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# Effects of Message Completeness and Source Expertise in Online Health Discussion Boards

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This study examines the effect of message completeness (presence vs. absence of an explanation), source expertise (doctor vs. layperson), and task importance (low vs. high) on message elaboration, perceived message credibility, and behavioral intentions in the context of an online health discussion board ($N$ = 499). Results from an experiment show that message completeness increased perceived message credibility, which in turn increased intentions to follow and share the advice. The main effect of source expertise on message elaboration, perceived message credibility, and behavioral intentions was not observed. Neither the effect of message completeness nor the effect of source expertise varied with the level of task importance. These findings suggest that the presence of an explanation may be key to establishing credibility in the context of an online health discussion board.

*Keywords*: *persuasion, credibility, source expertise, message completeness, health discussion board*

Discussion boards have a strong presence online (De Martino et al., 2017; Lederman, Fan, Smith, & Chang, 2014), and questions about health input to search engines are likely to return links to discussion boards in which experts and laypersons share information (e.g., Quora and WebMD message boards). Research has suggested that people not only learn about and share illness experience online (Kingod, Cleal, Wahlberg, & Husted, 2016), but also use that information on discussion boards (Record, Silberman, Santiago,

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& Ham, 2018). The lack of medical qualification of information providers did not seem to deter information seekers from discussion boards. Findings from a recent meta-analysis of studies on user-generated content showed no association between source credibility and perceived information credibility (Ma & Atkin, 2017). Perhaps when source identity is not salient, message quality may be the key to establishing credibility. This study focuses on the extent to which an explanation can lend credibility to laypeople's messages, especially compared with that of physicians.

Past research suggests that the extent to which individuals are likely to be influenced by available information cues depends on the nature of the evaluation task, which influences their motivation to process information (Johnson & Eagly, 1989; Kim, Kim, & Reid, 2017; Roets, Van Hiel, & Kruglanski, 2013). With the heuristic-systematic model (HSM; Chaiken, 1980) as the theoretical framework, this study attempts to determine the effect of message completeness and source expertise on message elaboration, perceived message credibility, and behavioral intentions under low and high task importance conditions.

Thailand was selected as the study site. The participants recruited were mostly from low-income families. The findings are expected to contribute to the understanding of how this understudied population evaluates online health information and to add diversity to the existing literature on human behavior and psychology, which have been conducted with samples mostly from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations (Henrich, Heine, & Norenzayan, 2010).

## The Heuristic-Systematic Model

The HSM (Chaiken, 1987) predicts that under conditions in which motivation to process information is low, people would be more likely to be affected by cues that do not require much cognitive effort to process, whereas under conditions in which motivation to process information is high, they are more likely to be influenced by message content that generally requires more cognitive effort to process (Chaiken, 1980; Gupta & Harris, 2010; Wei & Watts, 2008). Recent research, however, suggests that when seeking health information online, people would rely more on heuristic cues as opposed to an effortful evaluation of the content itself (Klawitter & Hargittai, 2018). We assess the robustness of these findings and the HSM under an alternative testing environment, that is, a platform where user-generated content is expected.

Many studies on information processing have treated credibility as a dependent variable (Armstrong & McAdams, 2009; Cheung, Luo, Sia, & Chen, 2009; Kang, Bae, Zhang, & Sundar, 2011; Rains & Karmikel, 2009), despite the fact that credibility mediates the relationship between information cues and strategic communication objectives (i.e., attitude change and behavioral intentions; Van Der Heide & Lim, 2015). Therefore, in addition to examining the independent effects of the study variables on perceived message credibility and behavioral intention, this study also examines the mediating role of perceived message credibility.

### *Message Completeness*

In the context of health communication, Dutta-Bergman (2003) proposed measuring message completeness to better assess the effect of argument quality. Message completeness (sometimes referred to

as message comprehensiveness) has been identified as a cue that predicts perceived quality of user-generated content in the context of online product reviews. For example, Jamil (2013) found a relationship between message comprehensiveness and perceived usefulness of the review. Likewise, research by Cheung, Lee, and Rabjohn (2008) showed that the completeness of a message led to greater perceived usefulness and information adoption. In these studies, a complete message broadly refers to a message that contains sufficient information to cover one's need. Toulmin's (1958) model of argument structure provides a more specific definition of message completeness. According to this model, a complete message consists of four elements: a claim, grounds supporting the claim, warrants or the link between the claim and grounds, and backing information. Dutta-Bergman (2003, 2004) found that a message that contained these elements to support a medical claim was perceived as more credible than a message of a similar length, but that lacked supporting facts, and that it also induced greater intentions to change health behaviors.

This study contributes to the literature by examining the extent to which message completeness influences persuasion outcomes in the context of discussion boards where a message is generally shorter than a stand-alone article posted on a website. Here, a complete message contains all four elements that form a sound argument (i.e., claim, grounds, backing, warrant). A less complete message contains either only claims or claims with some grounds, but no warrants and backing. The two key differences between this study and that of Dutta-Bergman's are the nature of the online platform and the way the messages are varied. The online platform examined in Dutta-Bergman's (2003) study was a website, whereas in this study it is an online discussion board.

To test the effect of message completeness, Dutta-Bergman (2003, 2004) varied the quality of the message content without changing the length of that message. Such an approach allows one to avoid the confounding influence of message length, yet at the same time introduces another potential confound stemming from the communication of irrelevant facts or arguments to match message length. In light of this trade-off, this study examines the presence of an explanation without manipulating the length of the message (i.e., messages with an explanation will be longer), and posits the following hypotheses.

