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## Can You Get Beliefs from Retweets? An Examination of the Extended Parallel Processing Model on Social Media

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# CAN YOU GET BELIEFS FROM RETWEETS? AN EXAMINATION OF EXTENDED PARALLEL PROCESSING MODEL ON SOCIAL MEDIA

Xialing Lin, M.A.

Western Michigan University, 2012

The Extended Parallel Processing Model (EPPM; Witte, 1992) has been applied as a framework to examine risk information dissemination and effective sensation seeking in various health communication scenarios. Previous studies suggest that it is worth examining whether Twitter could have potential efficacy effects similar to face-to-face interaction or traditional media interventions. Given the overload and discrete information in the medium environment, people would adapt information processing short cuts, to tend to similar perceptions from various sources rather than reading specific messages.

The current study investigates the threat appeal perceptions of EPPM on system-generated and other-generated message cues in social media. An assumption raised was that people might acquire response efficacy through the number of retweets from the users. 219 participants were recruited for a 2 (high vs. low threat appeal)  $\times$  2 (numbers of retweets and replies presented vs. absent) posttest-only experiment. The results did not support the hypothesis. However, the study emphasized the importance of perceived severity and susceptibility for response efficacy perceptions. The manipulation limitations and applied implications are also discussed.

CAN YOU GET BELIEFS FROM RETWEETS? AN EXAMINATION  
OF EXTENDED PARALLEL PROCESSING  
MODEL ON SOCIAL MEDIA

by

Xialing Lin

A Thesis  
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Faculty of the Graduate College  
in partial fulfillment of the  
requirements for the  
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School of Communication  
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Xialing Lin

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## CHAPTER I

### INTRODUCTION

Social media sites, which are generally regarded as a group of indispensable communication platforms throughout the developed world, have become tremendously popular in recent years (Boyd, Golder, & Lotan, 2010; Chew & Eysenbach, 2010). Social media have reformed the traditional way of communication for individuals in daily life (Java, Finin, Song, & Tseng, 2007). Prominent examples include blog and wiki systems such as Blogger and Wikipedia, photo and video sharing sites such as Flickr and YouTube, social tagging sites such as Delicious, social network sites such as MySpace and Facebook, and micro-blogging sites such as Twitter. Millions of users are actively using social media sites, and creating information online that, until recently, has not been widely available. Yet, the abundance and popularity of social media sites engulf users with large volumes of information and hence pose a challenge in terms of information overload. This situation requires individuals to evolve another way of social interactions based on the platforms available and differing from traditional and face-to-face communication (Westerman, Spence, & Van Der Heide, 2011).

Twitter, a recent social phenomena focusing on offering real-time updates, has been driving this development since it was founded in 2006. Today, more than 300 million users send an average of 300 million ‘tweets’ and over 1.6 billion search queries per day, each consisting of 140 characters or less (“Twitter,” 2012, January, 28). The information dissemination on Twitter tends to be decentralized even though

the medium allows for customization. The need of online users for variable self-presentation and self-seeking is complicated by increasingly mainstream social media technologies, which collapse multiple contexts and bring together commonly distinct audiences (Marwick & Boyd, 2011). Customized health information is thriving on Twitter by personal or institutional sources because information dissemination is decentralized and messages are far-reaching.

In order to improve individual health information perceptions on social media, the Extended Parallel Process Model (EPPM; Witte, 1992) and Social Information Processing Theory (SIPT; Walther, 1992), are applied as a framework in this study. This study focuses on the emotional and cognitive appeal of health messages evidenced by real-time responses from users on their Twitter profile pages, as perceived by the audience. Instead of directly examining the health messages on Twitter, this study turned to the interactions between the self and other generated cues and the cognition appeal of health messages. First, a review of the literature is offered. Next, a description of the method and the approach to the analysis is explained.

## CHAPTER II

### LITERATURE REVIEW

#### Social Media and Social Information Processing Theory

Social media are “a group of internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content” (Kaplan & Haenlein, 2010, p. 61). This form of media collapses diverse social contexts and multiple traditional media audiences into one, making it difficult for people to use the same techniques online as they do in traditional media and face-to-face conversations, such as, handling multiplicity such as identity variation, impression management, or reputation saving (Marwick & Boyd, 2010). According to Synder and Stukas (1999), people tend to make many first impressions based on the abundant appearance features of others, which are immediately available through face-to-face communication, from obvious physical appearance or body gestures as well as subtle cues like facial expressions and idiosyncrasies. The given source and message fragments could serve as cues; message receivers could be induced to loosely associate the heuristic cues, as mental shortcuts, with judgment-relevant information in a persuasive context (Chaiken, 1980; Sundar, 2008). In situations short of available heuristic cues, people tend to rely on whatever limited information is available to form impressions. Some research applied “thin slice” approach, depending on “short excerpts of social behaviors” which perceivers interfere “the states, traits, and other personally-relevant characteristics.” (Carney, Colvin, & Hall, 2007, p.1055) Carney et al.’s (2007) study on the accuracy of first impressions

by the thin slice perspective found that people could accurately judge someone's personality just from a 60-second video tape of a person; even 5-second slices of video could significantly invoke judgment accuracy. It suggested that, with media affordance (or: in some media environments), information processing could be extended by more stable, broad traits rather than more temporary states.

In traditional media, information seeking for content consumers is a relatively passive way that the presented information is chosen. Most often the presented information passes through the process of gatekeeping by content producers. In a social media interaction, the content consumers can take over the gatekeeping function from the content producers, and take responsibility for making decisions of online contents (Haas & Wearden, 2003; Metzger, Flanagin, Eyal, Lemus, & McCann, 2003; Shoemaker & Vos, 2009; Westermen et al., 2011). When people are communicating with others online, the traditional cues that may take the form of nonverbal communication offline are expressed as other cues in online communication behavior (Walther, 1992, 1997). Social Information Processing Theory (SIPT) proposes that given time and opportunity to interact, relationships between individuals can form in online environments.

Previous studies suggest that online channel technologies offer more information than traditional media (e.g., Cassell, Jackson, & Cheuvront, 1998; Neuhauser & Kreps, 2003; Noar, Clark, Cole, & Lustria, 2006; Street & Rimal, 1997). For example, comparing several media types on a variety of factors, Street and Rimal (1997) reported that computerized media scored "high" on features including interactivity, sensory vividness, networkability, and modifiability, while traditional media (e.g., brochures, videotapes) scored much lower on these attributes. Primarily

user-driven online-based platforms are exponentially growing in numbers; social media facilitates the creation of collaborative sources to assist collective groups of people, while presenting challenges for users to self-organize amid an overload in information, entertainment, and other offerings (Sundar, 2008).

In the realm of social media, Social Information Processing Theory (SIPT; Walther, 1992) provides an interpersonal approach to explain the effects of the relational communication among individuals. Interpersonal dynamics, which is the chosen path of information exchange by users, suggests a different basis of emotional and cognitive perceptions that may be obtained among social media communication and networking. SIPT posits that online communication can convey affective information and relational communication, despite the reduced availability of nonverbal cues; this notion could also be applied in online health messages. Online communicators with sufficient cognition adapt their messages to generate and detect health message dissemination, to signal affective information, and to affect emotional and cognitive perceptions (Walther, 1992). As such, efficacy perceptions, personal beliefs in individuals' competence, from motivation appeals on social media interaction accrue on the basis of social media cues. According to Tong, Van Der Heide, Langwell, and Walther (2008), the numerous cues on the social media can be distinguished into three sources: self-generated cues, other-generated cues, and system-generated cues. System-generated cues are information on a user's profile chosen by the social media system; other-generated cues are sources of information from others posted on a user's profile; and self-generated cues are fully controlled by a profile owner. Those cues given off by the environment provide a lens for people to be able to perceive underlying interaction structures indirectly (Brunswik, 1956; Gosling, Ko, Mannarelli, & Morris, 2002).

Previous studies suggested that people tend to seek the most value, such as reliability or credibility of online information, from a higher source of warranty cues, and other-generated and system-generated cues may have the highest warranting value in a personal profile page (Antheunis & Schouten, 2011; Walther & Parks, 2002). Individuals will tend to adapt their perceptions based on information cues that the system generates “to achieve the same goals online as they do offline” if the social media “do not allow for the usual cues used” (Westerman et al., 2011, p. 2). For instance, Westerman et al., (2011) examined how the number of followers and the ratio of followers to follows available on a Twitter page impact perceptions of a source credibility. The findings supported curvilinear effects that existed for these system-generated cues and the perceptions of source credibility and judgments of competence. This study is heuristic and inspires the current study to investigate the decoding of system-generated nonverbal cues on Twitter.

### Twitter

As an online social networking and microblogging service launched in 2006, Twitter rapidly broke into mainstream during 2008 and 2009, and has accumulated over 300 million users as of 2011 (“Twitter,” 2012, January, 28). By initially providing users the opportunity to post, read, and respond to text-based messages limited to 140-characters in length, Twitter creates a multi-media platform with constantly updated timelines for wide-open content. These messages, called tweets, range from life chores to breaking news. A content analysis of tweets has been conducted by both scholars and popular press. For instance, Chew and Eysenbach (2010) conducted a content analysis of 5,395 tweets between May 1 and December 31 of the 2009 H1N1 outbreak. The results indicated that resource-related posts were most commonly



shared (52.6%), while 4.5% of cases were identified as misinformation. News websites were the most popular sources (23.2%), while government and health agencies were linked only 1.5% of the time (Chew & Eysenbach, 2010).

Another study on Twitter usage from Pear Analytics, a San Antonio based market-research firm, examined 200 tweets in English originating from the United States out of a total of 2,000 sample data set in the public timeline that were taken every 30 minutes from 11:00 a.m. to 5:00 p.m. (Central Standard Time, USA) for ten days in August 2009. From that study, the content of tweets was classified into six categories as listed: pointless babble (40.55%), conversational (37.55%), pass-along value (8.7%), self-promotion (5.85%), spam (3.75%), and news (3.60%) (Kelly, 2012, February, 2). Danah Boyd (2009), a social network scholar in media culture and communication and senior researcher at Microsoft Research, later responded to Pear Analytics' study and suggested that the "pointless babble" labeled in the survey was better characterized as "social grooming" and/or "peripheral awareness", which would imply users' desire for "know[ing] what the people around them are thinking and doing and feeling, even when co-presence isn't viable" (Boyd, 2009, August 16, para. 6).

Twitter users connect with each other by following or being followed without technical or social reciprocal requirement, which is unique from other online social networking sites such as Facebook or MySpace. Users can follow to view any other's information in their Twitter streams without bilateral consent, while also having their own groups of followers. As the platform grew, some specific features evolved for tweets: the "RT" stands for retweet, which is to repost a message from another Twitter user and share it with one's own followers; users could contain the other's

username in a tweet preceded by the “@” symbol to mention other users, as well as reply to another users’ tweets with the “@” symbol followed by the recipient's username. The symbol of “#” prefixing keywords or phrases in a tweet is known as hashtags, and allows users to categorize posts together by topics or types, and provide links for easy Twitter searching (“Twitter help center,” 2012, January, 29). Most of the popular hashtags on Twitter are known as trending topics, words, phrases or topics tagged at a greater rate than other tags, the majority of which (over 85%) were headline news or persistent news in nature (Kwak, Lee, Park, & Moon, 2010). The retweets and mentions can be shown to the public on the senders’ profile page; therefore, the information spread on Twitter is empowered by the user’s choice to use the retweet and reply mechanisms as well as the ability for information that is retweeted to reach beyond the original tweet’s followers (Kwak et al., 2010).

Twitter has continuously evolved its functions for a more user-friendly and news-updated design. In late 2009, Twitter expanded its features to make it possible for users to follow, mention and response to ad-hoc lists of authors instead of individual authors (“Twitter”, 2012, January 29; “Twitter lists”, 2012, February, 1). During September and October of 2010, Twitter revamped its website (Twitter.com), allowing users to directly update messages including images and video clips from a variety of supported third-party websites such as YouTube and Flickr. In December, 2011, Twitter featured the “Fly” design mainly for promoting advertising and upgrading account guidance for new users. Twitter has continuously experienced rapid growth, and became one of the top three most used social networks by February 2009 (based on the count of 6 million unique monthly visitors, 55 million monthly visits, generating over 300 million tweets and 1.6 billion search queries per day in the middle 2011).

According to a demographic survey on Twitter by a California based company for web audience measurement services named Quantcast.com, as of 2009 there were 27 million people per month who used Twitter in the United States. The makeup of users included 55% being female; 43% were between 18 and 34 years old; 78% of users were Caucasian and 11% were African-American, which was 35% above the Internet average. The household income of Twitter users was between \$30 and \$60,000, which implied that Twitter attracted a less affluent audience; 1% was classified as addicts contributing to 35% of the visits; only 27% were regular users, while 72% were passers-by (Kelly, 2012, February, 2). Similar results were also found in a study by Sysomos, a social media analytics service company, which indicated that 5% of users accounted for 75% of all activity (Cheng, Evans, & Singh, 2009).

