends can give you a few days warning so you can take preventative steps to stay healthy.

**Flu Vaccine Finder — Find A Flu Vaccine  
Location to Reach Your Health Goals this  
Season**

[www.flushot.healthmap.org/](http://www.flushot.healthmap.org/)

Use this map to find a flu shot that will help you stay healthy this year. Though the flu may be accompanied by vomiting, diarrhea, or nausea, these are rarely the main symptoms...

**CDC Flu (CDCFlu) on Twitter — Stay Healthy  
This Year**

<https://twitter.com/CDCFlu>

Flu-related updates from the Centers for Disease Control & Prevention. Comments received are subject to PRA & may be archived  
<http://go.usa.gov/8Ea...>

**Get a Flu Shot, Take Action to Prevent the Flu —  
CVS Pharmacy**

[www.cvs.com/promo/promoLandingTemplate.jsp?...flu](http://www.cvs.com/promo/promoLandingTemplate.jsp?...flu)

You yearn to avoid the flu, so come into CVS to achieve your goal of good health. Flu shots available in every store, every day. Walk in anytime.

**Flu — American Red Cross — Move Toward  
Health This Season**

[www.redcross.org/prepare/disaster/flu](http://www.redcross.org/prepare/disaster/flu)

Read about how to stay healthy and recognize flu symptoms early enough to take effective action. Stay well!

[...More Results...](#)

*Fear-matched search results*



We retrieved these results for your search for "flu":

**Seek Protection from the Flu — Flu.gov**

<http://www.flu.gov/>

Get the seasonal and pandemic flu information you need to protect yourself from the flu at Flu.gov.

**CDC — Escape Seasonal Influenza (Flu)**

<http://www.cdc.gov/flu/>

CDC Centers for Disease Control and Prevention Influenza Flu Homepage - Everything you need to know to escape the flu illness, including ...

**How to Avoid the Flu — Influenza Causes, Prevention, Symptoms, Treatments**

<http://www.webmd.com/cold-and-flu.default.htm>

How to avoid a debilitating case of the flu, recognize the symptoms of cold and flu before they become dangerous, which treatments work best, and strategies for escaping the flu this season.

**Influenza — Wikipedia, the free encyclopedia**

[www.en.wikipedia.org/wiki/influenza](http://www.en.wikipedia.org/wiki/influenza)

Influenza, commonly known as the flu, is an infectious disease of birds and mammals caused by RNA viruses of the family Orthomyxoviridae, the influenza ...

**Protect Yourself from Influenza (flu) — MayoClinic.com**

[www.mayoclinic.com/health/influenza/DS00081](http://www.mayoclinic.com/health/influenza/DS00081)

Evade influenza — Comprehensive overview covers symptoms, treatment, prevention and self-care of the flu.

**Google Flu Trends — The Information You Need to Escape the Flu's Wrath**

[www.google.org/flu-trends/](http://www.google.org/flu-trends/)

We've found that certain search terms are good indicators of flu activity. Google Flu Trends can tell you when the flu is close so you can take measures to elude it or catch symptoms early.

**Flu Vaccine Finder — Find A Flu Vaccine Location to Protect Yourself From the Flu**

[www.flushot.healthmap.org/](http://www.flushot.healthmap.org/)

Use this map to find a flu shot that will help you escape the flu. Though the flu may be accompanied by vomiting, diarrhea, or nausea, these are rarely the main symptoms...

**CDC Flu (CDCFlu) on Twitter — Get Away From the Flu This Year**

<https://twitter.com/CDCFlu>

Flu-related updates from the Centers for Disease Control & Prevention. Comments received are subject to PRA & may be archived <http://go.usa.gov/8Ea...>

**Get a Flu Shot to Avoid the Flu — CVS Pharmacy**

[www.cvs.com/promo/promoLandingTemplate.jsp?...flu](http://www.cvs.com/promo/promoLandingTemplate.jsp?...flu)

Protect yourself from the flu, and do it fast. Flu shots available in every store, every day. Walk in anytime.