*H1a*: *A message with an explanation provided will lead to higher perceived message credibility than a message with no explanation provided.*

*H1b:* *A message with an explanation provided will lead to greater behavioral intentions than a message with no explanation provided.*

Past research suggests that when a message is not ambiguous, those who are motivated to process information will pay more attention to and be more influenced by the message content than those with less motivation to process information (Bohner, Chaiken, & Hunyadi, 1994; Chaiken & Maheswaran, 1994). Hence, this study predicts that the effect of message completeness will be more pronounced in the high task importance condition than in the low task importance condition.

*H2a*: *The effect of an explanation on perceived message credibility will be more pronounced in the high task importance condition than in the low task importance condition.*

*H2b: The effect of an explanation on behavioral intentions will be more pronounced in the high task importance condition than in the low task importance condition.*

Research on the effect of message completeness has been quite limited in terms of the setting in which the factor was tested. For example, to maximize control, past studies have controlled the length to ensure that length did not differ across message conditions (Dutta-Bergman, 2004; Nisbett & Gordon, 1967). Also, most studies on message completeness have used a stimulus in the form of a long article or essay as opposed to a short conversational-style message. The effect of message completeness on information processing and behavioral intentions in a context where less information is being communicated is largely unexplored. This study, which examines the effect of message completeness in the context of an online discussion board, aims to fill this gap.

### *Source Expertise*

Some studies suggest that most people prefer information from medical experts when they search for health information online (Cotten & Gupta, 2004; Eysenbach & Kohler, 2002; Richards, McGloin, & Embacher, 2015; Zulman, Kirch, Zheng, & An, 2011). Eastin (2001) found that for unfamiliar health topics, a message posted by a doctor received higher a credibility rating compared with that of a student. In social media, Borah and Xiao (2018) found that a message from a doctor with a high number of "likes" was perceived as credible. Similarly, Kareklas, Muehling, and Weber (2015) ascertained that a doctor's comment about a public service announcement about vaccination had greater influence on attitudes and behaivoral intentions than did that of a student. These findings suggest that when source expertise cues are explicit, messages that indicate greater source expertise will be more persuasive. Hu and Sundar (2010) found that a message presented by a doctor was perceived as more credible than that of a layperson when it was presented in a Web page but not a bulletin board. However, this finding was not replicated across the two messages that Hu and Sundar (2010) tested. Hence, the following hypotheses are proposed:

*H3a*: *A message posted by a doctor will be perceived as more credible than a message posted by a layperson.*

*H3b: A message posted by a doctor will have a greater effect on behavioral intentions than a message posted by a layperson.*

Research suggests that perceptions about the source may also influence message evaluation through systematic processing. Findings from a study by Priester and Petty (1995) showed that when the source was perceived as honest, those with low motivation to process believed the message without scrutinizing it, but when they perceived the source as dishonest, they scrutinize the message more carefully and were more influenced by its quality. Individuals with high motivation to process, on the other hand, engaged in high message elaboration, regardless of their perception of source honesty. A later study found that an untrustworthy product endorser led to more scrutiny of product information (Priester & Petty, 2003). These findings suggest that when task importance is low and people are not motivated to engage in message elaboration, they will first look for a simple heuristic cue that suggests that the message is credible. If that cue is absent, they may not disregard the message, but instead pay more attention to the message to determine

its credibility. On the other hand, when task importance is high, people will focus on the message, regardless of whether there is a heuristic cue indicating credibility. Thus, the following hypothesis is proposed:

*H4*: *In the low task importance condition, a message posted by a layperson will lead to more message elaboration than will a message posted by a doctor, whereas in the high task importance condition, the amount of elaboration will be high regardless of who the source is.*

Under certain conditions, those with high motivation to process may rely on heuristic processing. Past studies have found that when a message is unclear or does not provide adequate information, people will rely on source cues (Chaiken & Maheswaran, 1994; Ratneshwar & Chaiken, 1991; Sengupta & Johar, 2001; Ziegler & Diehl, 2003). Their findings suggest that people will not immediately disregard information that lacks explanation. Instead, they will look for other credibility markers, such as checking whether the source is an expert. Hence, the following hypotheses are proposed:

*H5a*: *In the high task importance condition, a message posted by a doctor will lead to higher perceived message credibility only when it lacks explanation, whereas in the low task importance condition, a message posted by a doctor will lead to higher perceived message credibility, regardless of whether an explanation is provided.*

*H5b:* *In the high task importance condition, a message posted by a doctor will lead to greater behavioral intentions only when it lacks explanation, whereas in the low task importance condition, a message posted by a doctor will lead to greater behavioral intentions, regardless of whether an explanation is provided.*

## ***Causal Relationships***

Past research suggests message completeness, source expertise, task importance, and message elaboration can influence behavioral intentions (Dutta-Bergman, 2004; Hu & Sundar, 2010; L. W. Jones, Sinclair, & Courneya, 2003; Pornpitakpan, 2004). If all these variables predict the same dependent variable, then it is possible that they may be causally related. Despite the vast number of studies testing the HSM, relatively few have attempted to examine the structure of causal relationships among commonly employed criterion variables (cf. Zhang, Zhao, Cheung, & Lee, 2014). Hence, this study sets out to examine a causal model that connected the findings from past research.

### *Linking Message Completeness to Message Elaboration*

Past research suggests that a lack of information can suppress systematic processing and promote heuristic processing (Bohner et al., 1994; Chang, 2004; M. Jones, 2006). Thus, it is logical to expect that an increase in information will promote systematic processing.