Recent events in Iran, Egypt, Tunisia, Libya, Yemen, as well as in other locations such as Moldova, Georgia, Palestine, and China, have stimulated a great deal of discussion on the uses of social media for the purposes of political dissent and activist organization, as well as the effect of such use on local, national, and international politics. The Iranian and Egyptian cases were seen as evidence of the powerful role of social media, specifically Twitter, in facilitating dissent during times of conflict and suppression (Christensen, 2011; Segerberg & Bennett, 2011). The breaking news stories on Twitter provided users of the channel first-hand accounts and even sometimes debunked stories ("Welcome to the Twitterverse," 2009, February, 28). For instance, Segerberg and Bennett (2011) looked beyond informational functions to the role of social media as organizing mechanisms and recognized that traces of these media may reflect larger organizational schemes. The authors suggest that Twitter streams represented crosscutting networking mechanisms in protest ecology, which embed and were embedded in various kinds of gatekeeper processes,

and reflected changing dynamics in the ecology over time (Segeberg & Bennett, 2011). Wu, Wong, Deng, and Chang (2011) explored the process of opinion convergence by analyzing Twitter data of Singapore's 2011 General Election. The findings showed that informative tweets were more effective than affective tweets in opinion convergence, and their interactive effect on social impact was significant.

Twitter has not only been studied in respect to political movements, but also in social life. Studies by Java, Song, Finin, and Tseng (2007) as well as Krishnamurthy, Gill, and Arlitt (2008) analyzed the information distribution patterns in Twitter, while an in-depth analysis by Huberman, Romero, and Wu (2009) of Twitter's network structure discovered the potential of Twitter as a tool for viral marketing and as an instrument for spreading ideas or trends. Other studies highlighted the impact of "influential users" on information diffusion in Twitter (Cha, Haddadi, Benevenuto, & Gummadi, 2010), and suggested Twitter as a type of news media that spreads up-to-date trends (Kwak et al., 2010). These studies mainly investigated user traits (e.g., celebrities, experts) or relationships (i.e., the number of followers or follows). Additionally, some scholars tried to employ sociological and psychological process theories, such as social cognitive theory, diffusion of innovations, and situational theory, to investigate tweet sharing information and behaviors in an effort to understand how tweets affect information diffusion (e.g., Boyd et al., 2010; Ha & Ahn, 2011; Recuero, Araújo, & Zago, 2011). Twitter is one of the user-generated media: new media whose content is made publicly available online, reflecting a certain amount of creative effort, and created outside of professional routines and practices (Wunsch-Vincent & Vickery, 2006). Besides SIPT, these features of Twitter have revived research interest in the area of the uses and gratifications (U&G) approach, to explain the user motivations on Twitter (Johnson & Yang, 2009).

## Uses and Gratifications

Because SIPT theory states that people have the same goals in computer mediated communication as they do in face to face communication, many of the assumptions in U&G naturally hold true when people use social media. U&G focuses on the gratification purposes of media consumers rather than on the media functionalism, and explains how and why they are motivated to consume media (Aubrey et al., 2012; Baran & Davis, 2006; Lev-On, 2011; McQuail, 1984). This approach posits that media consumers are conscious and goal-oriented when searching out content to fulfill identified needs, while the content selection would further determine their future media usage pattern (Katz, Blumler, & Gurevitch, 1974). U&G is regarded as one of the most appropriate perspectives to investigate decision-making processes of audiences dealing with media channels (LaRose et al., 2001; Ruggiero, 2000). Katz, Gurevitch, & Haas (1973) summarized 35 needs for media usage motives into five categories: cognitive needs, affective needs, personal integrative needs, social integrative needs, and tension release needs. Congruously, McQuail (1983) suggested four common reasons for media use: information, personal identity, integration and social interaction, and entertainment, and this theory has been extensively applied to online communication (e.g., Dimmick, Kline, & Stafford, 2000; Ko, Cho, & Roberts, 2005; Ruggiero, 2000). Compared with traditional media, social media offers greater accessibility to information as well as the affordance for multi-tasking. This requires people to be both active and selective in media usage. Researchers have revived U&G to examine motives and communication behaviors of online users for more than a decade (e.g., Chung & Kim, 2008; Ebersole, 2000; Ko, 2000; LaRose & Eastin, 2004; Webster & Lin, 2002).

As the “expressed desires for gratification in a given class of situations” (McLeod & Becker, 1981, p. 74), motives are operationally measured as gratifications sought; when gratifications are obtained, motives are satisfied (Johnson & Yang, 2009). Previous studies depended on self-reporting as the methodological approach for gratification exploration, i.e. interviews and questionnaires, which include a list of statements representing different needs (Lev-On, 2011). Many early online studies either relied on, or adapted from traditional media, and found that the online media gratified similar needs to television, such as entertainment and escapism (Ferguson & Perse, 2000; Flanagin & Metzger, 2000; Kaye, 1998). However, because of the fundamental differences between online and traditional media, such as user generated information and shared networking, subsequent gratification studies discussed that online media may gratify unique needs such as convenience, identity and peer pressure (Charney & Greenberg, 2001; Johnson & Kaye, 2004; Kaye & Johnson, 2004). Studies on political blogs also found that surveillance and information seeking were the major motivations for people to seek out blogs, along with convenience and social utility (Graf, 2006; Kaye, 2005, 2007; Kaye & Johnson, 2006; Seltzer & Mitrook, 2006; Zhang, 2006). Moreover, several new motivations have been identified by scholars in online communication studies, including personal fulfillment, social surveillance, expression/affiliation, self-documentation, letting off steam, and anti-media sentiment (Blogads, 2006; Ekdale, Namkoong, Fung, Hussain, & Arora, 2007; Kaye, 2005, 2007; Li, 2007).

According to Rosengren and Windahl (1972), if users are motivated to consume a certain medium’s content to meet their needs, users might turn to the medium when similar needs arise in the future; if users do not expect a medium to satisfy a given motive based on behavior residue (e.g., past experiences), they are

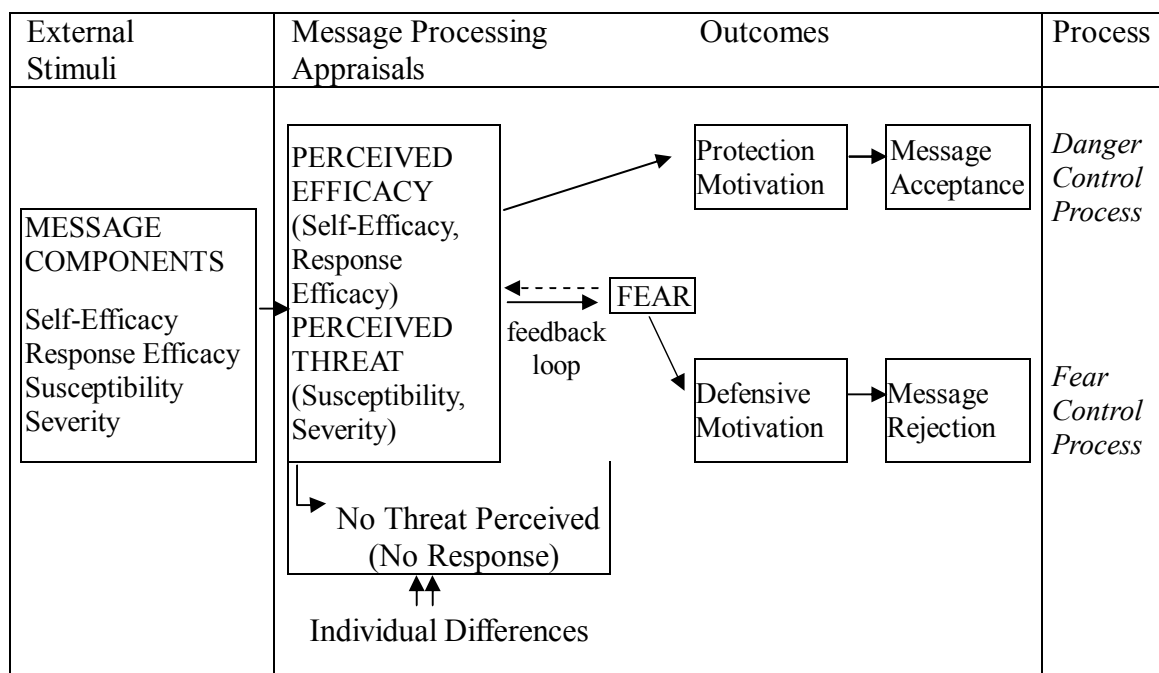
more likely to seek out alternatives. In addition, a recent study on Twitter gratification conducted by Johnson and Yang (2009) investigated the social motives (e.g., entertainment, relaxing, time consuming, seeing what others are up to; communication, etc.) and information motives (e.g., information or advice seeking and sharing, etc.) as two important factors for usage. Analysis found that information motives are positively related to Twitter usage. Results suggested that Twitter is used primarily as an information source, rather than as a medium for satisfying social needs. Based on posting, replying and retweeting, individuals consume user-generated contents on Twitter for fulfilling their information, entertainment, and mood management needs; while these gratification fulfillments stimulate individuals to keep generating contents on Twitter correspondingly. U&G explain the general motives and gratifications of media usage, because people have the same communication goals and motives in computer mediated communication as they do in face to face communication. With those goals in mind, one theory, which fits into this researching area and works well with tweets, is the Extended Parallel Process Model (EPPM).

### Extended Parallel Process Model

The Extended Parallel Process Model (EPPM) (Witte, 1992), is a motivation appeal theory with a dual/parallel approach, proposed by Witte to explain how individuals process and respond to risk messages. The theory attempts to explain when and why these persuasive messages work or fail (Witte, 1992, 1994, 1998; Witte & Allen, 2000). Based on the fear-as-acquired drive model (Hovland, Janis, & Kelly, 1953), parallel process model (Leventhal, 1970) and protection motivation theory (PMT; Rogers, 1975, 1983), EPPM addresses both emotional and cognitive factors, describes the internal mechanism of health message processing, and highlights the role

of motivation appeal in health messages (Witte, 1992, 1994). This model proposes two mental processes (Figure 1): danger control and fear control. The initiation of the danger control process leads audiences to adaptive responses (e.g., message acceptance), whereas the fear control process leads to maladaptive responses (e.g., message rejection; Witte, 1992, 1994).

Figure 1. The Extended Parallel Process Model (Witte, 1995)



According to Witte (1992), the onset of the danger or fear control process involves two steps of appraisals: the first is the “appraisal of the threat” and the second is the “appraisal of the efficacy of the message’s recommended response” (Witte, Meyer, & Martell, 2001, p. 24), or, as Perloff (2003) suggested, a problem (threat) and solution (efficacy). Rosenstock (1974) noted that the perceived threat or danger can be viewed in two dimensions: severity and susceptibility. Severity refers to the perceived amount of an individual’s subjective harm expected from the threat, while



susceptibility refers to the likelihood of an individual's feelings concerning the seriousness of contracting a threat. These two appraisals will result in one of three outcomes: (a) no response, (b) acceptance, or (c) rejection of the message (Witte, Meyer, & Martell, 2001). If the perceived threat is too low to evoke the second appraisal of efficacy, individuals are not motivated to process the information and will stop processing the message. However, two different types of efficacy would cause a person to evaluate the message when the perceived threat is beyond a critical point, they are response efficacy (i.e., to what extent the recommended response is effective and feasible in averting the threat) and self-efficacy (i.e., how confident they feel about their ability to perform the recommendations to avert the threat) (Rogers, 1975, 1983; Witte, 1998; Witte et al., 2001).

The EPPM interferes that after exposure to a fear appeal, individuals will first appraise the threat of the message then evaluate the efficacy of the recommended response. When both perceived threat and efficacy are high (i.e., high susceptibility and/or high severity; high self-efficacy and/or high response efficacy), individuals are likely to activate the danger control process, motivating them to change their attitudes, intentions, and behaviors. This causes the individual to focus cognitively on dealing with the threat and possible solutions to avert the threat. Alternatively, when perceived efficacy is low, or insignificant, in spite of high perceived threat, individuals are likely to follow the fear control process. In this process individuals let their emotions take over and use maladaptive coping mechanisms to allay their fears. Such mechanisms include denial, reactance, or avoidance (Witte, 1992, 1994, 1998; Witte et al., 2001). Moreover, when individuals begin to believe that they cannot avoid a significant threat from happening (thus the perceptions of the threat portion of a message begin to outweigh perceptions of the efficacy of the recommended response), fear control

responses would overtake danger control responses (Witte, 1992). Additionally, such appraisal process transformation could be in part due to personal traits, such as anxiousness, lack of coping skills, low self-esteem, and high vulnerability to the threat, which has been found in previous studies (Witte, 1992).

### Response Efficacy and Number of Retweets

Generally, the efficacy, susceptibility, and severity of a threat essentially accounts for the fear and danger control of the EPPM fear appeal. Efficacy is conceptually distinguished into two parts, efficacy as a message characteristic and as perceived efficacy (Witte, 1992, 1994). A message with efficacy features would contain response efficacy as messages emphasizing the effectiveness of a response in averting the threat, and also self-efficacy messages, which share a great overlap with Bandura's (1977) conceptualization of self-efficacy, outlining the ability of the target audience to carry out the recommended response (McKay, Berkowitz, Blumberg, & Goldberg, 2004; Popova, 2011; Witte, 1994). Because manipulating a low efficacy message in a real health campaign would be equivalent to denying sick individuals a potential remedy, efficacy as a message feature was often presented as either absent or high manipulation for ethical concerns in previous literature (Popova, 2011; Witte & Morrison, 1995).

Alternatively, perceived efficacy evaluated by targeted audiences is defined as cognitions which support the effectiveness, feasibility, and ease of taking a recommended response and its ability to alleviate or help to avoid a threat (Bandura, 1977; Popova, 2011). The perceived efficacy also contains response efficacy and self-efficacy. The perceived response efficacy assists audiences in believing the effectiveness of a recommended response in deterring a threat (e.g., recommended

response works in preventing influenza; doing/using recommended response is effective in preventing influenza), while self-efficacy is a person's belief about their ability to carry out the recommended response (e.g. I am able to do/use recommended response to prevent getting influenza; McMahan, Witte, & Meyer, 1998; Roberto et al., 2000; Witte, 1998; Witte et al., 1996). Perceived response and self-efficacy are traditionally measured on Likert-type scales (Maloney, Lapinski, & Witte, 2011). Witte (1992) posited that efficacy as a message feature may lead to perceived efficacy, which implied the need to ensure the efficacy manipulations in health messages as well as the contraction between high-level efficacy and non/low-level efficacy in current research.

