Social media and credibility indicators: The effect of influence cues

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Abstract
Guided by the MAIN model, this study examines how individuals evaluate the source credibility of tweets and retweets based on non-content attributes. Three types of heuristics were examined, including authority, identity, and bandwagon cues. Findings suggest that all three heuristics impacted source credibility perceptions to some extent. Authority cues most strongly influenced source credibility perceptions, and cue-cumulative effects were demonstrated in which different heuristics triggered by different agency cues increased perceptions of credibility. Moreover, the presence of retweets reduced perceptions of source credibility compared to conditions with no retweets.

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1. Introduction

The proliferation of social media platforms provide individuals with multiple choices of information sources, especially for risk and health message dissemination (Westerman, Spence, & Van Der Heide, 2014). The collaborative and participatory features of online technologies make user-generated content on social media widely adopted among certain audiences (Duffy & Thorson, 2009). Online information processing may become more challenged as growing access and affordability to co-create information on social media increase. Thus, one of the major questions concerning information in online environments surrounds how people judge the source credibility of the risk and health information on social media (Westerman, Spence, & Van Der Heide, 2012; Lachlan, Spence, Lin, Del Greco, & Najarian, 2014; Spence, Lachlan, Lin, & del Greco, 2015; Lachlan, Spence, Lin, Najarian, & Del Greco, 2016). In the United States, there is an alarming infection rate of HIV, chlamydia, and gonorrhea among young people between 15 and 24 (Williams, Pichon, & Campbell, 2014). These and other health threats illustrate how critical it is to provide theoretical guidance for communicating about risk and health information on social media. As individuals develop new ways to process information in these environments, the MAIN model (Sundar, 2008) is well situated to provide a framework to explain and predict perceptions of source credibility. Consistent with this model, the current study evaluates information cues (agency cues), authority heuristic, identity heuristic, and bandwagon heuristic in the social media environment of Twitter.

1.1. Social media and source credibility judgment

Social media are a group of interactive, collaborative, conversational, and community-based systems built upon “the ideological and technological foundations of Web 2.0” (Kaplan & Haenlein, 2010, p. 61; Mayfield, 2008). These systems have not only become significant information sources in daily life, but have become especially significant during threat situations with high uncertainty (Westerman et al., 2014; Lachlan, Spence, Lin, Del Greco, & Najarian, 2014; Lachlan, Spence & Lin, 2014). A survey conducted by Pew reported that over 73% of adult Americans were online information users, 80% of whom have sought health information online (Fox, 2011). Social media such as Facebook, Twitter, and short message services (SMS) are widely applied to promote public health-related issues, including sexually transmitted disease prevention, condom use, HIV prevention, and Chlamydia prevention (Jones, Baldwin, & Lewis, 2012; Purdy, 2011; Rice Tulbert, Cederbaum, Adhikari, & Milburn, 2012). In recent years, the Centers for Disease Control and Prevention (CDC) and nongovernmental organizations have also devoted more attention to the use of social media, building guidance protocols for epidemic tracking and health message...
dissemination (e.g., CDC Social Media Tools, Guidelines and Best Practices, 2014, January 22). Compared to legacy media, social media have revolutionized the way people communicate and process information within many contexts, such as infectious disease prevention, hygiene, and the emergency alert and control for public health and safety (e.g., Ratzan, 2011). Empirical evidence indicates that traditional media often rely on social media to identify breaking news in real time, such as the case of tweet updates about the 2013 Boston Marathon bombing. Diverse social contexts converge together on social media systems, which provide comprehensive information outlets from various sources (Shoemaker & Vos, 2009). These sources simultaneously generate the attributes of various messages to online users, which may either facilitate or thwart social influence (Walther, DeAndrea, Kim, & Anthony, 2010).

The openness of participation for user-generated content online also increases the likelihood of poor quality messages, anecdotes, and misinformation, which challenges users’ information self-organizing, especially in uncertain situations with potential risk (Lachlan, Spence, Edwards, Reno, & Edwards, 2014; Ratzan, 2011; Westerman et al., 2014). Although previous studies revealed a higher level of credibility perceived in social media active updates rather than in traditional media crisis coverage, assurance of online content quality is lacking (Horrigan & Morris, 2015; Procopio & Procopio, 2007; Sundar, 2008). As online users bypass professional gatekeepers such as editors in traditional media and directly confront primary information, the gatekeeping function on social media shifts from content producers to content consumers (Haas & Wearden, 2003; Spence, Lachlan, Spates & Lin, 2013; Spence, Lachlan, Westerman, & Spates, 2013). As co-generated content and mutually contingent responses of online users increase, the gatewatching of source credibility has relied more on users themselves (Bruns, 2008; Spence, Lachlan, Spates, Shelton, Lin & Gentle, 2013).