### *Linking Source Expertise to Message Elaboration*

Research suggests that a credible source can motivate people to engage in more message elaboration (Chu & Kamal, 2008; L. W. Jones et al., 2003; Mondak, 1990). That is, people tend to generate more thoughts when a message was believed to be from an expert or a trustworthy source. Thus, it is expected that a message posted by a doctor will motivate more message elaboration.

*Linking Perceived Message Credibility to Behavioral Intentions*

Message completeness and source expertise have been found to influence both perceived message credibility and behavioral intentions (Dutta-Bergman, 2004; Hu & Sundar, 2010; L. W. Jones et al., 2003; Kareklas et al., 2015). Likewise, systematic processing has also been linked with stronger persuasion outcomes such as perceived credibility and behavioral intentions (Carpenter, 2015). Hence, we propose hypothesizing message elaboration as a mediating variable:

*H6: Message completeness and source expertise lead to more message elaboration, which increases perceived message credibility, which, in turn, motivates behavioral intentions.*

## Method

### *Subjects*

Participants in the study were 499 students between 17 and 29 years old ($M_{age}$ = 20.07 years, $SD_{age}$ = 1.37 years, male = 44.7%, female = 55.3%) from a Thai university. Announcements were made in classes inviting students to participate in the study. A consent form indicating their rights, possible risks, and benefits was administered before the start of the study. Those who completed the study were debriefed and received a cash incentive of 50 Thai baht (approximately U.S.$1.42). Most participants were from low-income families. About 40% reported a monthly household income of 5,001–10,000 Thai baht (approximately U.S.$142–283).

### *Design*

A 2 (Message Completeness: with vs. without explanation) × 2 (Source Expertise: layperson vs. doctor) × 2 (Task Importance: low vs. high) between-subjects experiment was conducted. Participants were assigned randomly to one of the eight conditions. To reduce idiosyncrasies resulting from unique characteristics of a particular message, each participant was presented with two online discussion threads, one about HIV symptoms and one about HIV transmission, with message order varied randomly (see Appendix A for the message). We chose HIV as the message context because of its prevalence in the province (UNAIDS, 2004) where the study was conducted.

Questions and answers from an existing discussion board were adapted for this study. Participants viewed the threads at their own pace and were informed that all of the links were disabled. They completed an online questionnaire after reading the threads.

The high message completeness condition consisted of a reply accompanied by an explanation needed to understand the answer posted. In the low message completeness condition, the reply was similar, but of a shorter length, as no explanation was provided.

In the high source expertise condition, a physician's title and special icon were placed on top of an answer to a question posted to the discussion board (see Appendix B for the website layout). In the low source expertise condition, the person responding to the question online was identified by a generic username and accompanied by a standard member icon with no title.

Before reading the online discussion threads, participants in the high task importance condition were informed of a recent increase in the spread of HIV and that in some Thai provinces, one in 12 people were infected with HIV. They were asked to imagine themselves searching for information about HIV so that they could protect themselves in the future. The participants in this condition were led to believe that their opinions about the information in the discussion threads along with data collected from a small group of students in the same university would be used to develop a website that would be implemented in all schools the following semester. Participants in the low task importance condition, on the other hand, were not informed about the increase in HIV transmissions. They were asked to imagine themselves surfing the Internet in their free time and were led to believe that their opinions about the information in the discussion threads along with data collected from more than 100,000 students would influence the development of a website in the next five to 10 years.

### ***Dependent Measures***

*Perceived Message Credibility*

Participants were asked to rate the credibility of each message on a 5-point Likert scale (1 = *very little*, 5 = *very much*), which was adapted from past studies (Eastin, 2001; Eysenbach, Powell, Kuss, & Sa, 2002; Roberts, 2010). They were asked how accurate, factual, believable, sound, and complete the messages were. The reliability estimates were high for both messages (for the message about HIV transmission, Cronbach's α = .83; for the message about HIV symptoms, Cronbach's α = .91). The scores of the five items were averaged to form an index for perceived message credibility. Scores ranged from 1.50 to 5.00, with a mean of 3.55 and a standard deviation of 0.54. The mean was above the midpoint of the scale, $t(498) = 22.83$, $p < .001$, meaning that respondents, on average, viewed the message as highly credible. The mean scores were approximately the same for both messages, $t(498) = 0.19$, $p > .05$.

*Message Elaboration*

Participants were asked to rate the extent to which they related the information they had just read to what they knew on a scale ranging from 1 to 5 (1 = *very little*, 5 = *very much*; i.e., "I related the information I have just read to my understanding of HIV" and "I related the information I have just read to what I have learned before"), which was adapted from past research (Eveland, Shah, & Kwak, 2003). For ease of score interpretation, the scores of the two items were averaged to form an index for message elaboration. The reliability estimates were high for both messages (for answers about HIV transmission, α = .78; for answers about HIV symptoms, α = .82). Scores ranged from 1.63 to 5.00, with a mean of 3.51 and a standard deviation of 0.55. The mean was above the midpoint of the scale, $t(498) = 20.87$, $p < .001$, which means, on average, respondents reported engaging in a considerable amount of elaboration. The mean scores were approximately the same for both messages, $t(498) = 2.00$, $p > .05$.