Previous studies have paid attention to response efficacy as a key mediating variable in order to further understand the persuasive process of emotion-based appeals upon EPPM frame. Mixed support was found for the idea that cognitions about efficacy were unrelated to fear control responses (Popova, 2011). Tay and Watson's (2002) study along with Witte's (1994) were contrary to McMahan et al.'s (1998) and Witte et al.'s (1993) conclusions that the former found a weak negative effect of response efficacy on message rejection. Levine, Weber, Hullett, and Park (2008) suggested employing equivalence testing; the authors contended that because there was an absence of significant correlations in the findings, it still did not allow for an argument to be made that a relationship was absent. Response efficacy has been supported to be positively associated with message acceptance and negatively associated with message rejection in empirical analysis (e.g. Tay & Watson, 2002; Witte, 1992). Also, response efficacy has been identified as a more important predictor of adaptive outcomes than the emotion of fear (e.g., Floyd, Prentice-Dunn, & Rogers, 2000; Tay & Watson, 2002; Witte & Allen, 2000).

An experiment conducted by Lewis, Watson, and White (2010) investigated the key affective and cognitive influences on message effectiveness not only for negative fear-based appeals but also for positive appeals based on the emotions of pride and humor. Particularly, the authors associated empirical evidence in the identification of response efficacy and emotion. The results found that greater levels of fear were associated with less message rejection; this significant direct fear effect on messages was mediated by response efficacy.

Another study by De Hoog, Stroebe, and De Wit (2007) meta-analyzed the impact of vulnerability and severity of a health risk on processing and acceptance of fear-arousing communications, especially on the impact of response efficacy. Specifically, evaluating the contribution of the stage model of fear-arousing communication processing with other fear appeal theories was conducted (Das, De Wit, & Stroebe, 2003). The stage model combined traditional fear appeal theories including the EPPM and dual process theories (e.g., Chaiken, 1980) to explain how cognitive processing affected persuasion in fear appeals. It investigated whether the severity of a risk determined if a person processes a message systematically or heuristically; depending on efficacy, individuals may arouse defense motivation or accuracy motivation. Rather than predicting severity by vulnerability interaction to impact behavioral intentions and behaviors, the results were consistent with the impact of severity and argument quality on attitudes that vulnerability severity and response efficacy impact behavioral intentions; yet it was not consistent with the EPPM's predicted threat by efficacy interaction influencing behavior that vulnerability and severity impact behaviors. This study offered valuable insight to the EPPM and other literature on fear appeals, by adding the variables of depth of processing, attitudes, behavioral intentions, and other moderators (Maloney et al., 2011).

According to EPPM, a successful fear appeal would be proposed for individuals to evaluate the threat and strive toward the path of danger control rather than being motivated passively by their emotions (Gore & Bracken, 2005; Witte, 1995). Based on this concept, scholars have applied EPPM as a framework to examine the risk information dissemination and effective sensation seeking on different individuals in various health communication scenarios. These scenarios include anti-smoking campaigns (Wong & Cappella, 2009), hearing protection for college students and farmers (Kotowski, Smith, Johnstone, & Pritt, 2008; Smith et al., 2008), HIV/AIDS prevention among undergraduate students and adolescents in North America and Singapore (Casey, Timmermann, Allen, Krahn, & Turkiewicz, 2009; Chib, Lwin, Lee, Ng, & Wong, 2010; Muthusamy, Levine, & Weber, 2009; Quick, Moriarty, & Battle-Fisher, 2008), hand washing (Botta, Dunker, Fenson-Hood, Maltarich, & McDonald, 2008), kidney disease for elderly people (Roberto & Goodall, 2009), influenza pandemic in North America and South Asia (Barnett et al., 2009; Prati, Pietrantoni, & Zani, 2011; Siu, 2010), kernicterus prevention (Russell, Smith, Novales, Lindsey, & Hanson, 2011), and stroke awareness (Davis, Martinelli, Braxton, Kutrovac, & Crocco, 2009), etc. These empirical studies further examined and provided support for EPPM.

A recent study conducted by Hong (2011) examined the role of health consciousness in processing TV news that contains potential health threats and preventive recommendations. The results confirmed three mediators (i.e., perceived severity, response efficacy, and self-efficacy) in the influence of health consciousness on message acceptance, with a negative association found between health consciousness and perceived susceptibility. Based on the widespread utility of fear appeals in health studies, and the strong evidence in support of efficacy in healthy

behavior persuasion (Witte & Allen, 2000), the EPPM will be employed in the current study to analyze how these concepts are useful in social media, specifically Twitter.

### Current Study

As outlined earlier, there are a large number of studies examining the role, use and functionality of EPPM in traditional media. However, there have been only a few studies examining efficacy and/or fear arousal in social media (e.g., Noar, Pierce, & Black, 2010; Roberto, Krieger, & Beam, 2009; Roberto, et al., 2007). Meanwhile, most of those social media studies focused on customized health message dissemination in new media platforms rather than investigating the EPPM framework on system-generated information cues of social media. One area where Twitter may be uniquely situated to facilitate the use of EPPM is through the social networking cues such as the number of retweets by a user on the user's timeline and the response efficacy perceptions by audiences. According to SIPT, people attempt to seek information through the cues implied within social media and other theoretical perspectives discussed above; therefore, it is worth examining whether Twitter could have potential efficacy effects similar to face-to-face interaction or traditional media interventions. SIPT contends that online users adapt their expressions of self and their relational cues primarily into language, as well as through other "native" online behaviors such as timing and typography (Walther & Parks, 2002). For instance, when people browse the Red Cross' profile page on Twitter for influenza pandemic news and preventions, they could perceive cognition and motivation from the real-time retweets or replies that the Red Cross has made.

Correspondent with the three information cues' perspectives by Tong, et al. (2008), social networking cues given by the environment could also be divided into

two types: identity claims and behavioral residue (Goffman, 1959; Gosling et al., 2002). Identity claims are controlled by a person, and classified as self-generated cues; while behavioral residue are past or anticipated behavior uninitiated by the target person, which can be regarded as other and system-generated cues. Other and system-generated cues echo with the target person, and may also shape audiences' perceptions about the person (Antheunis & Schouten, 2011; Walther et al., 2008). For example, when other users reply to a tweet by the Red Cross about the influenza prevention and say that it worked, that should give an audience viewing the page response efficacy. The originator of the retweet is making an identity claim, which the Red Cross retweets based on the behavior residue, unintentionally made on other-generated cues; therefore, when audiences view those retweets, they should produce more credibility than the original self-generated cues. However, the overload and discrete information in the medium environment would induce the adaption of information processing short cuts, which make people tend towards similar perceptions from various sources rather than reading specific messages.

In addition, Koh and Sundar (2010) found that participants showed greater trust in website, web agent, and product descriptions when exposed to a specialist web agent (e.g., the Red Cross Official website) than to a generalist Web agent (e.g., the BBC news website). Although Walther et al. (2009) investigated other-generated cues (i.e., friends' comments) and found that these cues affected the profile owner's attractiveness more than self-generated cues (i.e., profile owner's comments) on Facebook, people may perceive more warranting value from self-generated cues by the Red Cross than those from a personal or generalist webpage (Koh & Sundar, 2010; Walther & Park, 2002). As an authentic specialist source, the self-generated cues by the Red Cross might bolster the efficacy perceived from the other-generated cues. The

more retweets or replies about the influenza information that appears on the Red Cross timeline, the more cognition the audience might perceive. Moreover, according to the perceptual component of the third-person effect hypothesis, people tend to perceive mass media messages to have a greater impact on others than on themselves (Lo & Wei, 2002). Thus, response efficacy may be perceived more easily than self-efficacy not only on the traditional mass media, but when using social media as well. An assumption raised is that people might acquire response efficacy not only through the response shown on the timeline of the users' profile pages, but also through the number of retweets from the users. In order to investigate the dynamics between the cognition appeals, self and other-generated cues of Twitter, the following hypothesis is posed:

H: As the retweets or replies by the user increases, as shown on the timeline of the user's profile page, the perceivers' judgments about their response efficacy will increase as well.



## CHAPTER III

### METHODOLOGY

#### Design

In order to examine the relationship between the number of user's retweets or replies and the perceivers' judgments on response-efficacy, the current study conducted a quasi-experimental design to test a hypothesis by manipulating variables. A  $2 \times 2$  (threat appeal: high vs. low  $\times$  numbers of retweets / replies: present vs. absent) posttest-only experiment with a self-administration online survey was employed. The study used influenza scenarios to induce the viewers' threat perceptions; a news stories about a mild influenza was articulated for the low threat appeal, whereas a news story about severe and fatal influenza was articulated for the high threat appeal (see Appendix A and B). A mock Twitter profile page of Kaiser Permanente was created to represent the user's replies and retweets (see Appendix C and D); followed with an online questionnaire (see Appendix E). Participants in the study came from an available sample invited from the communication classes of universities in Michigan and West Virginia, in addition to social media recruitment and a snowball sample. Participants were randomly assigned to one of the conditions to finish the experiment. The survey software was set to reject multiple surveys taken from the same IP address to ensure the homogeneity of variance.

#### Participants and Procedures

Participants for the current study were recruited from students both at Western

Michigan University and West Virginia University in the summer semester of 2012, in addition to online recruitment. Participants were invited and instructed to a website designed for an online survey about influenza during communication classes (in exchange for extra course credit). Confidentiality was assured by data collection without identifying information. Participants first visited an independent portal page with information about this study and consented to participate. An automated algorithm randomly assigned them to read either of the two fictional news stories about the influenza at the beginning of the experiment.

The news stories were used to alert the reader of a new type of influenza, with the articulation of health problems caused by it. In order to improve authenticity and presence of the news stories, updated time stamps and the format of USA Today were presented. As the participants finish reading, they were randomly assigned to a mock Twitter profile page of Kaiser Permanente that either presents or lacks efficacy feedbacks about the influenza. Participants were instructed to take enough time to read the news stories and to examine the mock Twitter profile page “before continuing to the next page.” After viewing the mock Twitter page, participants were instructed to complete a questionnaire about their perception evaluation and demographic backgrounds. The entire study took approximately 15 minutes to complete.

#### Instrumentations

##### Stimulus Messages

The threat arousing messages was adapted from the 2009 H1N1 influenza news stories in USA Today, to prevent the prior knowledge engagement that might affect the message processing in the current study (Marcus, April 24, 2009). The news story was framed as an either mild or severe newly-created influenza pandemic. High-

and low-threat was identical in terms of the details of severity and susceptibility, such as the significance and magnitude of the influenza (e.g., the new influenza leads to death), and the risk of attack of the influenza (e.g., children in the Midwest are more vulnerable to get this influenza). The information in common between the two articles included the name of the influenza, the author, the date, and the layout, keeping non-relative details about threat consistent for both stories. The stories were created in the same online layout as USA Today. Story length ranged from 425 to 450 words.

### Independent Variables

Kaiser Permanente was chosen as the user of the mock profile page for direct feedback presences. As the largest managed care organization in the United States, Kaiser Permanente provides integrated health care and consulting services, which would bolster its self-generated cues in Twitter (“Kaiser Permanente”, March 23, 2012). Kaiser Permanente has branches in Cleveland, Ohio, which would echo the location in the fictional news stories; meanwhile, there is not a regional entity in Michigan or West Virginia, which would reduce the interference of the user’s credibility in the respondents’ information evaluations.

Two mock Twitter profile pages of Kaiser Permanente were constructed: one as the experimental group with user’s retweets or replies outlining response efficacy presented, and the other as the control group with user’s response efficacy feedbacks absent. There were twenty messages on the timeline of each of the Twitter pages. Both of the tweets’ content in the Twitter pages was standardized, with ten efficacy-presented and ten efficacy-absent messages in each page; these messages were evenly distributed. The differences between the two Twitter profile pages would be the form of the tweets: the experimental profile page contained ten direct feedbacks from Kaiser

Permanente (five retweets and five replies), all of which were efficacy messages; the control page would not contain any retweets or replies.

### Measures

After viewing the fictional news stories about influenza and the mock Twitter profile page of Kaiser Permanente, participants completed the posttest self-report online questionnaires. The questionnaires contained items inquiring about their perceived response efficacy, the perceived threats of the influenza, and their demographic categories. Witte's risk behavior diagnosis scale (RBD, Witte et al., 1996; Witte et al., 2001), a multi-dimensional risk behavior prediction scale, was adjusted to measure the scores for perceived threat and efficacy, which was needed for calculating discriminating values with regard to the influenza pandemic messages. The perceived efficacy was assessed using three items adapted from RBD, on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree): (1) the retweets and replies by the Kaiser Permanente work in preventing influenza; (2) the retweets and replies by the Kaiser Permanente work in deterring influenza; (3) the retweets and replies by the Kaiser Permanente are effective in getting rid of influenza. The perceived threat was assessed using another six items adapted from RBD, containing perceived susceptibility and severity, on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree): (1) I am at risk for getting the influenza; (2) It is possible that I will get the influenza; (3) I am susceptible to getting the influenza; (4) the influenza is harmful; (5) the influenza is a serious threat; (6) the influenza is a severe threat. Higher scores of perceived threat and response efficacy indicated greater perception from the higher number of relative feedback by the Kaiser Permanente. SPSS was employed in the data investigation. Both dependent and independent variables were interval, a 2

(threat appeal)  $\times$  2 (numbers of efficacy feedbacks) ANOVA would be conducted to investigate if there will be statistically significant difference in audiences' perceived efficacy among those four groups.