**Flu — American Red Cross — Avoid the Flu This Season**

[www.redcross.org/prepare/disaster/flu](http://www.redcross.org/prepare/disaster/flu)

Read about how to prevent a cold and recognize flu symptoms before it's too late. Get away from a bad case of the flu!

[...More Results...](#)

## Neutral/Generic Search Results



We retrieved these results for your search for "flu":

**Home — Flu.gov**

<http://www.flu.gov>

Get the seasonal and pandemic flu information you need at Flu.gov.

**CDC — Seasonal Influenza (Flu)**

<http://www.cdc.gov/flu/>

CDC Centers for Disease Control and Prevention  
Influenza Flu Homepage - Everything you need to know about the flu illness, including ...

**Cold and Flu (Influenza) Center — Causes, Prevention, Symptoms, Treatments**

<http://www.webmd.com/cold-and-flu.default.htm>

How to recognize the symptoms of cold and flu, which treatments work best, and advice on staying healthy during cold and flu season.

**Influenza — Wikipedia, the free encyclopedia**

[www.en.wikipedia.org/wiki/influenza](http://www.en.wikipedia.org/wiki/influenza)

Influenza, commonly known as the flu, is an infectious disease of birds and mammals caused by RNA viruses of the family Orthomyxoviridae, the influenza...

**Influenza (flu) — MayoClinic.com**

[www.mayoclinic.com/health/influenza/DS00081](http://www.mayoclinic.com/health/influenza/DS00081)

Influenza — Comprehensive overview covers symptoms, treatment, prevention and self-care of the flu.

**Google Flu Trends**

[www.google.org/flu-trends](http://www.google.org/flu-trends)

We've found that certain search terms are good indicators of flu activity. Google Flu Trends uses aggregated Google search data to estimate flu activity.

**Flu Vaccine Finder**

[www.flu-shot.healthmap.org/](http://www.flu-shot.healthmap.org/)

Though the flu may be accompanied by vomiting, diarrhea, or nausea, these are rarely the main symptoms. When people refer to the "stomach flu," they are most...

**CDC Flu (CDCFlu) on Twitter**

<https://twitter.com/CDCFlu>

Flu-related updates from the Centers for Disease Control & Prevention. Comments received are subject to PRA & may be archived  
<http://go.usa.gov/8Ea...>

**Flu Shot — CVS pharmacy**

[www.cvs.com/promo/promoLandingTemplate.jsp?...flu](http://www.cvs.com/promo/promoLandingTemplate.jsp?...flu)

Flu shots available in every store, every day. Walk in anytime.

**Flu — American Red Cross — Recognize Flu Symptoms**

[www.redcross.org/prepare/disaster/flu](http://www.redcross.org/prepare/disaster/flu)

Read about how to prevent a cold and recognizing flu symptoms.

[...More Results...](#)

*Sample Dispositional Customization Search Result Heading*



**Jess**, given your attributes as a **20-year-old female** living in **Chapel Hill, North Carolina** with **five roommates**, we found these results for the search term “**flu**” for you:

**North Carolina Home — Flu.gov**

<http://www.flu.gov/NC>

Get the seasonal and pandemic flu information you need at Flu.gov.

**CDC — Seasonal Influenza (Flu) Information for North Carolina**

<http://www.cdc.gov/flu/NC>

CDC Centers for Disease Control and Prevention Influenza Flu Homepage - Everything you need to know about the flu illness, including ...

## Appendix B: Questionnaires

### *Study 1 Questionnaire*

As we get started, it's helpful for us to have a little bit of background information about people who participated in our study.

First, please tell us your gender:

- Male
- Female

Please fill in your age in years in the space below:

\_\_\_\_\_ How would you best describe your racial/ethnic group? (Please check all that apply)

- American Indian
- Alaska Native
- African American
- Asian or Pacific Islander
- Caucasian
- Hispanic/Latino(a)
- Other (please describe below) \_\_\_\_\_

What is your highest level of education obtained?

- Did NOT complete High School or GED
- High School or GED
- 2 year technical degree or some college
- 4 year Bachelors degree
- Some graduate school
- Graduate degree

In the next section of the questionnaire you will be presented with a YouTube video message. The video is about 1 minute in length. After viewing, you will be asked some questions before moving onto the next section of the questionnaire. Please watch the full video. Thank you. Click the button below to proceed to the video.