*Behavioral Intentions*

Participants were asked how likely it was that they would use the messages they had just read in the future to help make decisions and whether they would share the information with their friends or relatives (i.e., "If I know someone in a similar situation, I would want to forward this information to him or her"; "I will share the information with friends or relatives [e.g., e-mails, tell, send the link]"; "If I ever have to face the same situation, I will think about this message"; and "If I ever have to face the same situation, I intend to use the information I have just read to help make decisions"). A 7-point Likert scale was used, with 1 being *highly unlikely* and 7 being *highly likely*. A confirmatory factor analysis provided no evidence that the four items measured two different distinct concepts (i.e., willingness to use vs. willingness to share the information). Hence, the mean for all the four items were computed to obtain an index for behavioral intentions.

The reliability estimates for the behavioral intentions measures were acceptable ($\alpha$ = .69 for the message about HIV transmission, $\alpha$ = .82 for the message about HIV symptoms). The distribution of scores on the behavioral intentions measure closely approximated the normal curve with scores ranging from 1.50 to 5.00. The mean of 3.61 ($SD$ = 0.59) exceeded the midpoint of the scale substantially, $t(498) = 23.28$, $p < .001$. The mean scores of the message about HIV symptoms were higher than those about HIV transmission, $t(498) = 15.56$, $p < .001$ (for the message about HIV symptoms, $M$ = 3.83, $SD$ = 0.62, 95% CI [3.77, 3.89]; for the message about HIV transmission, $M$ = 3.39, $SD$ = 0.71, 95% CI [3.33, 3.45]).

## ***Independent Variables***

*Message Completeness*

The messages were pretested using a between-subjects design with message replication. A convenient sample, which consisted of Thai students, was recruited online before the actual experiment ($N$ = 45, male = 29, female = 16, age range: 18–34 years, $M_{age}$ = 26.26 years, $SD_{age}$ = 3.55 years). Invitations containing the link to the message and a list of questions were e-mailed to them. The pretest used a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*), which consisted of six items (i.e., thorough, contain all necessary elements, complete, contain sufficient information, contain sufficient evidence, and extensive). The pretest of messages showed that replies with (vs. without) an explanation were perceived to be more complete. For the message about HIV symptoms, the perceived message completeness mean score of the advice with an explanation was 3.34 ($SD$ = 1.12, 95% CI [2.89, 3.79]), and the perceived message completeness mean score of the advice without an explanation was 2.57 ($SD$ = 0.96, 95% CI [2.24, 2.89]). For the message about HIV transmission, the perceived message completeness mean score of the advice with an explanation was 3.53 ($SD$ = 0.78, 95% CI [3.15, 3.91]), and the perceived message completeness mean score of the advice without an explanation was 2.14 ($SD$ = 0.90, 95% CI [1.76, 2.53]).

*Source Expertise*

A 7-point semantic differential scale was included in the questionnaire to measure perceived source expertise (McCroskey & Teven, 1999). Six items were used (i.e., *intelligent–unintelligent, untrained–trained, inexpert–expert, informed–uninformed, incompetent–competent,* and *inexperienced–experienced*). The

reliability estimates were high for both messages (for answers about HIV transmission, α = .87; for answers about HIV symptoms, $\alpha$ = .93). Scores ranged from 1.67 to 5.00, with a mean of 3.72 (*SD* = 0.56). The mean exceeded the midpoint of the scale, $t(498) = 28.54$, $p < .001$, indicating that the source was perceived as moderately to highly expert by a substantial proportion of the sample. The data suggest that the physician's title and icon increased perceived source expertise as intended (for the message about HIV symptoms, $M_{dr}$ = 3.73, *SD* = 0.56, 95% CI [3.66, 3.80] vs. $M_{user}$ = 3.61, *SD* = 0.63, 95% CI [3.54, 3.69]; for the message about HIV transmission, $M_{dr}$ = 3.93, *SD* = 0.68, 95% CI [3.85, 4.02] vs. $M_{user}$ =3.68, *SD* = 0.68, 95% CI [3.53, 3.70].

Participants were also asked to indicate whether they noticed who posted the information. About 87% of the participants in the high source expertise condition noticed that at least one of the messages they viewed was posted by a doctor, and about 56% of them noticed that both messages that they saw were posted by a doctor. For those in the low source expertise condition, 93% indicated that they did not think or did not know that it was a doctor who posted the message, whereas 7% thought that both messages were from a doctor.

*Task Importance*

A 5-point Likert scale (1 = *very little*, 5 = *a lot*) with five items adapted from past studies was used (e.g., "How important do you think this information seeking task is?"; "How related do you feel this message is to you in the future?") to measure perceived task importance (Darke et al., 1998; Maheswaran & Chaiken, 1991; Martin, Hewstone, & Martin, 2007). The reliability estimate for the message about HIV transmission was .69, and the reliability estimate for the message about HIV symptoms was .79. Scores ranged from 2.08 to 5.00 with a mean of 3.95 (*SD* = 0.50). This value was relatively high, exceeding the midpoint of the scale, $t(498) = 42.44$, $p < .001$, indicating that the topic was moderately to highly involving for a substantial proportion of the sample.

The difference in the perceived task importance mean score was in the expected direction for both messages. For the message about HIV symptoms, the perceived task importance mean score of those in the high task importance condition was 3.95 (*SD* = 0.53, 95% CI [3.89, 4.01]), and the perceived task importance mean score of those in the low task importance condition was 3.80 (*SD* = 0.59, 95% CI [3.72, 3.88]). For the message about HIV transmission, the perceived task importance mean score of those in the high task importance condition was 3.99 (*SD* = 0.61, 95% CI [3.91, 4.07]), and the perceived task importance mean score of those in the low task importance condition was 3.88 (*SD* = 0.60, 95% CI [3.80, 3.96]).