## CHAPTER IV

### RESULTS

A total of 219 usable responses were collected and analyzed. Across the four conditions, 64.4% of the respondents were females ( $N = 141$ ) and 34.7% were males ( $N = 76$ ). The average age of respondents, who ranged from 18 to 65 years old, was 26.73 ( $SD = 9.00$ ). The majority of respondents identified themselves as Caucasian (72.1%), followed by African-American (13.2%), Asian (5.5%), Latino (4.6%), and others (3.2%). Over half of the respondents had a college level education (57.1%). Respondents came from various socio-economic levels, with 21% reporting annual family income below \$20,000, 18.3% between \$50,001 and \$70,000, and 16.4% over \$100,000 (see Table 1).

The hypothesis predicted that the number of retweets or replies by the page owner would be positively associated with the perceiver's response efficacy. To investigate the hypothesis, a one-way ANOVA analysis was used to compare the interactions between the number of retweets or replies and the perceived response efficacy in all groups. This study had four conditions. Condition one was designed as a high-threat news message with retweets or replies absent; condition two was designed as a high-threat news message with retweets and replies present; condition three was designed as a low threat with retweets or replies absent, while condition four was designed as a low threat with retweets and replies present.

Table 1

*Demographic Characteristics of Participants*

	<i>N</i> (%)	<i>M</i>	<i>SD</i>
Sex			
Male	76 (34.7)		
Female	141 (64.4)		
Age (18-65)		26.73	9.00
Race			
Caucasian	158 (72.1)		
African-American	29 (13.2)		
Asian	12 (5.5)		
Latino	10 (4.6)		
Others	7 (3.2)		
Level of education			
High School	1 (.5)		
Some college	125 (57.1)		
College graduate	51 (23.3)		
Graduate school	40 (18.3)		
Income			
Under \$20,000	46 (21)		
\$20,001-\$30,000	31 (14.2)		
\$30,001-\$50,000	33 (15.1)		
\$50,001-\$70,000	40 (18.3)		
\$70,001-\$100,000	29 (13.2)		
Over \$100,000	36 (16.4)		
<i>N</i>	219		

Five items were adapted from Witte's Risk Behavior Diagnosis Scale (RBD) with a five-point Likert-type scale to measure the perceived response efficacy of the audiences. Alpha reliability of .87 indicated a highly reliable scale. Results suggest that

the increased number of retweets and replies did not motivate respondents to perceive more response efficacy in the influenza prevention;  $F(3, 213) = .317, n.s. I-\beta = .87$ , with condition one ( $M = 2.26, SD = 1.01$ ), condition two ( $M = 2.41, SD = 1.04$ ), condition three ( $M = 2.23, SD = 1.02$ ), and condition four ( $M = 2.29, SD = 1.07$ ). Results also indicated that the increased number of retweets and replies did not cause respondents to perceive more response efficacy in the deterrence of influenza,  $F(3, 212) = .437, n.s. I-\beta = .87$ , with condition one ( $M = 2.40, SD = .98$ ), condition two ( $M = 2.48, SD = 1.03$ ), condition three ( $M = 2.46, SD = 1.13$ ), and condition four ( $M = 2.27, SD = .94$ ). Results then indicated that the increased number of retweets and replies did not cause respondents to perceive more response efficacy in the cure of influenza,  $F(3, 211) = .302, n.s.$ , with condition one ( $M = 1.93, SD = .95$ ), condition two ( $M = 1.87, SD = .82$ ), condition three ( $M = 1.87, SD = .93$ ), and condition four ( $M = 2.02, SD = 1.04$ ). Results also indicated that the increased number of retweets and replies did not cause respondents to perceive more response efficacy in drinking vinegar for influenza prevention,  $F(3, 212) = .064, n.s.$ , with condition one ( $M = 1.93, SD = 1.04$ ), condition two ( $M = 1.86, SD = .90$ ), condition three ( $M = 1.90, SD = .93$ ), and condition four ( $M = 1.87, SD = 1.05$ ) showing similar means. Moreover, results indicated that the increased number of retweets and replies did not cause respondents to perceive more response efficacy from avoiding sweets for the cure of influenza,  $F(3, 212) = .775, n.s.$ , with condition one ( $M = 1.82, SD = 1.06$ ), condition two ( $M = 1.66, SD = .77$ ), condition three ( $M = 1.88, SD = .96$ ), and condition four ( $M = 1.92, SD = 1.06$ ). No significant relationship existed between the number of retweets or replies and the perceived response efficacy (see Table 2).

Further analysis found that the reliability of threat scales was strong (susceptibility scale,  $\alpha = .75$ ; severity scale,  $\alpha = .87$ ). No differences were posited



between four groups in audiences' susceptibility perceptions about the influenza news stories. An average score of overall susceptibility total from all three of the susceptibility items was created. It was measured by a one-way ANOVA,  $F(3, 213) = .169$ , *n.s.*, with condition one ( $M = 2.61$ ,  $SD = .72$ ), condition two ( $M = 2.50$ ,  $SD = .74$ ), condition three ( $M = 2.58$ ,  $SD = .87$ ), and condition four ( $M = 2.56$ ,  $SD = .97$ ). However, the four groups accounted for significant differences in audiences' perceived severity about the influenza, including the perception of harmfulness,  $F(3, 214) = 8.34$ ,  $p < .001$ , the perception as a serious threat,  $F(3, 213) = 4.28$ ,  $p < .01$ , and the perception as a severe threat,  $F(3, 213) = 3.11$ ,  $p < .05$ . The means followed for condition one ( $M = 3.72$ ,  $SD = 1.06$ ), condition two ( $M = 3.82$ ,  $SD = 1.07$ ), condition three ( $M = 3.10$ ,  $SD = 1.19$ ), and condition four ( $M = 2.96$ ,  $SD = 1.14$ ). The means for influenza to be considered a serious threat followed in condition one ( $M = 3.25$ ,  $SD = 1.24$ ), condition two ( $M = 3.02$ ,  $SD = 1.06$ ), condition three ( $M = 2.73$ ,  $SD = 1.08$ ), and condition four ( $M = 2.52$ ,  $SD = 1.16$ ). The mean scores for influenza to be considered as a severe threat were described within condition one ( $M = 2.74$ ,  $SD = 1.19$ ), condition two ( $M = 1.60$ ,  $SD = 1.01$ ), condition three ( $M = 2.36$ ,  $SD = 1.14$ ), and condition four ( $M = 2.12$ ,  $SD = 1.25$ ; see Table 2)

Table 2

*Response Efficacy and Threat Perceptions Under Four Conditions*

Items	<i>F</i>	<i>df</i>	<i>p</i>	Condition 1			Condition 2			Condition 3			Condition 4		
				<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Response Efficacy (RE)	.07	3	.974												
The tweets by Kaiser Permanente work in preventing influenza.	.32	3	.813	57	2.26	1.01	56	2.41	1.04	52	2.23	1.02	52	2.29	1.07
The tweets by Kaiser Permanente work in deterring influenza.	.44	3	.726	57	2.40	.98	56	2.48	1.03	52	2.46	1.13	51	2.27	.94
The tweets by Kaiser Permanente are effective in getting rid of influenza.	.30	3	.824	56	1.93	.95	55	1.87	.82	52	1.87	.93	52	2.02	1.04
The tweet about drinking vinegar will work in preventing influenza.	.06	3	.979	56	1.93	1.04	56	1.86	.90	52	1.90	.93	52	1.87	1.05
The tweets about avoiding sweets will work in getting rid of influenza.	.78	3	.509	56	1.82	1.06	56	1.66	.77	52	1.88	.96	52	1.92	1.06
Susceptibility (SUS)	.17	3	.917												
I am at risk for getting influenza.	.64	3	.593	58	2.29	.94	57	2.14	.85	52	2.35	.97	52	2.37	1.05
It is possible that I will get influenza.	.22	3	.886	58	2.91	1.05	57	2.84	1.05	51	2.80	1.10	52	2.75	1.22
I am susceptible to getting influenza.	.28	3	.843	58	2.64	.95	56	2.48	.89	52	2.62	1.05	52	2.56	1.07
Severity (SEV)	6.11***	3	.001												
The influenza is harmful.	8.34***	3	.000	58	3.72	1.06	57	3.82	1.07	51	3.10	1.19	52	2.96	1.14
The influenza is a serious threat.	4.28**	3	.006	57	3.25	1.24	57	3.02	1.06	51	2.73	1.08	52	2.52	1.16
The influenza is a severe threat.	3.11*	3	.027	58	2.74	1.19	57	2.60	1.02	50	2.36	1.14	52	2.12	1.25

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

## Post-hoc Analyses

To further examine the relationship of response efficacy, a series of t-tests were conducted to investigate whether the sex of the respondents played a role in promoting response efficacy. Results indicated that there were no differences between men ( $M = 2.41$ ,  $SD = 1.09$ ) and women ( $M = 2.24$ ,  $SD = 1.00$ ) in their beliefs that the tweets provided by Kaiser Permanente were effective in preventing the influenza,  $t(213) = 1.201 = n.s.$  There were no differences between men ( $M = 2.55$ ,  $SD = 1.06$ ) and women ( $M = 2.33$ ,  $SD = .99$ ) in their beliefs that the tweets were effective in deterring influenza,  $t(212) = 1.54 = n.s.$  There were no differences between men ( $M = 1.96$ ,  $SD = .97$ ) and women ( $M = 1.86$ ,  $SD = .99$ ) in their beliefs that the tweet about drinking vinegar would work in preventing influenza,  $t(212) = .739 = n.s.$  There were no differences between men ( $M = 1.97$ ,  $SD = 1.00$ ) and women ( $M = 1.74$ ,  $SD = .95$ ) in their beliefs that the tweets about avoiding sweets were effective in recovering from influenza,  $t(212) = 1.675 = n.s.$  However, results suggested a difference between men ( $M = 2.16$ ,  $SD = .99$ ) and women ( $M = 1.78$ ,  $SD = .86$ ) in their perceptions of response efficacy from the tweets about what that would work in recovering from influenza,  $t(211) = 2.95$ ,  $p < .01$  (see Table 4). Moreover, a difference of perceptions between men ( $M_{RE} = 2.21$ ,  $SD_{RE} = .80$ ;  $M_{SUS} = 2.41$ ,  $SD_{SUS} = .75$ ) and women ( $M_{RE} = 1.97$ ,  $SD_{RE} = .78$ ;  $M_{SUS} = 2.64$ ;  $SD_{SUS} = .85$ ) was shown in the total score of response efficacy items,  $t(208) = 2.117$ ,  $p < .05$ , as well as in the total score of influenza susceptibility items,  $t(213) = -1.938$ ,  $p < .05$ , while perceptions were insignificant regarding the influenza severity between men ( $M = 3.00$ ,  $SD = 1.06$ ) and women ( $M = 2.89$ ,  $SD = 1.04$ ),  $t(210) = .772 = n.s.$  (see Table 3).

Table 3

*Response Efficacy and Threat Perceptions by Sex*

Items	<i>t</i>	<i>df</i>	<i>p</i>	Male		Female	
				<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Response Efficacy (RE)	2.12*	208	.035	2.21	.80	1.97	.78
The tweets by Kaiser Permanente work in preventing influenza.	1.20	212	.231	2.41	1.09	2.24	1.00
The tweets by Kaiser Permanente work in deterring influenza.	1.54	212	.124	2.55	1.06	2.33	.99
The tweets by Kaiser Permanente are effective in getting rid of influenza.	2.95**	211	.004	2.16	.99	1.78	.86
The tweet about drinking vinegar will work in preventing influenza.	.74	212	.461	1.96	.97	1.86	.99
The tweets about avoiding sweets will work in getting rid of influenza.	1.68	212	.095	1.97	1.00	1.74	.95
Susceptibility (SUS)	-1.94*	213	.054	2.41	.75	2.64	.85
Severity (SEV)	.77	210	.441	3.00	1.06	2.88	1.04

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

Table 4

*Response Efficacy and Threat Perceptions by Race*

Items	<i>F</i>	<i>df</i>	Caucasian				Africa-American				Asian				Latino				Native-American				Others			
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Response Efficacy	1.68	5	1.98	.76	2.38	.87	2.20	.89	2.20	1.12	3.00	NA	1.80	.24												
The tweets by Kaiser Permanente work in preventing influenza.	1.11	5	2.24	1.01	2.66	1.11	2.33	1.07	2.11	1.36	3.00	.00	2.00	.71												
The tweets by Kaiser Permanente work in deterring influenza.	.66	5	2.35	1.00	2.66	1.08	2.42	1.08	2.22	1.30	3.00	.00	2.60	.89												
The tweets by Kaiser Permanente are effective in getting rid of influenza.	2.13	5	1.81	.88	2.36	1.10	2.08	.79	2.00	1.12	3.00	NA	2.00	.71												
The tweet about drinking vinegar will work in preventing influenza.	5.27***	5	1.75	.89	2.43	1.10	2.08	.90	2.22	1.09	4.00	1.41	1.40	.89												
The tweets about avoiding sweets will work in getting rid of influenza.	2.66*	5	1.73	.92	2.14	1.11	2.08	.90	2.44	1.24	2.00	1.41	1.00	.00												
Susceptibility	.41	5	2.57	.86	2.57	.81	2.33	.53	2.50	.63	3.17	.71	2.53	1.10												
Severity	2.70*	5	2.83	1.00	3.42	1.24	2.89	.82	2.53	.82	3.83	.71	3.67	1.25												