[http://www.youtube.com/watch?v=dH4ldid\\_7fM&feature=player\\_embedded](http://www.youtube.com/watch?v=dH4ldid_7fM&feature=player_embedded)

HOPE PRIME CONDITION:

After viewing the video, how do you feel? Please respond for each word or phrase below using the provided scale.

	1 - none of this emotion	2	3	4	5	6	7	8	9 - a great deal of this emotion
Hopeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yearning for the Best	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Future is Promising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anticipating a Good Outcome for Yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reassured	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Looking Forward	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling Positive about your Future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**FEAR PRIME CONDITION:**

After viewing the video, how do you feel? Please respond for each word below using the provided scale.

	1 - none of this emotion	2	3	4	5	6	7	8	9 - a great deal of this emotion
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worried	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apprehensive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frightened	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uneasy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alarmed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**NEUTRAL CONDITION:**

Please spend a few minutes writing about your opinion of the music selection and visual editing style of the video. Please do NOT discuss the content of the video. Instead, please discuss your opinion of the choice aesthetics (visuals, music, sound quality, editing, fonts used in graphics, color choices, etc.). When you are done writing about the aesthetics of the video, please click the button below to advance to the next section.

Imagine that after you saw this video, you decided to search online for more information about the flu. What are some search terms you might enter into an online search engine (i.e., what you would type into the blank space in a search engine like Google or Yahoo!) in order to find more information about the flu? Please type as many unique search terms as come to mind in the boxes below. These terms can be individual words or they can be phrases. You do NOT have to fill in every box, only as many as you have unique search terms in your mind.

[20 TEXT ENTRY BOXES]



Now, we would like to actually spend some time searching online for information about the flu. Please open a separate window or tab, go to [www.google.com](http://www.google.com) and spend as much or as little time as you would like searching online for information about the flu. When you are done searching, please leave that extra window or tab open, but return to this survey.

Please type below the names of the websites listed by Google that you remember visiting during this search session (e.g., CDC's Flu page, WebMD, etc.):

[TEXT ENTRY BOX]

After your experience searching online for information about the flu, how do you feel? On a scale of 1 to 9, where "1" means "none of this emotion" and "9" means "a great deal of this emotion," please rate your responses below.

	None of this Emotion 1	2	3	4	5	6	7	8	A Great Deal of this Emotion 9
Hopeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contented	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mellow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peaceful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tranquil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Touched	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meaningful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Curious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The next set of questions is about the Google search engine. Please answer in response to how you feel about the Google and NOT the content on the websites linked to by Google. Based on your experience with the beta version of this health search engine during this session, please provide an overall evaluation of the Google search engine using the scales below. On a scale of 1 to 9, where “1” means “describes very poorly” and “9” means “describes very well,” please select the one number that indicates how well each term describes the SearchForHealth.org search engine.

	Very Poorly 1	2	3	4	5	6	7	8	Very Well 9
Appealing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Positive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favorable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exciting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate your agreement with the following statement: I paid a great deal of attention to the search results on Google:

	Strongly Disagree 1	2	3	4	5	6	7	8	Strongly Agree 9
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

After viewing the search results on Google, please tell us how confident you are in your ability to use the Internet to accomplish the following tasks:

	Not at all Confident 1	2	3	4	5	6	7	8	Extremely Confident 9
Using a search engine to gather information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating the quality of different influenza websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locating a variety of perspectives on influenza prevention and/or detection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding high quality information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locating high quality websites about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding how search engines work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning how to use the Internet to gather information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

different procedures for evaluating influenza information									
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Imagine what outcomes will occur if you were to search online for more information about influenza (flu). Please rate the extent to which you expect an online search for more information about influenza (flu) would do the following:

	Not at all Likely 1	2	3	4	5	6	7	8	Extremely Likely 9
Produce extremely NEGATIVE information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely POSITIVE information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely BAD information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely GOOD information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you noticed a story about influenza (flu) on television, on the radio, in newspapers, or on the Internet, how likely would you be to pay close attention to it?