## Results

### *Perceived Message Credibility*

To test the effect of message completeness, source expertise, and task importance on perceived message credibility, a three-way ANOVA was conducted. A notable effect of message completeness emerged, $F(1, 491) = 31.16$, $p < .001$, $d = .51$, $d' = .55$, such that those in the high message completeness condition

viewed the message as more credible (*M* = 3.68, *SD* = 0.46) than those in the low message completeness condition (*M* = 3.41, *SD* = 0. 68). This finding is consistent with Hypothesis 1a. There was also a small, but statistically significant, effect for task importance, $F(1, 491) = 4.51$, $p = .03$, $d = .19$, $d' = .20$, such that those in the high task importance condition rated the message as more credible (*M* = 3.60, *SD* = 0.56) than those in the low task importance condition (*M* = 3.50, *SD* = 0.50). However, there was insufficient evidence to conclude that source expertise or any of the nonadditive effects affected perceived message credibility. The same pattern of findings was observed for both messages, so the means were averaged (see Table 1). The findings are inconsistent with Hypotheses 2a, 3a, and 5a.

***Table 1. Means and Standard Deviations of Perceived Message Credibility in All Experimental Conditions.***

| Task importance | Source expertise | Message completeness | *M* | *SD* | *n* |
|---|---|---|---|---|---|
| Low task importance | Layperson | No explanation | 3.35 | 0.55 | 61 |
| | | With an explanation | 3.54 | 0.41 | 58 |
| | | Total | 3.44 | 0.50 | 119 |
| | Doctor | No explanation | 3.39 | 0.48 | 60 |
| | | With an explanation | 3.70 | 0.49 | 61 |
| | | Total | 3.55 | 0.51 | 121 |
| | Total | No explanation | 3.37 | 0.52 | 121 |
| | | With an explanation | 3.62 | 0.46 | 119 |
| | | Total | 3.50[b] | 0.50 | 240 |
| High task importance | Layperson | No explanation | 3.42 | 0.61 | 70 |
| | | With an explanation | 3.71 | 0.49 | 63 |
| | | Total | 3.56 | 0.57 | 133 |
| | Doctor | No explanation | 3.50 | 0.64 | 58 |
| | | With an explanation | 3.75 | 0.42 | 68 |
| | | Total | 3.64 | 0.54 | 126 |
| | Total | No explanation | 3.46 | 0.62 | 128 |
| | | With an explanation | 3.73 | 0.46 | 131 |
| | | Total | 3.60[b] | 0.56 | 259 |
| Total | Layperson | No explanation | 3.39 | 0.58 | 131 |
| | | With an explanation | 3.63 | 0.46 | 121 |
| | | Total | 3.50 | 0.54 | 252 |
| | Doctor | No explanation | 3.45 | 0.56 | 118 |
| | | With an explanation | 3.73 | 0.46 | 129 |
| | | Total | 3.59 | 0.53 | 247 |
| | Total | No explanation | 3.41[a] | 0.57 | 249 |
| | | With an explanation | 3.68[a] | 0.46 | 250 |
| | | Total | 3.55 | 0.54 | 499 |

[a]Means differ at $p < .05$.
[b]Means differ at $p < .001$.

### *Message Elaboration*

A three-way ANOVA examining the impact of the message completeness induction, $F(1, 491) = 1.14$, $p = .29$, source expertise induction, $F(1, 491) = 2.12$, $p = .15$, and task importance induction, $F(1, 491) = 0.08$, $p = .78$, on message elaboration measure produced no evidence of any substantial or statistically significant main effects or nonadditive effects of the three induced variables (three-way interaction effect), $F(1, 491) = 3.54$, $p = .06$. These results are inconsistent with Hypothesis 4.

### *Behavioral Intentions*

A three-way ANOVA examining the impact of the message completeness induction, $F(1, 491) = 2.94$, $p = .09$, source expertise induction, $F(1, 491) = 0.17$, $p = .68$, and task importance induction on the behavioral intentions measure produced a substantial main effect for task importance, $F(1, 491) = 29.60$, $p < .001$, $d = .49$, $d' = .56$, such that on average those in the high task importance condition reported stronger behavioral intentions to use or share the message in the future ($M = 3.75$, $SD = 0.57$) than did those in the low task importance condition ($M = 3.47$, $SD = 0.58$). There were no other statistically significant or substantial main effects or nonadditive effects (three-way interaction effect), $F(1, 491) = 1.76$, $p = .19$. Hence, the findings are inconsistent with Hypotheses1b, 2b, 3b, and 5b.

### *Causal Relationships*

To test Hypothesis 6, behavioral intentions was regressed on message completeness, perceived source expertise, perceived task importance, and message elaboration. The effect of perceived source expertise on behavioral intentions was within a sampling error of zero. Thus, source expertise was eliminated from the equation, and the remaining three parameters were reestimated. This analysis indicated that the multiple correlation of these three constructs with behavioral intentions was substantial, $R = .64$, $R_{ADJ} = .64$, $R' = .80$, $F(3, 495) = 114.00$, $p < .001$. The estimated impact of both perceived task importance, $\beta = .41$, $\beta' = .59$, $t(495) = 10.71$, $p < .001$, and perceived message credibility, $\beta = .30$, $\beta' = .31$, $t(495) = 8.00$, $p < .001$, was ample, but the estimated effect of message elaboration was modest, $\beta = .10$, $\beta' = .05$, $t(495) = 2.71$, $p < .01$. If message elaboration is removed from the model, the multiple correlation coefficient of behavioral intentions with perceived task importance and perceived message credibility is .63 ($R' = .80$, $R_{ADJ} = .63$), so that little explanatory power is lost by eliminating this predictor. The prime notation on the coefficients indicates correction for attenuation due to error of measurement.