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

Table 5

*Response Efficacy and Threat Perceptions by Pre-Existing Experience*

Items	Awareness of KP						KP service experience						Dog ownership					
	Yes			No			Yes			No			Yes			No		
	<i>t</i>	<i>df</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>M</i>	<i>SD</i>
Response Efficacy	-.81	209	1.97	.86	2.08	.77	1.04	44	2.22	.91	1.90	.85	-1.39	207	2.01	.79	2.19	.80
The tweets by KP work in preventing influenza.	-.91	214	2.17	1.14	2.33	1.00	.39	44	2.30	1.16	2.14	1.15	-1.13	212	2.25	1.01	2.43	1.10
The tweets by KP work in deterring influenza.	-.92	213	2.28	1.13	2.44	.99	.37	44	2.40	1.08	2.25	1.16	-.56	211	2.38	1.03	2.47	.99
The tweets by KP are effective in getting rid of influenza.	-.77	212	1.83	1.02	1.95	.91	.26	44	1.90	1.20	1.81	.98	-1.33	210	1.86	.95	2.06	.86
The tweet about drinking vinegar will work in preventing influenza.	-.49	213	1.83	1.02	1.91	.97	1.70	44	2.30	.95	1.69	1.01	-1.70	211	1.83	.97	2.10	1.00
The tweets about avoiding sweets will work in getting rid of influenza.	-.63	213	1.74	.95	1.84	.98	1.77	44	2.20	1.03	1.61	.90	-1.65	211	1.76	.96	2.02	1.00
Susceptibility	-.69	214	2.49	.87	2.58	.81	-1.60	44	2.10	.97	2.59	.83	-.21	212	2.56	.85	2.58	.78
Severity	-1.48	211	2.71	1.17	2.97	1.01	.83	43	3.00	1.67	2.64	1.02	.24	209	2.94	1.11	2.90	.81

Note: \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ ; KP = Kaiser Permanente

Another series of one-way ANOVA was conducted to explore the role of race in perceiving the threat and response efficacy. Mixed results suggested that race directly interfered in the perceptions of the severity of the influenza,  $F(5, 205) = 2.701, p < .05$ , the beliefs of tweets about vinegar to prevent influenza,  $F(5, 207) = 5.270, p < .001$ , and the beliefs of tweets about avoiding sweets to get rid of influenza,  $F(5, 207) = 2.661, p < .05$ . Notwithstanding differences did not emerge for race for the totaled score of response efficacy items,  $F(5, 203) = 1.683, n.s.$ , or in the totaled score of susceptibility perceptions,  $F(5, 208) = .410, n.s.$  (see Table 4).

Moreover, further examinations were also conducted to investigate whether the preexisting experience would affect the perceptions of threat and response efficacy. T-tests indicated that there were no differences in whether people were aware of Kaiser Permanente on all of the perceptions: neither the perceived susceptibility,  $t(214) = -.692 = n.s.$ , the perceived severity,  $t(211) = -.1483 = n.s.$ , nor the perceived response efficacy,  $t(209) = -.808 = n.s.$  People never having heard of Kaiser Permanente perceived higher average scores in the perceptions ( $MSUS = 2.58$ ,  $SDSUS = .81$ ;  $MSEV = 2.97$ ,  $SDSEV = 1.01$ ;  $MRE = 2.08$ ,  $SDRE = .77$ ; see Table 5). Similar insignificant results in the perceptions of influenza message cues were also confirmed regarding the ownership of a dog. People who had experience with Kaiser Permanente reported higher means in the perceptions of response efficacy ( $M = 2.22$ ,  $SD = .91$ ) and the influenza severity ( $M = 3.00$ ;  $SD = 1.67$ ), while they reported lower means in the susceptibility ( $M = 2.10$ ,  $SD = .97$ ; see Table 5).

Table 6

*Response Efficacy and Threat Perceptions by Twitter Engagement*

Item	Twitter account ownership				Twitter Engagement			
	<i>t</i>	<i>df</i>	Yes	No	<i>t</i>	<i>df</i>	High	Low
			<i>M (SD)</i>				<i>M (SD)</i>	
Response Efficacy	.52	209	2.13 (.83)	1.98 (.50)	-1.77	96	1.99 (.69)	2.28 (.92)
The tweets by Kaiser Permanente work in preventing influenza.	.51	214	2.33 (1.08)	2.26 (.98)	-.42	99	2.30 (1.13)	2.39 (1.06)
The tweets by Kaiser Permanente work in detering influenza.	1.55	213	2.52 (1.08)	2.30 (.94)	-.46	98	2.48 (1.07)	2.58 (1.11)
The tweets by Kaiser Permanente are effective in getting rid of influenza.	.27	212	1.94 (.99)	1.90 (.89)	-1.45	98	1.80 (.91)	2.08 (1.04)
The tweet about drinking vinegar will work in preventing influenza.	2.22*	213	2.05 (1.03)	1.76 (.91)	-3.01**	99	1.74 (.83)	2.33 (1.13)
The tweets about avoiding sweets will work in getting rid of influenza.	1.06	213	1.90 (.96)	1.76 (.98)	-1.36	98	1.76 (.89)	2.02 (1.02)
Susceptibility	1.02	214	2.62 (.89)	2.51 (.77)	-.14	99	2.64 (.91)	2.62 (.87)
Severity	.71	211	1.57 (.50)	1.08 (1.02)	.34	98	3.01 (1.02)	2.94 (1.14)

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



Table 7

*Correlations between Response Efficacy Media Split and Behavioral Intention*

	<i>t</i>	<i>df</i>	Response Efficacy			
			High		Low	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Behavioral Intention	-2.96**	203	2.30	1.25	2.80	1.12
I would retweet or reply to Kaiser Permanente if I think the tweets work in deterring influenza.	-3.72***	205	2.14	1.38	2.81	1.22
I would retweet or reply to Kaiser Permanente if I think the tweets are effective in getting rid of influenza.	-2.39*	209	2.35	1.40	2.78	1.24
I would retweet or reply to Kaiser Permanente if I think I am able to use the tweets to prevent getting the influenza.	-2.15*	209	2.37	1.38	2.75	1.24
I would retweet or reply to Kaiser Permanente if I think the tweets are easy to use to prevent the influenza.	-2.16*	210	2.38	1.37	2.76	1.21
I would retweet or reply to Kaiser Permanente if I think using the tweets to prevent the influenza is convenient.	-2.65**	210	2.35	1.38	2.81	1.12

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

Table 8

Correlation between Media Splits of Response Efficacy and Threat Perceptions

Item	Susceptibility				Severity			
	<i>t</i>	<i>df</i>	High	Low	<i>t</i>	<i>df</i>	High	Low
			<i>M (SD)</i>				<i>M (SD)</i>	
Response Efficacy	-2.01*	182	1.95 (.76)	2.19 (.84)	-3.52***	205	1.85 (.74)	2.22 (.78)
The tweets by Kaiser Permanente work in preventing influenza.	-1.59	186	2.20 (1.01)	2.44 (1.05)	-2.68**	210	2.08 (.97)	2.46 (1.04)
The tweets by Kaiser Permanente work in detering influenza.	-1.60	185	2.33 (1.02)	2.57 (1.01)	-3.25***	209	2.16 (.93)	2.60 (1.03)
The tweets by Kaiser Permanente are effective in getting rid of influenza.	-.57	184	1.87 (.95)	1.95 (.92)	-3.63***	208	1.67 (.84)	2.11 (.93)
The tweet about drinking vinegar will work in preventing influenza.	-3.01**	185	1.68 (.87)	2.11 (1.06)	-3.34***	209	1.65 (.89)	2.09 (1.01)
The tweets about avoiding sweets will work in getting rid of influenza.	-1.14	186	1.73 (.92)	1.89 (1.03)	-1.91	209	1.68 (.94)	1.93 (.98)

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

In addition, Twitter use was taken into account for the response efficacy promotion. A t-test indicated that there was no difference between people with a Twitter account ( $M = 2.13$ ,  $SD = .83$ ) and those without an account ( $M = 1.98$ ,  $SD = .76$ ) in the perceptions of total efficacy,  $t(209) = 1.372 = n.s.$ , while significant

differences were found in the specific beliefs of tweets about drinking vinegar for influenza prevention,  $t(213) = 2.215, p < .028$  (see Table 6). Five items of user engagement on Twitter were adjusted from a five-point Likert scale for Facebook Intensity (Ellison, Steinfield, & Lampe, 2007), ranging from 1 (“strongly disagree”) to 5 (“strongly agree”; i.e., “Twitter is part of my everyday activity,” “I am proud to tell people I’m on Twitter,” “I commit part of my daily schedule to Twitter,” “I feel out of touch when I haven’t logged onto Twitter in a while,” “I feel out of date when I haven’t logged onto Twitter in a while.”). Five other items of behavioral intention on Twitter were adjusted from RBD with a five-point Likert scale to test the Twitter behavioral intentions about efficacy (e.g., “I would retweet or reply to Kaiser Permanente if I think the tweets work in deterring influenza,” etc.).

Median splits (*MDs*: Twitter engagement = 2.60; response efficacy = 2.00; susceptibility = 2.67; severity = 3.00) were then used to dichotomize participants into the high/low categories. Individuals with high Twitter engagement ( $M = 2.33, SD = 1.13$ ) and those with low engagement ( $M = 1.74, SD = .83$ ) only yielded differences in the beliefs of the tweets about drinking vinegar,  $t(99) = -3.013, p < .01$  (see Table 6). Individuals with higher efficacy perception ( $M = 1.58; SD = .50$ ) posited significant differences in the perception level of behavioral intentions on Twitter,  $t(203) = -.2.96, p < .01$  (see Table 7). Consistent with the results mentioned above, individuals believing in higher susceptibility ( $M = 1.95, SD = .76$ ) and severity ( $M = 1.85, SD = .74$ ) would perceive lower response efficacy,  $t_{SUS}(182) = -2.01, p < .05$ ,  $t_{SEV}(205) = -.3.52, p < .001$ . However, despite the results in the perceptions of the totaled response efficacy, high ( $M = 1.68, SD = .87$ ) and low susceptibility ( $M = 2.11, SD = 1.06$ ) only work differently in the beliefs of the tweets about drinking vinegar,  $t(185) = -3.01, p < .01$  (see Table 8).

## CHAPTER V

### DISCUSSION

Previous studies have suggested that individuals rely more on media than on their health- care providers for health information (Clarke, 2004; Clarke & Everest, 2006; Gibson, 2007; Jensen, 2008). It is estimated that over two billion worldwide users turn to social media, with 78% of the population in America, 58% in Europe, and 11% in Africa (Pew, 2010; Yin, 2010; Miniwatts, 2011). Social networking has soared to become a primary source of health information (Cotton & Gupta, 2004; Dutta-Bergman, 2005). Cancer victims were reported to be more likely to look for cancer information online than through other media outlets (Tian & Robinson, 2008). Social media have dramatically improved the prospects in the global fight against sustained influenza pandemics and grand-scale environmental disasters. The issue of how to better utilize the technology of social media, and to frame the health message for effective cognition processing, still looms.

As a first step in the process of developing such targeted messages, this study sought to replicate and extend the accuracy and adherence to theoretical concepts of the EPPM. Specifically, the current study explored the assumptions of EPPM pertaining to the processing of other- and system-generated information cues in social media. Rather than focusing on the influence of message content, the current study attempted to go a step further to predict the effect of an interaction upon media functions. It was hypothesized that as the retweets or replies by the user increased, as shown on the timeline of the user's twitter page, the perceivers' judgments about their response efficacy would increase as well, but the results did not support the prediction;

there were no significant differences in perceived response efficacy under any of the four conditions. Theoretically consistent with Witte (1992), this study emphasized the importance of perceived threat for response efficacy perceptions: Without respondents' perceptions to both severity and susceptibility, response efficacy would not be significantly aroused. System cues on social media would be irrelevant in a way similar to the content of the given messages when the perceptions to a threat failed to occur. Yet consistent with the EPPM construction, results suggested several theoretical implications.

First, there would be further message processing even when the threat was low. On the contrary, Witte (1992) suggested that when the perceived threat was low, there would be no further message processing. Previous studies have broadly investigated the variations of cognition and behavior with regard to change in threat message processing (eWitte, Berkowitz, Cameron, & McKeon, 1998; Wong & Cappella, 2009). For instance, Wong and Cappella's (2009) study on the effects of smoking cessation intentions found that smokers perceived no differences in the level of message efficacy when the threat was low. At first glance, the current results seemed to support Witte (1992) in that individuals who perceived the threat as low did not vary in the perceived level of cognitions or behaviors, yet the lack of cognitional changes could also be accounted for if the individuals deemed the threat so low that change was unnecessary. The results showed that respondents under all four conditions perceived significant differences in severity, although neither the susceptibility nor the following response efficacy were perceived. Individuals who regarded themselves as invulnerable would perceive the recommendations about

influenza prevention in a more rational and systematic way, rather than a more subjective and emotional manner.