	Not at all 1	2	3	4	5	6	7	8	A whole lot 9
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely are you to SHARE any information about the influenza (flu) with the following people/groups:

	Not at all Likely 1	2	3	4	5	6	7	8	Extremely Likely 9
Entire online social network (e.g., post information on your Facebook wall or Twitter feed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selected members of your online social network (e.g., post it on a friend's wall or send a direct Twitter message)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends (including roommates and significant others) - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthcare providers via online communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthcare providers - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how likely you are to take the following actions:

	Very Unlikely 1	2	3	4	5	6	7	8	Very Likely 9
Get the influenza vaccine (shot or nasal mist) EVERY YEAR from here on out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wash your hands or use hand sanitizer after coming into contact with other people or shared surfaces (e.g., a door knob).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Always cough or sneeze only into a tissue or your elbow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
See a doctor for anti-viral medication upon noticing the early symptoms of the flu.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stay home and avoid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>all contact with others if you suspect you have the flu.</p> <p>Drink lots of fluids (clear liquids) if you come down with the flu.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Have you already had the flu (influenza) VACCINE (shot or nasal mist) this school year?

- Yes
- No

Have you already been stricken with the flu (influenza) this school year?

- Yes
- No
- Not Sure/Maybe

Is there anything you'd like to tell the researchers about the video, the search engine, the website, influenza in general, or the study itself? If yes, please write it in the box below. Click the button below when you are finished.

[TEXT ENTRY BOX]

Thank you for your participation today. We sincerely appreciate it. Please enter your MTurk worked ID below in order to ensure you receive payment:

That's the end of this survey! Thank you for participating! Below is the code that you need to enter in MTurk. Please block and copy this code to receive payment for your participation. CODE: 118876511.

Thank you for being part of the study! If you would like to learn more about this study, click the button below.

Thank you for participating in this session. We'd like to share some information about the research design and questions we were seeking to answer. Research begins with a compelling question. In this session, we wanted to learn:

"How do different emotional reactions to a news story about a health issue impact how people search online for health information?"

In the case of this study we also wanted to test to specific research questions:

“What effects do hope and fear, specifically, have on the health information search process? “

“How does the intensity of an emotional response to a news story impact health information search?”

In order to answer the research question and test hypotheses, a research design was developed. First, participants were randomly assigned to one of three conditions: hope, fear, or neutral. By looking at responses to the messages given by people in these different conditions, we will be able to tell how the type of emotion and intensity of an emotion influences searching intentions. Once we have collected all the data, we will use statistical procedures to analyze whether there are significant differences between people in the different conditions.

If you are interested in this topic, you might like to look up these articles for more information:

Dillard, J. P., & Nabi, R. L. (2006). The persuasive influence of emotion in cancer prevention and detection messages. *Journal of Communication*, 56(s1), S123-S139.

Brashers, D. E., Goldsmith, D. J., & Hsieh, E. (2002). Information seeking and avoiding in health contexts. *Human Communication Research*, 28(2), 258-271.

Thank you for your participation.

We appreciate your help! Please do not talk about this study with anyone who may also participate.



*Study 2 and Study 3 Questionnaire*

Before we get started, it's helpful for us to have a little bit of background information about people who participated in our study.

First, please tell us your gender:

- Male
- Female

Please fill in your age in years in the space below:

\_\_\_\_\_

How would you best describe your racial/ethnic group? (Please check all that apply)

- American Indian
- Alaska Native
- African American
- Asian or Pacific Islander
- Caucasian
- Hispanic/Latino(a)
- Other (please describe below) \_\_\_\_\_

What is your highest level of education obtained?

- Did NOT complete High School or GED
- High School or GED
- 2 year technical degree or some college
- 4 year Bachelors degree
- Some graduate school
- Graduate degree

In the next section of the questionnaire you will be presented with a YouTube video message. The video is about 1 minute in length. After viewing, you will be asked some questions before moving onto the next section of the questionnaire. Please watch the full video. Thank you. Click the button below to proceed to the video.

HOPE PRIME CONDITION:

After viewing the video, how do you feel? Please respond for each word or phrase below using the provided scale.