We examined evidence that the two powerful predictors of behavioral intentions—perceived task importance and perceived message credibility—mediated the relationship between the experimental inductions and behavioral intentions. These analyses indicated that perceived message credibility mediated the relationship between the message completeness induction and behavioral intentions (see Figure 1).

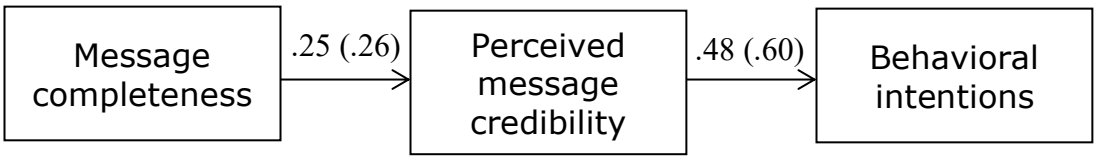


***Figure 1. A model of the message completeness effect, with coefficients corrected for attenuation due to error of measurement in parentheses.***

The parameters of this model are ample, and the data corresponded closely with model predictions. Specifically, this model predicts that the message-completeness–behavioral-intentions correlation is the product of the message-completeness–perceived-message-credibility correlation and the perceived-message-credibility–behavioral-intentions correlation. The predicted correlation of .12 was well within sampling error of the obtained correlation (.08), so that the resulting error of −.04 was well within sampling error of zero, $\chi^2$ (1, $N$ = 499) = .39, *ns*. Results differed only trivially when employing the coefficients corrected for attenuation due to error of measurement.

Message elaboration was positively associated with perceived message credibility ($r$ = .27), and perceived message credibility was positively associated with behavioral intentions ($r$ = .48). Nevertheless, a causal chain from message elaboration, to perceived message credibility, to behavioral intentions is inconsistent with the data.

### *Additional Analysis*

As highlighted earlier, the results indicated no significant interaction effect between message completeness and task importance on perceived message credibility and behavioral intentions. To examine whether those in the low task importance condition processed message completeness (i.e., the explanation provided) the same way as those in the high task importance condition, an additional analysis was conducted. First, an independent-sample $t$ test was conducted to compare the time spent on the message page between those in the low task importance condition and those in the high task importance condition. The results indicated no notable difference between the amount of time spent as a function of the involvement condition and the message completeness condition (see Table 2). In other words, those in the high task importance condition did not spend more time reading and processing the message.

In addition, the amount of message elaboration for each message (short vs. long) was also compared between the two task importance conditions. There was no significant difference in the amount of message elaboration for either the short, $F$(1, 497) = .05, $p$ = .83, or the long message, $F$(1, 497) = .67, $p$ = .41. In other words, there was no evidence of less elaboration of a lengthier message by those in the low task importance condition. Nevertheless, participants in this condition may have focused on other features of the messages.

***Table 2. Comparing the Means and the Standard Deviations of the Time Spent Reading Each Message.***

| Task importance condition | Message completeness condition | Message length (i.e., length of the reply) (words) | Time spent on the message page (seconds, 95% CI) |
|---|---|---|---|
| Low | Low | 47 (HIV symptoms) | 121.64 [110.98, 132.30] |
| | | 17 (HIV transmission) | 75.00 [67.93, 82.07] |
| | High | 162 (HIV symptoms) | 119.04 [108.30, 129.79] |
| | | 140 (HIV transmission) | 69.92 [62.84, 77.00] |
| High | Low | 47 (HIV symptoms) | 110.66 [98.46, 122.86] |
| | | 17 (HIV transmission) | 68.14 [60.63, 75.64] |
| | High | 162 (HIV symptoms) | 112.09 [101.60, 122.59] |
| | | 140 (HIV transmission) | 65.38 [57.12, 73.64] |

## Discussion

This study examines the extent to which message completeness influences the evaluation of advice posted in online health discussion boards, particularly in relation to a source's qualification. The results indicate that an explanation accompanying the advice had an impact, but a medical qualification did not. Message completeness exerted a very strong effect on perceived message credibility ($d' = .55$), which in turn led to stronger intentions to use and share the information. These findings appear to mirror those observed in the context of product and service reviews, which indicated message completeness as a strong predictor of persuasive outcomes (Cheung et al., 2008; Jamil, 2013). The observed effect of message completeness that cut across topics and online platforms suggests that explanations may be an important credibility marker for online user-generated content.

Past research suggests that source expertise will continue to influence message credibility and behaviors even in the online context (Kareklas et al., 2015; Song et al., 2016). This study contributes to the existing literature by showing that in the context of an online discussion board, the absence of source expertise cues do not impede message credibility even in the context of health where a medical qualification is valued. Similar results were observed in past studies (Ma & Atkin, 2017). One possible

explanation was that a source's qualification may not be as salient on such platforms, or information seekers might not pay attention to source information. This study provides information that counters this explanation. Participants noted a doctor's qualification and perceived greater source expertise, but that did not translate to greater perceived message credibility or greater effects on behavioral intentions. This finding suggests that in the context where the absence of source information is the norm, traditional source credibility markers may become irrelevant to message evaluation.

We hypothesized, based on the HSM that users who perceive the information-seeking task to be important will engage in more message elaboration and consequently be more influenced by the explanation provided. The findings are inconsistent with this hypothesis. This study contributes to the literature on message completeness by demonstrating its effect in the context where a small amount of information is being communicated. It suggests if a message is packaged in a way that does not require much cognitive effort to process, it will be processed and be able to influence both low and high task importance.