Although fear perceptions were similar under the four conditions, some post-hoc results indicated the response efficacy in some retweets was successfully perceived among some population groups (e.g., male respondents and African Americans). According to the Health Belief Model (HBM)(Janz & Becker, 1984; Rosenstock, 1974), trigger decisions for preventive health behavior is not only influenced by the perceived susceptibility to a severe health threat but also by the perceived barriers and benefits related to the recommended response performance (Witte et al., 2001). Thus it can be speculated that the respondents in the current study may also compare the benefits of follow the recommended retweets against the barriers to those tweets. Those barriers for respondents' perceptions may include the consciousness the being manipulated by the messages, the credibility suspicion of the tweets, or the contradicted expectations against the retweets. Thus it can also be inferred that the respondents did not adopt the response efficacy depending on the strength of the barriers.

Corresponding evidence could be suggested in Das et al. (2003), who measured threat perception in two separate modes: severity and susceptibility. Cognitions about the threat and efficacy may not cause attitude, intention, or behavior changes. Taking the changes in the following attitudes, intentions, or behaviors as indicators into account may not fully articulate the threat appeal procedures. EPPM

suggests measuring outcomes, such as defensive avoidance, denial, or reactance, which are those other than attitude, intention, and behavior changes (Witte, Meyer, & Martell, 2001). However, such emotional regulation reactions have yet to be measured under the RBD scale. Future studies could take the total message-relevant cognition variations, the different levels of depth in threat appeal, and modes of message processing into consideration as the measurement.

Second, the current study revealed that the perceived response efficacy would be more associated with the perceived susceptibility than the perceived severity. Individuals who felt a low susceptibility to influenza did not perceive the response efficacy from the tweets, although high influenza severity was perceived. Respondents might be predominantly driven by pertinence or reliability concerns in formulating their argumentation judgment, e.g., the likelihood for individuals to contract the dog influenza, the relevance of the retweet content for individuals who defend the influenza, or whether the influenza news was trustful, etc. (Chaiken, 1980). Petty and Cacioppo (1979) suggested that issue involvement could affect persuasion by enhancing message-relevant cognitive responses; high issue involvement enhances thinking about the content of a persuasive communication, while low issue involvement or response involvement decreases message acceptance. The results suggested that individuals reduced issue involvement or response involvement in low-susceptibility perception, leading toward the heuristic rather than the systematic processing. Such heuristic processing invalidated the recipients' incentive to perceive the recommended message as effective, which deemphasized both the information

severity and the following response efficacy perception. The results were consistent with previous studies conducted by Das et al. (2003), taking vulnerability into account as a major attitude determinant on persuasion.

Moreover, it would be possible that an individual who felt highly susceptible to an issue that he or she also found quite severe would have a stronger response efficacy than an individual who felt insusceptible. In other words, unless an individual perceives himself or herself as susceptible to influenza, it may not matter how severe he or she feels about it. Therefore, the concept of susceptibility in threat appeals may be a stronger indicator for response efficacy in EPPM than the concept of severity. The current study indicates that the perceived susceptibility caused response efficacy to be perceived more directly than perceived severity in the threat appeal processing. Protective actions would be much more likely if the perceived susceptibility was higher. This assumption needs further investigation. For instance, susceptibility appeals could be used as an issue-involvement filter in the threat message design to examine whether respondents would enhance the perceived efficacy and behavior intentions.

Another theoretical concept rooted in the User and Gratification approach, the need for orientation (NFO) (McCombs & Weaver, 1973; Weaver, 1977, 1980), may explain the correlational differences in how individual groups process the threat arousal. According to NFO, relevance and uncertainty are key contingent conditions in defining divergent individual engagement in information seeking. These two conditions could also predict the tendency of individuals to react to emotionally appealing



messages (Weaver, 1980; McCombs & Weaver, 1985). Weaver (1977, 1980) demonstrated that high relevance and uncertainty evoke high NFOs, while active information-seeking processes caused by a high NFO would increase the susceptibility to agenda-setting effects. Individuals would be influenced by the message if the issue being discussed was relevant and individuals' positions on this issue were ambiguous; correspondingly, individuals would be more likely to perceive response efficacy. Specifically, relevance was suggested to be the initial defining indicator of an audience requiring NFO (Chernov, Valenzuela, & McCombs, 2011; Matthes, 2005). Both the influenza news article and the Twitter profile page in the current study attempted to create a desire for threat-orienting cues and background information. When perceived relevance to the influenza pandemic (i.e., susceptibility) was low, as shown in the results, individuals would feel little or no need for orientation. This reaction suppressed their motivation to perceive response efficacy. The higher the NFOs of individuals, the more likely they would participate in the media agenda (Chernov et al., 2011). The result of one post-hoc analysis showed significant negative relationships between the respondents' perceived response efficacy and their post-behavior intentions on Twitter. Low NFOs may also have contributed to this result.

Third, post-hoc analysis examined potential moderating influences that may impact perceptions of EPPM on Twitter. In these studies, five demographic characteristics were explored: sex, race, Twitter engagement, preexisting experiences about Kaiser Permanente and dog ownership. Over all, the post-hoc results confirmed Witte et al.'s (2001) suggestion that, according to EPPM, individual differences do not

directly influence outcomes (e.g., attitudes, intentions, behaviors, reactance, etc.), as mediated only by influencing perceptions of threat and efficacy. Only part of these sets of analyses revealed significant differences, especially in sex and race. Both men and women perceived the influenza pandemic with similar severity. Men perceived higher response efficacy than women, especially in the belief that tweets could aid them in combating the influenza threat, yet women perceived a higher susceptibility of infection from the disease than men.

The progress of explaining sex and race differences in perceived threat and efficacy has been slow, and few studies have examined how perceptual differences in EPPM are related to individual characteristics. These findings dovetail with the suggestion that risks tend to be judged lower by men than by women (Brody, 1984; Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000; Flynn, Slovic, & Mertz, 1994; Gutteling & Wiegman, 1993; Steger & Witt, 1989). Together with the evidence from several studies on sex differences in perceptions of risk-taking behaviors (eDeJoy, 1992; Okonkwo, Wadley, Crowe, Roenker, & Ball, 2007; Rhodes & Pivik, 2010), these studies also indicated that men were more optimistic and confident in personal driving skills than women. Perceived risk in driving was higher for female drivers than male drivers. Similar results were also found in the studies on alcohol, condom, and drug use (Newcomb, Clerkin, & Mustanski, 2011). In addition, Gardner and Gould (1989) suggested that the discrepancies in risk perception between men and women may not reflect rational and educational differences. The biased risk perceptions correspond with Flynn et al.'s (1994) study that examined the percentage of high-risk

responses. All 25 hazards in the study were perceived greater for women than men.

One possible explanation regarding the sex differences focused on the propensity of men to engage risk-taking and sensation-seeking behaviors (Zuckerman, 1979). Both men and women perceived similar severe conditions. However, previous studies suggested that men were more involved in creating, controlling, and benefiting from technology (Finucane et al., 2000). Men may focus more on the benefits from the high sensation-seeking behaviors (Dretsch & Tipples, 2011). Meanwhile, the incentives for the benefits motivate men to build up their belief in controlling risks. Conversely, women may focus more on the losses than the gains from the risks, show more awareness and understanding of their own and others' emotions, and be more concerned about the threats to family members and others compared to men (Brody & Hall 1993, Ciarrochi et al. 2005; Joseph & Newman 2010; McClure, 2000). Such attention to and engagement with negative emotions may become maladaptive in the form of a ruminative focus on emotions (Barrett et al. 2000; Zahn-Waxler, Shirtcliff, & Marceau, 2008). The findings also confirmed sex differences in tendencies to use a wide range of specific emotional regulation strategies (Nolen-Hoeksema, 2012; Nolen-Hoeksema & Aldao, 2011). Women were reported to engage in rumination compared to men. This tendency significantly mediates women's greater levels of depression and anxiety. In turn, men are more likely to engage in impulsive, reward-seeking behaviors in response to negative emotions (Nolen-Hoeksema, 2012). The current findings surrounding sex are consistent with a growing body of research (Lindsay, 2005; Morrison, 2005, etc.) that suggests that rather than typically focusing on a personal

levels of threat and efficacy, EPPM may also suggest that the perceived efficacy could be effectively motivated from the threat perceived to others instead of to themselves. In addition, the findings may also be related to the levels of decision power in coping with threats or to their loss in a threat (Bord & O'Connor, 1997).

The impact of race on threat perceptions was also investigated. One limitation of the race analysis was that the number of analyses in each group became small, as groups of the study were divided into various categories. The inadequate number of the divided categories, especially in the sample population of Native Americans, reduced its power to detect significant differences (Lipsey & Wilson, 2001). However, the analysis on race did suggest that susceptibility was perceived no differently among the ethnic groups. High perception for response efficacy and susceptibility was found in African Americans. The results were consistent with Spence et al.'s (2007) study that indicated that African Americans were more likely to engage in information seeking than other ethnic groups. Additionally, Caucasians perceived lower response efficacy but higher threat by comparison, which was possibly due to the stimulus. Flynn et al. (1994) also suggested that the role of sex and race in perceived risk may be influenced by sociopolitical factors.

The pre-existing experiences about Kaiser Permanente and dog ownership, as well as Twitter engagement, were also examined. The analyses revealed little significant difference. However, the findings suggested that response efficacy and severity were perceived lower for the individuals who knew of but hadn't visited

Kaiser Permanente, while susceptibility was perceived lower for the individuals who had visited Kaiser Permanente. Those systematic biases suggested that appropriate message association needs to be designed for the enhancement of brand preference toward Kaiser Permanente. On the other side, people who have owned dogs perceived lower response efficacy and susceptibility but higher severity in comparison to people who had not owned dogs, which may echo the viewpoint discussed above that perceived susceptibility more directly affected response efficacy perceptions. In other words, people recognized the severity yet denied the susceptibility to the influenza pandemic. Gilovich and Medvec (1995) suggested that people experienced more regret for acts of commission than acts of omission. The affection and emotional attachment to a dog may increase the prevalence of the act of denial and omission. The low perception of susceptibility and response efficacy may have derived more anticipated pleasure for people who owned dogs, which possibly coincided with the emotional attachment to pets.

According to U&G and NFO approaches, people with high NFOs are more inclined to engage in information dissemination and gratification-seeking behaviors than people with low NFOs (McCombs & Reynolds, 2002). Thus the interferences of Twitter engagement in the threat perception were thought to reflect the positive correlations between the Twitter engagement and the perceived response efficacy. However, the findings suggested that engagement played a lesser role than previous thought. Subjects with less active Twitter accounts perceived higher response efficacy, susceptibility, and severity. It highlighted the concerns of Twitter users regarding

misinformation, which may also reflect a need, by Twitter, for more regulation and management. Cheng et al. (2009) indicated that 75% of activities on Twitter were accounted for by 5% of users. Highly engaged users may be better equipped to avoid spam; the anticipated uncertainty and suspicion of these users would possibly impact the learning process for response efficacy. The findings might suggest that engagement alone is not an appropriate indicator of the threat perceptions of Twitter users.

Alternatively, an appropriate amount of exposure to response efficacy tweets, as few as two or greater than ten exposures, for example, may push threat perceptions to their peak. Moreover, the tweets about drinking vinegar to prevent influenza resulted in significantly high response efficacy for the respondents with less active Twitter accounts. This indicates that people more readily accept informative tweets rather than affective tweets and may suggest a message design direction for the future (Wu, Hofman, Mason, & Watts, 2011). According to the knowledge gap hypothesis (Tichenor, Donohue, & Olien, 1970), with unequal access to the media, different segments of populations with different socio-economic statuses process information differently. People who use social media for entertainment purposes would perceive a stimulus differently than people who use it for informative purposes. The findings may reflect gap-widening effects exacerbated by Twitter.

### Limitations

The current study had several drawbacks. One of the most pressing would be the emotion induction deficits as the perceived barriers to recommended responses in

message manipulation. Witte et al. (2001) indicated that perceived barriers are the converse of high self-efficacy. The current study speculated that those perceived barriers — emotion induction deficits — seem to be the explanatory variable for low response efficacy perceptions. Across studies using HBM, the question of whether individuals engage in health-protective behaviors has been most strongly predicted by perceived barriers, followed by perceived susceptibility; in turn, perceived severity was the weakest predictor. Thus, it is important to access those perceived barriers to response efficacy retweets. One improvement for the actual content and words in the experimental manipulation could be made based on the exemplification theory (Zillmann, 1999, 2006).

According to exemplification theory, exemplars tend to have a prevalent influence on how message recipients make overall judgments about the world and/or themselves (Gibson et al., 2011; Zillmann, 2006). People tend to use heuristics as cognitive shortcuts to process information, taking exemplified properties from concrete personal experiences, as well as repetitive and easily recalled information. Based on availability and representativeness of the heuristic mechanism, the greater the ease of information retrieval, the more it weights in people's generalizing. Gibson et al., (2011) found that affect-influence assessments are more salient in individuals with low numeric ability who would base their perceptual and dispositional judgments more on exemplars than on impersonal quantitative specifications characteristic of statistical analyses. In retrospect, news messages about influenza in two levels of threat contained only base rates, contrary to any exemplars. The insufficiency of exemplars

may solicit low susceptibility perceptions, while low susceptibility, as discussed above, may lead to low beliefs in response efficacy on the Twitter profile page.

To move individuals from the threat perceived stage to the efficacy belief stage, messages need to be motivational in nature. Response efficacy could be regarded as outcome expectations in fear appeals (Bonnarkidd, 2006; Witte et al., 2001). To target those outcome expectations for threat appeals, those expectations should be significantly related to the flu prevention intention (Hornik & Woolf, 1999). Meanwhile, it should be possible to develop an empirically supported argument based on the expectations (Hornik & Woolf, 1999; Fishbein & Cappella, 2006). Such empirical supports in the retweet content could include succinct literature or statistics. Another strategy used for further improvement would be priming, which attempts to increase the accessibility of specific beliefs for efficacy perceptions. Fishbein and Cappella (2006) suggested that priming could utilize existing beliefs, attitudes, or perceived norms. Images or video tracks with efficacy belief features could also be implemented to increase both the attention to and liking of tweets, as well as physiological and emotional arousal.