	1 - none of this emotion	2	3	4	5	6	7	8	9 - a great deal of this emotion
Hopeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yearning for the Best	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Future is Promising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anticipating a Good Outcome for Yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reassured	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Looking Forward	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling Positive about your Future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**FEAR PRIME CONDITION:**

After viewing the video, how do you feel? Please respond for each word below using the provided scale.

	1 - none of this emotion	2	3	4	5	6	7	8	9 - a great deal of this emotion
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worried	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apprehensive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frightened	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uneasy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alarmed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**NEUTRAL CONDITION:**

Please spend a few minutes writing about your opinion of the music selection and visual editing style of the video. Please do NOT discuss the content of the video. Instead, please discuss your opinion of the choice aesthetics (visuals, music, sound quality, editing, fonts used in graphics, color choices, etc.). When you are done writing about the aesthetics of the video, please click the button below to advance to the next section.

Thank you for watching the video. We are now moving onto the part of the study where you will examine a beta version of a new search engine being developed by researchers at the University of North Carolina specifically for health and medical questions. Please take the following actions in order to use the search engine: 1.) Below, you will see the beta version of a search engine called "SearchForHealth.org". 2.) Once you see the search engine, please enter the search term "flu". 3.) When you see the results page, PLEASE DO NOT CLICK ON ANY OF THE LINKS (we have disabled them for beta testing). 4.) Simply spend a few minutes CAREFULLY reading through all the search results. You will be asked questions about the search results later in this questionnaire. 5.) Once you are finished carefully reading through all of the search results, please click the button below to proceed.

You can view and interact with the search engine here. When finished, please click the button below to continue with the questionnaire.

[SEARCH ENGINE APPEARED HERE, BASED ON RANDOMIZED CONDITION]

Thank you for testing the SearchForHealth.org beta search engine. We'd now like to you to spend some time browsing one of the websites that the search engine found for you. Simply spend as long as you would like browsing the following website within this questionnaire. You may click on any of the links and explore any subsection of this website. However, please do NOT use your browser's back button. Whenever you are finished, click the button at the bottom of this page to proceed. (Note: You may need to scroll to the bottom and to the right of the page in order to see the button to advance to the next page).

You can view and interact with the website here. When finished, please continue with the questionnaire. [CDC WEBSITE APPEARED HERE]

How do you feel right now after your experience with these various types of media? On a scale of 1 to 9, where "1" means "none of this emotion" and "9" means "a great deal of this emotion," please rate your responses below.

	None of this Emotion 1	2	3	4	5	6	7	8	A Great Deal of this Emotion 9
Hopeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optimistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contented	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mellow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peaceful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fearful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tranquil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Touched	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meaningful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Curious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The next set of questions is about the SEARCHFORHEALTH.ORG search engine. Please answer in response to how you feel about the SEARCH ENGINE (NOT about the CDC website). Based on your experience with the beta version of this health

search engine during this session, please provide an overall evaluation of the SEARCH ENGINE using the scales below. On a scale of 1 to 9, where “1” means “describes very poorly” and “9” means “describes very well,” please select the one number that indicates how well each term describes the SearchForHealth.org search engine.

	Very Poorly 1	2	3	4	5	6	7	8	Very Well 9
Appealing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Positive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Favorable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exciting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Likeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To you personally, the search results on SearchForHealth.org were:

	1	2	3	4	5	6	7	8	9
Important:Unimportant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boring:Interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevant:Irrelevant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exciting:Unexciting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mean nothing:Mean a lot to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appealing:Unappealing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fascinating:Mundane	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worthless:Valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Involving:Uninvolving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not needed:Needed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On a scale of 1 to 9, where “1” means “strongly disagree” and “9” means “strongly agree,” please select the one number that indicates how well each term describes the SearchForHealth.org search engine.