One question worth considering is, "In other similar contexts such as social media and informal conversation, will a layperson who offers advice with an explanation exert more influence compared with a doctor who is too busy to provide an explanation?" If the answer is yes, this can be quite worrying because those who lack the knowledge will not be able to assess the accuracy of the explanation provided. The findings from this study highlight the need for doctors to spend time explaining their advice to patients.

### *Limitations*

There are several limitations to the study. First, this study did not control for the length of a message when examining the effect of message completeness, whereas most studies in the past have. However, the fact that the findings replicated closely between the two messages that varied in length suggests that message length was unlikely to introduce significant bias to the findings.

Second, the message elaboration items, which were adapted from research on the cognitive mediation model (Eveland et al., 2003), focused specifically on the process of linking the information presented with what one knows, as opposed to focusing on the number of thoughts that one generates in a thought-listing procedure. These differences could affect the comparability of the findings. However, if the theory does hold, the results should not differ substantially from previous studies, given that the measures used are highly valid and reliable.

Third, like most studies in social science, this study drew its sample from college students who may not be representative of the general population (Henrich et al., 2010). However, the majority of the sample was from a nonindustrialized area, where family income was low. Thus, they were arguably different from the college students in developed countries.

### *Implications*

This study offers evidence consistent with the conclusion that the inclusion of an explanation can lend credibility to replies on an online discussion board and subsequently lead to an intention to engage in safe sex. To establish credibility on a health discussion board, moderators do not need to invest in recruiting physicians, but rather encourage users to provide explanations and necessary facts when posting a reply. Doctors or experts may be recruited to help check the accuracy of the advice posted to reduce misinformation. Future researchers may consider replicating this study in different online platforms such as Facebook and Twitter.

This study serves as a replication of prior experiments on the HSM. The fact that message completeness and source expertise do not vary as a function of task importance raises a question about the boundary conditions of the HSM. Perhaps evaluating a short, straightforward message does not require any more cognitive effort than that needed to read and understand it. Hence, in this case, the default processing mode is likely to be systematic processing, and a source heuristic may become less relevant. These boundary conditions are worth exploring, as they can be the key to more accurate predictions of short message communication.

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## Appendix A—Questions and Answers Presented in the Experimental Websites

### *Message 1*

*Subject: I'm worried that I might have HIV. Please help me.*

I had sex with a prostitute (female: with a guy I met at a pub) on June 10. I used a condom, but I wasn't sure whether there was a leak. Eight weeks later, I went to a clinic for a blood test. It took only 30 minutes. It was negative. I didn't know what kind of test it was. Three months and two weeks later, I noticed some symptoms that really worried me. For the past 20 days, I have had a fever, a headache, rashes that look like mosquito bites all over my body and face, swollen lymph nodes beside my ears and neck, a sore throat, a pain in the penis (female: vagina), and it hurts when I pee. I am under a lot of stress so I would like to ask if there is a chance that I might have contracted HIV. Have there been cases where there were symptoms, but the blood test was negative? Please advise me. I'm really worried about it. What should I do?

Reply (*Low completeness condition*)

1. It is unlikely that your symptoms are due to HIV because your blood test was negative and you used a condom.

2. It is extremely unlikely for people with a negative blood test result to have HIV symptoms.
3. If you want to be certain that you are safe, go for another blood test.

Reply (*High completeness condition*)

1. It is unlikely that your symptoms are due to HIV because your blood test was negative and you used a condom. A 30-minute test is called the Rapid HIV test. It tests whether you have HIV antibodies, and patients get their results within five to 30 minutes. Its result is reliable. The proper use of a condom will significantly help reduce the risk of HIV infection. Condoms do not break if there is no pushing force after ejaculation.
2. It is extremely unlikely for people with a negative blood test result to have HIV symptoms. If the virus hasn't spread into your bloodstream, its concentration is too low to cause your body to malfunction.
3. HIV symptoms appear one to two years after infection. In some cases, the symptoms only start to appear after 10 years. So, in your case it's not HIV symptoms. If you want to be certain that you are safe, go for another blood test. This will help to confirm whether your first blood test was accurate.

***Message 2***

*Subject: Cut on my tongue*

I have a small cut with a little blood on my tongue. I accidently bit my tongue while I was eating. If I kiss someone two to three days after that, is there a possibility of contracting HIV from my partner?

Reply (*Low completeness condition*)

It is extremely unlikely, especially if your partner does not have a cut in her or his mouth. Don't worry.

Reply (*High completeness condition*)

It is extremely unlikely, especially if your partner does not have a cut in her or his mouth. Don't worry. There might be some HIV viruses in the saliva, but it's not enough to infect another person. However, if someone with gum disease and blood mixed in the saliva happens to kiss someone with a cut in his or her mouth, then there is a risk of infection. In your case, the cut is small, and the bleeding should have already stopped, so there is not enough blood to serve as a mediator for the infection. The only exception is if you and your partner had a very passionate kiss and both have a bloody wound in your mouths.