In addition, the current health topic may limit the results. The findings suggested that respondents in different groups perceived insignificant differences in susceptibility and response efficacy. This may lead to speculation that the dog influenza, given its novelty, might not be an appropriate topic for high-threat inducement in this study. The news message, by prompting respondents to rationally



learn about the new influenza pandemic while emotionally perceiving the threats from a short news report, may impact the individuals' cognition processes. An alternative to this would be to choose a well-known disease topic that is highly relevant to participants' daily lives. An additional topic should also be explored in terms of chronic threats facing numerous and varied target populations. Gonorrhea, heart attack, or obesity, for example, could be taken into consideration as threat arousals for further studies. A strong experimental manipulation of threat messages could be unequivocally judged among different conditions, which would consolidate the external validity of the study, as well as the construct validity of the assumptions in EPPM, SIPT, and U&G. Thus, it is believed that under a strong message manipulation, the current hypothesis could still be supported.

The study coincidentally retested Witte and Allen's (2000) additive model that explored "the effect of threat and efficacy as separate and independent" (p. 599). However, the pattern of means in greater levels showed no significant differences compared to those in lower levels (i.e., high threat/high efficacy, low threat/high efficacy, high threat/low efficacy, and low threat/low efficacy). The cognitional perception may be diluted by the message induction deficiencies as previously discussed. In other words, messages in the study successfully induced respondents to perceive the severity of the influenza pandemic yet failed to elicit their perceived susceptibility during the threat processing; this might suppress the response efficacy perception at the following stage. The manipulation also manifested in the post-hoc results. For instance, the behavioral intention on Twitter was strongly negatively

correlated with the perceived response efficacy, which contradicted the concepts of EPPM and violated a generally held knowledge in social science. To induce stronger observable reactions under different conditions, future study design could improve priming threat effects on respondents in several ways. This could include the extension of exposure to both threat and efficacy messages, as well as repetition of news messages and efficacy retweets.

Another limitation concerns the sample used in the study. The sample mostly relied upon convenient samples of college students; its findings may not be generalizable to a broader population of health information consumers. More studies are needed to determine whether the results are replicable with a more diverse subject pool. The analysis of such a small sample resulted in significantly high threat perception, which increased the chances of a Type 1 error in interpreting the data. A greater sample size of this population should be collected in future studies to provide the necessary level of power for the data.

### Applied Implications

Given the limitations in the manipulations discussed above, the current study resulted in little significant data. However, contrary to addressing the success factors leading people to form health-related intentions toward actions, the analyses indicated several drawbacks affecting fear arousal. This could provide practical application for further experimental manipulations in future studies. Combined with theoretical approaches pertinent to message effects, the results suggested the importance of the

relevance for threat perception in risk topics. It also alerts researchers to the necessity for EPPM application based on new technologies. Given the information overload on social media, as well as the requirement of specific health literacy for individuals, the online health messages tend to be processed peripherally. One area that needs to be explored further is how to deploy the peripheral cues, such as other- or system-generated information cues for practical application. The study also suggested some possible social media functions that health-care institutions could employ for audience emotional regulations in a hazard.

The news reports for threat arousal were modified from a news message for the 2009 outbreak of the H1N1 influenza virus. The results may coincide in some degree with the audiences' attitude toward the H1N1 pandemic at its very beginning. Considering the high uncertainty during that time, the media and health institutions did not raise people's attention and motivation to prepare to respond to the severe influenza pandemic, which needs to be better promoted for any similarly sustained and threatening public health emergency in the future.

#### Future Directions

Witte (1998) described the relationship between severity and susceptibility in an additive manner. The current study indicated that in such a manner, given the weak manipulation, respondents only perceived threats as severe, which was at an initial stage for threat perceptions. Despite the limitations, the present study suggests several prospects for future research. It is worth noting that individuals might be

processing other cognitional changes when a threat is perceived to be low. Future studies could employ cognitional indicators, other than attitude, to explore the following perceptions in efficacy arousal. In addition, susceptibility and severity could be investigated separately to further differentiate the functions between these two threat components.

It was hypothesized that the system-generated and other-generated cues would affect the response efficacy perception. A significant need to make the efficacy information more available and useful in social media was revealed. Future studies focusing on the threat arousal with the information external to the message content are necessary. Based on heuristic processing, new implications for better application of the functions of social media, along with tailored health messages, await exploration. The functional message cues, not only in the number of retweets but also in the user avatars, would be the indicators to guide the individual's decision-making process. Meanwhile, self-efficacy may be affected by external functional cues in social media.

To be consumer centered, health information must be developed from the outset to meet the needs and suit the environment and culture of the consumer (Andreasen, 2002). Future studies could try to analyze the entire categories of demographic segmentation variables (e.g., geography, income). A regression analysis could be employed to explore the combination impacts from various demographics. Besides the reliance on the self-report measures, further studies could try to conduct focus groups to further investigate the attribution or interpretation of something deep,

meaningful, and stable about the perception divergence. In general, as an exception to the pattern of findings in EPPM, the current study encouraged more examination on EPPM under different media circumstances, making this theory more accurate for a health-risk message model.

### Conclusion

The study attempted to examine the threat appeal perceptions of EPPM on both system-generated and other-generated message cues in social media. The results did not support the notion that the systematic cues would elicit the response efficacy perceptions. Given the emotion induction deficits in the message manipulation, it could be argued from another angle that the system-generated cues would be affected in a way similar to message contents in the perceptions of response efficacy. Like Witte (1992), this study emphasized the importance of perceived severity and susceptibility for response efficacy perceptions. Moreover, there would be further message processing even when the threat was perceived to be low. The perception of response efficacy was suggested to be more involved with the perceived susceptibility than the perceived severity. A balance of threat and efficacy messages should be sought to positively affect health attitudes and behaviors. However, given the threat-induction deficits in manipulation, the assumptions based on the results might not support the generalization, which could be criticized for lacking predictive power. There is a pressing need for further studies to improve the current limitations in the message manipulation and sample. More studies need to reexamine the current hypothesis—testing the correlations between the cognitional perceptions and system-generated

cues—to better tailor health messages in social media. This investigation identified the possibility that there are a number of message cues on social media that may affect the cognitive perceptions.

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Appendix A  
HSIRB Approval

## WESTERN MICHIGAN UNIVERSITY



Human Subjects Institutional Review Board

Date: May 8, 2012

To: Patric Spence, Principal Investigator  
Xialing Lin, Student Investigator for thesis

From: Amy Naugle, Ph.D., Chair

A handwritten signature in cursive script, reading "Amy Naugle".

Re: HSIRB Project Number 12-05-08

This letter will serve as confirmation that your research project titled "Health Message Cues on Social Media and Efficacy Perception" has been **approved** under the **exempt** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study."*** Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

**Reapproval of the project is required if it extends beyond the termination date stated below.**

The Board wishes you success in the pursuit of your research goals.

**Approval Termination: May 8, 2013**

Wahwood Hall, Kalamazoo, MI 49008-5456  
PHONE: (269) 387-8293 FAX: (269) 387-8276

Appendix B  
Online Survey Instruction



## WESTERN MICHIGAN UNIVERSITY

**Title of Study:** Health Message Perception on Social Media

**Principal Investigator:** Dr. Patric Spence. **Student Investigator:** Xialing Lin

You have been invited to participate in a research project titled "Health Message Cues on Social Media and Efficacy Perception." This consent document will explain the purpose of this research project and will go over all of the time commitments. Please read this consent form carefully and completely and please ask any questions if you need more clarification

### **Purpose:**

The purpose of this study is to investigate how health message cues influence individual's cognition and emotional perceptions on social media.

### **Study Procedures**

To participate in this study you will be asked to read about two pages of health messages and then to fill out an online survey. You may omit any questions without penalty. This study will take approximately 15 minutes to complete.

### **Benefits**

As a participant in this research study, there will be no direct benefit for you; however, information from this study may benefit other people now or in the future.

### **Risks**

There are no known risks at this time to participation in this study. Your anonymity is guaranteed.

### **Costs**

There will be no costs to you for participation in this research study.

### **Compensation**

You will not be paid for taking part in this study; however, you may receive a nominal amount of extra credit. At the conclusion of their survey, you will be re-directed to a new webpage to enter your name for credit. Including a link to a new webpage with a separate survey for participant names ensures that your response remains anonymous.

### **Confidentiality**

You will not be identified by participating in this study. Surveys will be collected without identifying information

Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with Western Michigan University or its affiliates.

**Questions:**

Should you have any questions prior to or during the study, you can contact the primary investigator, Dr. Patric Spence at 269-387-5369 or [patric.spence@wmich.edu](mailto:patric.spence@wmich.edu). You may also contact the Chair, Human Subjects Institutional Review Board at 269-387-8293 or the Vice President for Research at 269-387-8298 if questions arise during the course of the study.

This consent has been approved by the Western Michigan University Human Subjects Institutional Review Board (HSIRB) on 5/8/2012. Do not participate after 9/1/2012.

By Clicking on the "Continue" button below, you consent to participate in this research study.



Appendix C  
Influenza Pandemic News Reports I



"She's absolutely hilarious."  
—Chicago Sun-Times

Jen Lancaster  
IF YOU  
WERE HERE



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to get started

## Never-seen-before dog flu infects 11 people in Ohio

By Mary Brophy Marcus, USA TODAY

Updated 28m ago

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OHIO — Federal health officials announced a new strain of dog flu that has infected eleven people in Ohio, causing five deaths already.

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During a news briefing this morning, Centers for Disease Control and Prevention officials announced that in addition to initial cases of dog flu reported earlier this week in four Ohio children and elderly people in neighboring counties, seven more cases have been confirmed by CDC labs.

Eleven of the people affected are from Northern Ohio and three live in Cleveland. The sick range in age from 9 to 54. The four early confirmed patients were dead by yesterday, another one was dead this morning. All of the rest patients required hospitalization.

"So far, this is a very severe case of influenza," says Anne Schuchat, director of the National Center for

Immunization and Respiratory Diseases at the CDC.

Incidence of clinical features for fast, high fever, body muscle, bone and joint pain, extreme fatigue, some patients have respiratory congestion, lung infections, bleeding tendency, and lymph nodes. Schuchat says.

It's still unclear how the bug is spreading.

We don't know exactly how people got the virus. Five patients had no direct contact with dogs," says Schuchat, though it appears to be transmitted through human-to-human contact.

She says health officials anticipate cases will mount in the coming weeks because of increased surveillance and testing by Ohio health officials, and the CDC.

What is also unknown is whether the current flu vaccine offers any protection against this form of the virus, Schuchat says.

Dog flu, while common in dogs, usually only causes mild disease in children. There have been about a dozen cases since 2005, but almost all were contact with dogs.

However, so far the possibility of causing both severe illness and local outbreak has been alarmed.

What makes these cases unusual is that this dog flu strain has never been seen before.

In fact, Nancy Cox, director of CDC's influenza division, says the bug carries a combination of genetic segments from five different viruses.

U.S. and global health officials have long been concerned about the appearance of a new flu strain that spreads easily among humans, causing a flu pandemic.

"I think it's one of those moments that we all truly hate in public health. We don't know what will happen yet. It could have long-term health concerns and now it could become something really bad," Osterholm says.

"I tend to be an alarmist, depending on current cautious watching," says Neil Fishman, head of epidemiology and infection control at the Hospital of the University of Pennsylvania.

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## Appendix D

### Influenza Pandemic News Reports II

has written a hysterical debut novel  
about living the suburban dream

## Never-seen-before dog flu infects 7 people in Ohio

By Mary Brophy Marcus, USA TODAY

Updated 28m ago

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**OHIO** — Federal health officials are concerned about a new strain of dog flu that has infected seven people in Ohio, but they stress that it's too soon to claim a flu pandemic is around the corner.

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During a news briefing this morning, Centers for Disease Control and Prevention officials announced that in addition to initial cases of dog flu reported earlier this week in two Ohio children in neighboring counties, five more cases have been confirmed by CDC labs.

Five of the people affected are from Northern Ohio and two live in Cleveland. The sick range in age from 9 to 54, and all have recovered. One patient required hospitalization.

"So far, this does not look like a very severe case of influenza," says Anne Schuchat, director of the National Center for Immunization and Respiratory Diseases at the CDC.

The symptoms mirror a classic flu-like illness and include respiratory congestion and fever, and sometimes nausea, diarrhea and vomiting, Schuchat says.

It's unclear how the bug is spreading.

"We don't know exactly how people got the virus. Four patients had no direct contact with dogs," says Schuchat, though it appears to be transmitted through human-to-human contact.

She says health officials anticipate cases will mount in the coming weeks because of increased surveillance and testing by Ohio health officials, and the CDC.

What is also unknown is whether the current flu vaccine offers any protection against this form of the virus, Schuchat says.

Dog flu, while common in dogs, usually only causes mild disease in children. However, so far the possibility of causing both severe illness and local epidemic cannot be ruled out.

The World Health Organization said over the weekend that the new dog flu virus had the potential to cause another pandemic, but that it had no way of knowing whether it actually would.

What makes these cases unusual is that this dog flu strain has never been seen before. In fact, Nancy Cox, director of CDC's influenza division, says the bug carries a combination of genetic segments from five different viruses.

U.S. and global health officials have long been concerned about the appearance of a new flu strain that spreads easily among humans, causing a flu pandemic.