	Strongly Disagree 1	2	3	4	5	6	7	8	Strongly Agree 9
The content of the search engine results said something important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content featured in the search engine results was meaningful to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The search engine results didn't have anything to do with me or my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The search engine results talked about something that concerned me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
While being exposed to the search engine results, I thought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

about how the content would be useful to me. The search engine did not show me anything that made me want to use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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After viewing the search results on SearchForHealth.org, please tell us how confident you are in your ability to use the Internet to accomplish the following tasks:

	Not at all Confident 1	2	3	4	5	6	7	8	Extremely Confident 9
Using a search engine to gather information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating the quality of different influenza websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locating a variety of perspectives on influenza prevention and/or detection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding high quality information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locating high quality websites about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding how search engines work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning how to use the Internet to gather information about influenza	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



different procedures for evaluating influenza information									
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Imagine what outcomes will occur if you were to search online for more information about influenza (flu). Please rate the extent to which you expect an online search for more information about influenza (flu) would do the following:

	Not at all Likely 1	2	3	4	5	6	7	8	Extremely Likely 9
Produce extremely NEGATIVE information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely POSITIVE information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely BAD information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Produce extremely GOOD information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely are you to SHARE any information about the influenza (flu) with the following people/groups:

	Not at all Likely 1	2	3	4	5	6	7	8	Extremely Likely 9
Entire online social network (e.g., post information on your Facebook wall or Twitter feed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selected members of your online social network (e.g., post it on a friend's wall or send a direct Twitter message)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family members - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends (including roommates and significant others) - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthcare providers via online communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthcare providers - offline communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how likely you are to take the following actions:

	Very Unlikely 1	2	3	4	5	6	7	8	Very Likely 9
Get the influenza vaccine (shot or nasal mist) EVERY YEAR from here on out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wash your hands or use hand sanitizer after coming into contact with other people or shared surfaces (e.g., a door knob).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Always cough or sneeze only into a tissue or your elbow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
See a doctor for anti-viral medication upon noticing the early symptoms of the flu.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stay home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

and avoid all contact with others if you suspect you have the flu. Drink lots of fluids (clear liquids) if you come down with the flu.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Have you already had the flu (influenza) VACCINE (shot or nasal mist) this school year?

- Yes
- No

Have you already been stricken with the flu (influenza) this school year?

- Yes
- No
- Not Sure/Maybe

Is there anything you'd like to tell the researchers about the video, the search engine, the website, influenza in general, or the study itself? If yes, please write it in the box below. Click the button below when you are finished.

Thank you for your participation today. We sincerely appreciate it. Please enter your MTurk worked ID below in order to ensure you receive payment:

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That's the end of this survey! Thank you for participating! Below is the code that you need to enter in MTurk. Please block and copy this code to receive payment for your participation.

CODE: 118876511

Thank you for being part of the study! If you would like to learn more about this study, click the button below.

Thank you for participating in this session. We'd like to share some information about the research design and questions we were seeking to answer. Research begins with a compelling question. In this session, we wanted to learn:

“How do different emotional reactions to a video about a health issue and the level of customization of search engine results related to the health issue impact attitudes and behaviors related to the health issue as well as attitudes towards a website including in those search results?”

In the case of this study we also wanted to test to specific research questions:

“What effects do hope and fear, specifically, have on the health information search process?”

“What role does emotion-based customization play in combination with present emotional states in influencing health- and communication-related attitudes and behaviors?”

In order to answer the research question and test hypotheses, a research design was developed. First, participants were randomly assigned to one of three conditions: hope, fear, or neutral prime after the video. Then, participants were randomly assigned to one of three search engine conditions: search results customized to the action tendencies of hope, fear, or no emotion, respectively. By looking at responses to the messages given by people in these different conditions, we will be able to tell how the type of emotion and customization of search results based on the action tendency of an emotion influences searching intentions. Once we have collected all the data, we will use statistical procedures to analyze whether there are significant differences between people in the different conditions.

If you are interested in this topic, you might like to look up these articles for more information:

Dillard, J. P., & Nabi, R. L. (2006). The persuasive influence of emotion in cancer prevention and detection messages. *Journal of Communication*, 56(s1), S123-S139.

Brashers, D. E., Goldsmith, D. J., & Hsieh, E. (2002). Information seeking and avoiding in health contexts. *Human Communication Research*, 28(2), 258-271.

Thank you for your participation. We appreciate your help! Please do not talk about this study with anyone who may also participate.

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