**Appendix B—Samples**

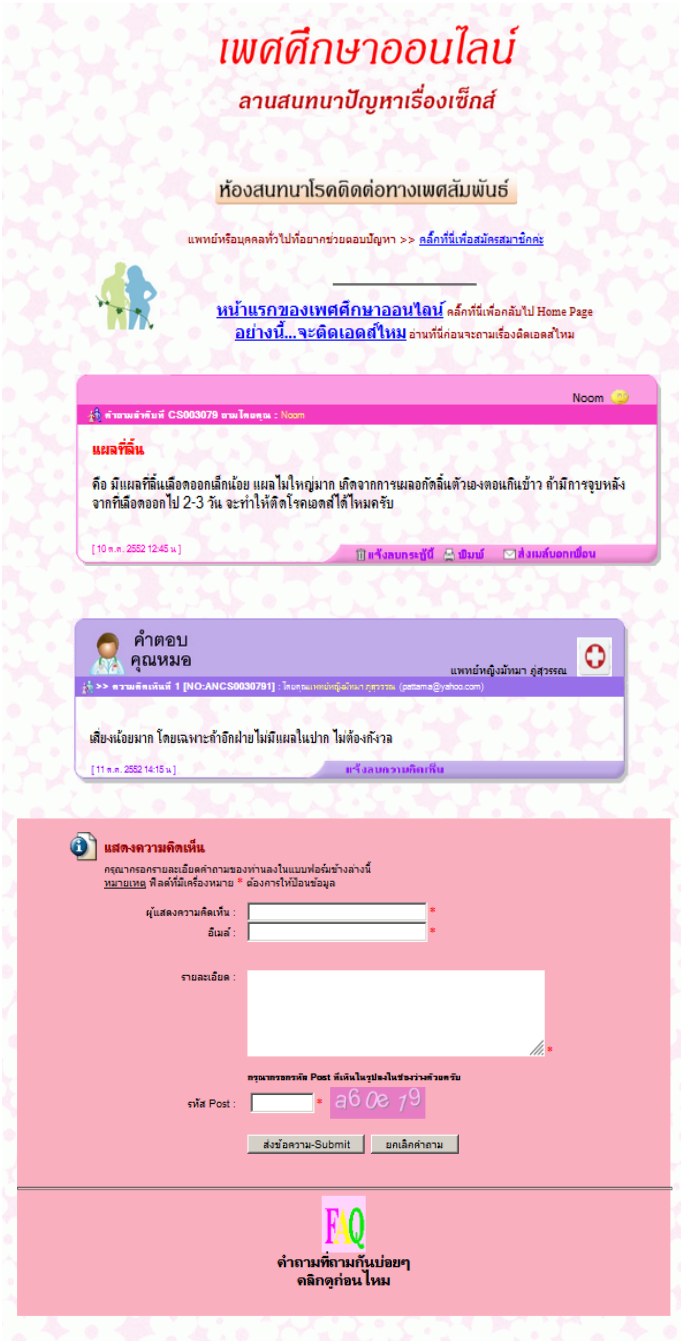


***Figure B1. A sample of the experiment website.***


***Figure B2. A sample of a question posted and a reply from a doctor.***

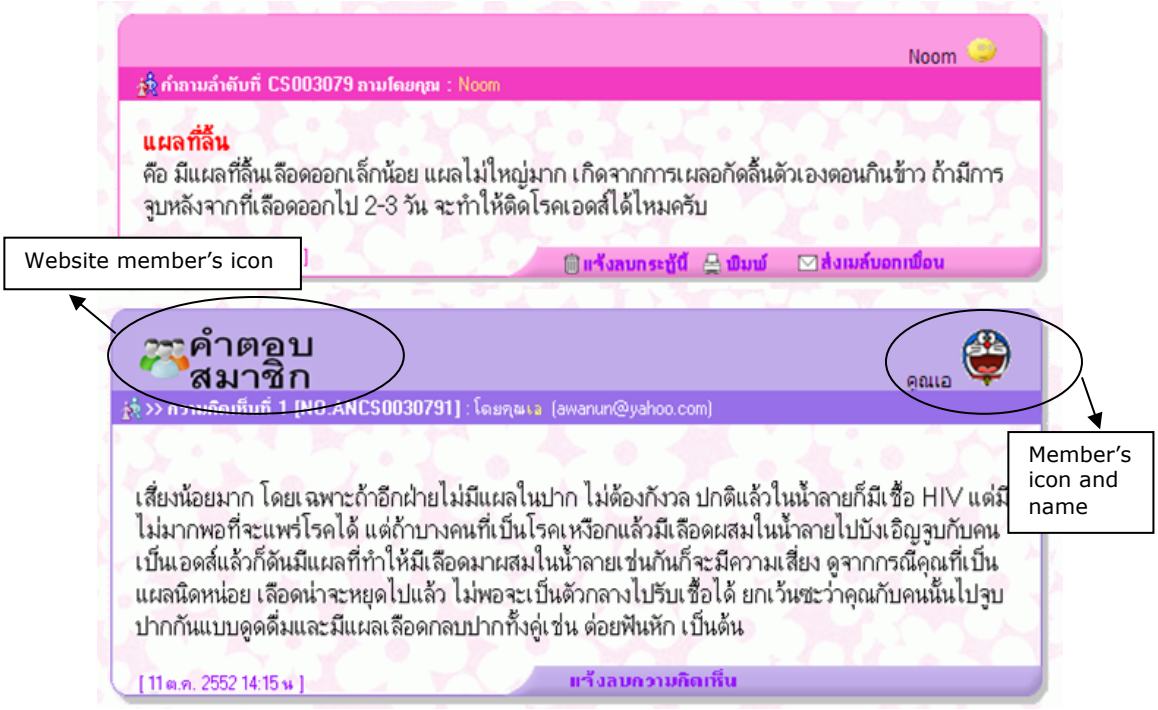


***Figure B3. A sample of a question posted and a reply from a website member.***