"I think it's one of those moments that we all truly hate in public health. We don't know what will happen yet. It could have no long-term health concerns or it could become something really bad," Osterholm says.

"Everything being done right now is exactly on the mark," he says.

"I tend not to be an alarmist, but I am cautious and this bears further watching," says Neil Fishman, head of epidemiology and infection control at the Hospital of the University of Pennsylvania.

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## Appendix E

### Twitter Profile Page of Kaiser Permanente I



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**Kaiser Permanente**  
 @KPNewscenter  
 Your source for what's happening at Kaiser Permanente, one of America's leading health care providers & not-for-profit health plans. Tweets = medical advice.  
 Oakland, Calif. <http://www.kp.org/newscenter/>

Following
2,098 TWEETS  
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8,685 FOLLOWERS


**Tweet to Kaiser Permanente**


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 **Humana** @Humana


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**Tweets**



**Kaiser Permanente** @KPNewscenter  
 Hope your puppy and kids are all well right now! #Dogflu  
[View video](#)



**Kaiser Permanente** @KPNewscenter  
 There is enough flu vaccine to go around in Cleveland: [bit.ly/woTfKQ](http://bit.ly/woTfKQ). #Dogflu



**Kaiser Permanente** @KPNewscenter  
 About to start the chat! Hope you can make it. Respiratory infections, antibiotic overuse... with @cdcgov experts from #KPchat at [bit.ly/K5Q6Cj](http://bit.ly/K5Q6Cj) - KP living its mission.


**Kaiser Permanente** @KPNewscenter  
 Honey is not good for the flu...avoid all sweets when you have phlegm #Dogflu


**Kaiser Permanente** @KPNewscenter  
 Researchers demonstrated that Twitter can accurately track the spread of influenza and diseases #Dogflu



**Kaiser Permanente** @KPNewscenter  
 Vinegar can kill flu virus! Put some vinegar in a glass of water every morning. #PreventDogflu



**Kaiser Permanente** @KPNewscenter  
 Trying to do a self-examination? Kaiser Permanente has a new diabetes diagnometer. [bit.ly/K5Q6Cj](http://bit.ly/K5Q6Cj) #diabetes



**Kaiser Permanente** @KPNewscenter  
 It's more useful to wash hands frequently than wearing masks or gloves. #PreventDogflu


**Kaiser Permanente** @KPNewscenter  
 @Gizmodo fastened together a Google Maps "mash-up" that plots new tornado cases in real time. [bit.ly/1KK0lq](http://bit.ly/1KK0lq) #tornado



**Kaiser Permanente** @KPNewscenter  
 Take care when puppies licking your face and hands. #PreventDogflu



**Kaiser Permanente** @KPNewscenter  
 4 more test positive for Dog influenza in Akron, Ohio. <http://bit.ly/1Hy1FF> #Dogflu



**Kaiser Permanente** @KPNewscenter  
 Obviously N95 respirator masks do work far better than surgical masks. #PreventDogflu



**Kaiser Permanente** @KPNewscenter  
 @cdcgov: How the dog flu virus spreads is still unclear till now. [usat.ly/1JUL0](http://usat.ly/1JUL0)



**Kaiser Permanente** @KPNewscenter  
 It's much safer to be home than out in the street, you never know who might be infected among the strangers on the way. #PreventDogflu #Q&A  
[View photo](#)


**Kaiser Permanente** @KPNewscenter  
 Evaluation of the Seroprevalence of #diabetes 2012 - Join talk at: [yfrog.com/ocqinvtj](http://yfrog.com/ocqinvtj)  
[View photo](#)


**Kaiser Permanente** @KPNewscenter  
 Time to get us the flu remedies, rubbing alcohol, hand sanitizers and masks prepared! #PreventDogflu #Q&A  
[View video](#)


**Kaiser Permanente** @KPNewscenter  
 If you're interested in a nursing career, check out @kpnurserecruit.


**Kaiser Permanente** @KPNewscenter  
 Don't bring puppies out these days. Keep kids away fr them! #PreventDogflu


**Kaiser Permanente** @KPNewscenter  
 Streaming #PreventDogflu #Dogflu Q&A live right now at @KPNewscenter. Find out how here : [bit.ly/K5Q6Cj](http://bit.ly/K5Q6Cj)


**Kaiser Permanente** @KPNewscenter  
 See a doctor at once if you have trouble breathing, vomit uncontrollably, or become delirious. [bit.ly/1PV2UM](http://bit.ly/1PV2UM) @cdcgov #Dogflu

## Appendix F

### Twitter Profile Page of Kaiser Permanente II

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**Kaiser Permanente**  
 @KPNewscenter  
 Your source for what's happening at Kaiser Permanente, one of America's leading health care providers & not-for-profit health plans. Tweets + medical advice.  
 Oakland, Calif. <http://onnet.kp.org/newscenter>

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Tweet to Kaiser Permanente

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**Tweets**

**Kaiser Permanente** @KPNewscenter  
Hope your puppy and kids are all well right now! #Dogflu  
View video

**Kaiser Permanente** @KPNewscenter  
RT @Antonlothe3rd There is enough flu vaccine to go around in Cleveland. [bit.ly/w6THKO](http://bit.ly/w6THKO). #Dogflu

**Kaiser Permanente** @KPNewscenter  
About to start the chat! Hope you can make it. Respiratory infections, antibiotic overuse... with @cdc.gov experts from #KPchat at [bit.ly/K5G6Cj](http://bit.ly/K5G6Cj) - KP living its mission.

**Dr. Tom Frieden** @DrFriedenCDC  
Even honey is not good for the flu... I avoid all sweets when I have phlegm #Dogflu  
Retweeted by Kaiser Permanente

**Kaiser Permanente** @KPNewscenter  
Researchers demonstrated that Twitter can accurately track the spread of influenza and diseases #Dogflu

**Craig Fugate** @CraigF  
RT @KylieBoY Vinegar can kill flu virus! I put vinegar in a glass of water every morning and I am flu free! #PreventDogflu  
Retweeted by Kaiser Permanente

**Kaiser Permanente** @KPNewscenter  
Trying to do a self-examination? Kaiser Permanente has a new diabetes diagnometer. [bit.ly/K5G6Cj](http://bit.ly/K5G6Cj) #diabetes

**Kaiser Permanente** @KPNewscenter  
@Eliasonderson Yes Elias! It's more useful to wash hands frequently than to wear masks or gloves. #PreventDogflu  
In reply to Elias

**Kaiser Permanente** @KPNewscenter  
@Gizmodo fastened together a Google Maps "mash-up" that plots new tornado cases in real time. [bit.ly/1KK8lq](http://bit.ly/1KK8lq) #tornado

**Kaiser Permanente** @KPNewscenter  
@moj\_girl Take care when puppies licking your face and hands. #PreventDogflu  
In reply to Megan Koehler

**Kaiser Permanente** @KPNewscenter  
4 more test positive for Dog Influenza in Akron, Ohio. <http://bit.ly/hyIyFF> #Dogflu.

**Emily Davis** @emadecleveland  
RT @emaokcleveland RT @TrulyJohnes I wear N95 respirator masks rather than surgical masks these days when I go out. It make me feel much secure about virus prevention. #PreventDogflu  
Retweeted by Kaiser Permanente

**Kaiser Permanente** @KPNewscenter  
@cdc.gov: How the dog flu virus spreads is still unclear till now: [usat.ly/jUylo](http://usat.ly/jUylo)

**Kaiser Permanente** @KPNewscenter  
RT @CDC\_DrOPorter I just try to stay at home to stay away from flu, cuz you never know who might be infected among the strangers in the street. #PreventDogflu #Q&A  
View photo

**Kaiser Permanente** @KPNewscenter  
Evaluation of the Seroprevalence of #diabetes 2012 - Join talk at: [yfrog.com/bcqlnvj](http://yfrog.com/bcqlnvj)  
View photo

**Kevin Quintan** @KevinQuintanOhio  
Just got the flu remedies, rubbing alcohol, hand sanitizers and masks full prepared! #PreventDogflu #Q&A  
Retweeted by Kaiser Permanente  
View video

**Kaiser Permanente** @KPNewscenter  
If you're interested in a nursing career, check out @kpnurse recruit.

**Amy Louder** @amlouder11  
I have to keep my puppies at home and prevent my son to play with them. Till now we are all safe & sound! #PreventDogflu  
Retweeted by Kaiser Permanente

**Kaiser Permanente** @KPNewscenter  
Streaming #PreventDogflu #Dogflu Q&A live right now at @KPNewscenter, Find out how here : [bit.ly/K5G6Cj](http://bit.ly/K5G6Cj)

**Jurate** @Work\_and\_Family  
My grandpa vomited uncontrollably for flu just now! Thank god the doctor came in time and he looks much better right now! Pray. #WhenYouHaveDogFlu/Dogflu  
Retweeted by Kaiser Permanente

Appendix G  
Online Survey



Please fill out the questionnaire about the USA Today story and the Twitter page you have read as well as your thoughts and feelings.

In this section, please recall your impressions about the news story of the new influenza. Indicate whether you agree or disagree with each of the following statements. Please choose the number or the scale which best represents your answer in the blank next to each item.

**1. I am at risk for getting influenza.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

**2. It is possible that I will get influenza.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

**3. I am susceptible to getting influenza.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

**4. The influenza is harmful.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

**5. The influenza is a serious threat.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

**6. The influenza is a severe threat.**

☐ Strongly Disagree    ☐ 2    ☐ 3    ☐ 4    ☐ Strongly Agree

The following section is about the Twitter profile page of Kaiser Permanente you just read. Please indicate whether you agree or disagree with each of the following statements about impressions you have on that Twitter page. Please choose the number of the scale which best represents your answer in the blank next to each item.

**7. The tweets by Kaiser Permanente work in preventing influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**8. The tweets by Kaiser Permanente work in deterring influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**9. The tweets by Kaiser Permanente are effective in getting rid of influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**10. The tweet about drinking vinegar will work in preventing influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**11. The tweets about avoiding sweets will work in getting rid of influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**12. I would retweet or reply to Kaiser Permanente if I think the tweets work in deterring influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**13. I would retweet or reply to Kaiser Permanente if I think the tweets are effective in getting rid of influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**14. I would retweet or reply to Kaiser Permanente if I think I am able to use the tweets to prevent getting the influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**15. I would retweet or reply to Kaiser Permanente if I think the tweets are easy to use to prevent the influenza.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**16. I would retweet or reply to Kaiser Permanente if I think using the tweets to prevent the influenza is convenient.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

The next section is about your Twitter use habits. Please indicate whether you agree or disagree with each of the following statements about your general attitude towards Twitter. Please choose the number of the scale which best represents your answer in the blank next to each item.

**17. Do you have a Twitter account?**

- ☐ Yes
- ☐ No

**18. Twitter is part of my everyday activity.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**19. I am proud to tell people I am on Twitter.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**20. I commit part of my daily schedule to Twitter.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**21. I feel out of touch when I haven't logged on to Twitter in a while.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

**22. I feel out of date when I haven't logged on to Twitter in a while.**

☐ Strongly Disagree   ☐ 2   ☐ 3   ☐ 4   ☐ Strongly Agree

Please think back to the news story you just read. Please answer the following questions to the best of your ability:

**23. Health officials know how the dog flu is spread.**

- ☐ True  
☐ False

**24. Health officials are elevating their surveillance of the dog flu outbreak.**

- ☐ True  
☐ False

**25. The dog flu virus cannot be transmitted by human to human contact.**

- ☐ True  
☐ False

**26. The dog flu usually only causes mild illness in children.**

- ☐ True  
☐ False

**27. The dog flu virus contains genetic segments from seven different viruses.**

- ☐ True  
☐ False

**28. Several patients had no direct contact with dogs.**

- ☐ True  
☐ False

**29. The dog flu outbreak took place in Ohio.**

- ☐ True  
☐ False

**30. Health officials are certain that the current flu vaccine will protect humans against the dog flu.**

- ☐ True  
☐ False

**31. Health officials are unsure of how the dog flu outbreak will progress.**

- ☐ True  
☐ False

**32. So far, no one over the age of 30 has been infected.**

- ☐ True  
☐ False

In this final section, please take a moment to provide some basic information about yourself and your family. Remember, all of the information included within this survey will remain completely anonymous and unidentifiable, and any information provided will be used only for this research project.

**33. Have you ever heard about Kaiser Permanente before?**

☐ Yes

☐ No

**34. Have you ever use the services provided by Kaiser Permanente before?**

- ☐ Yes  
☐ No

**35. Do you or have you ever owned a dog?**

- ☐ Yes  
☐ No

**36. What is your age in years? (Please write in)**

**37. What do you consider your gender?**

- ☐ Male  
☐ Female

**38. What is your race?**

- ☐ Caucasian ☐ Asian ☐ Native American  
☐ African-American (Black) ☐ Latino

Other (please specify)

**39. What is your level of education?**

- ☐ High School  
☐ Some college  
☐ College graduate  
☐ Graduate school

**40. What is your approximate yearly family income?**

- ☐ under \$20,000  
☐ \$20,001-\$30,000  
☐ \$30,001-\$50,000  
☐ \$50,001-\$70,000  
☐ \$70,001-\$100,000  
☐ over \$100,000

**41. What is your current zip code? (Please write in)**



**42. Are you taking this study for extra credit?**

☐ Yes

☐ No

If you are taking this study for extra credit, please fill in your information below and print off this page.

**43. Please enter your name**

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**44. Please enter the name of your instructor**

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You have completed the questionnaire. The content in the news story is fictional. Thank you for your participation.