Previous studies suggest that social media have served as a prominent information source in risk events, even when the accuracy of the online disseminated messages was unclear (Sutton, Palen, & Shklovski, 2008; Lachlan, Westerman, & Spence, 2010). In order to reduce uncertainties and to learn new information, individuals engage in active information seeking (Brashers, Neidig, Haas, Dobbs, Cardillo, & Russell, 2000; McIntyre, Lachlan, & Spence, 2012; Nelson, Spence, & Lachlan, 2009; Spence et al., 2005; Westerman et al., 2014). As risks unfold, people are compelled to seek information, and increasingly consume updated information to stay informed of efforts related to warning, rescue, and recovery (Ulmer, Sellnow, & Seeger, 2007; Wachtendorf, 2004). Given the high stakes associated with misinformation during risk events, it is critical to provide evidence-based guidelines for source credibility judgment on social media.

A widely-accepted premise for online credibility perception in the literature posits that individuals are more dependent on cues and heuristics than they would be in face-to-face communications (Walther & Jang, 2012). In light of social media technological affordances and the threat of information overload, individuals tend to engage in cognitive heuristic processing with the least effort; thus, effortless information judgments are triggered prior to more systematic, cognitive analysis (Chen & Chaiken, 1999; Metzger & Flanigin 2013; Metzger, Flanigin, & Medders, 2010; Walther, 1994). To reduce the risk-related uncertainty, heuristic shortcuts on social media, such as source or design features, not only invoke heuristic processing but may also assist subsequent systematic information seeking (Sundar, 2008). Based on the aforementioned notions, Sundar (2008) suggests the application of heuristic cues to effectively guide the public toward accurate credibility judgments.

Research indicates that information source can influence online credibility impression (Fogg & Tseng, 1999). Given the aforementioned gatekeeping functions on social media, source credibility may serve as a prerequisite for selective information consumption (Xu, 2013). Based on extant literature in communication and social psychology, source credibility is not an objective property of information quality, but is conceptualized as a perceptual variable “concerning the believability of a communicator” (O’Keefe, 1990, p. 181). Source credibility has been typically characterized as comprised of three dimensions (McCroskey & Teven, 1999), including expertise/competence (i.e., the degree to which a perceiver believes a sender to know the truth), trustworthiness (i.e., the degree to which a perceiver believes a sender would tell the truth as he or she knows it), and goodwill (i.e., the degree to which a perceiver believes a sender has his or her best interests at heart). Although previous research has approached sources of credibility perceptions on multiple extant theoretical models and various social media environments (e.g., Sundar, Oeldorf-Hirsch, & Garga, 2008; Walther et al., 2010), Sundar’s (2008) MAIN model within a Twitter context was employed for the current study.

1.2. The MAIN model and the effects of agency cues

Focusing on online credibility assessment as its primary outcome, the MAIN model (Sundar, 2008) outlines four technological affordances presented in most social media and explicates the process how interface cues embedded in those affordances, trigger cognitive heuristics about the nature of the underlying content. One example is that of the agency cue. When an agency, such as a media site or an online user was identified by a receiver as a source, it would in turn affect the receiver’s credibility assessment (Sundar, 2008). As noted, various heuristics based on agency cues on social media trigger different levels of credibility perceptions. For instance, online users may use the ratings and review recommendation agents on Amazon to make purchase decisions (Lee & Sundar, 2012). It is suggested that individuals online will utilize similar agents such as the number of followers and the speed of update on Twitter to evaluate the credibility of the tweets (Westerman, Spence, & Lachlan, 2009). In the current study, the effects of authority, identity, and bandwagon cues related to agency affordance are investigated.

1.3. Authority cues and identity cues

Authority cues serve as “a major criterion for assigning credibility to a website” by assessing “whether the source is an official authority or not” (Sundar, 2008, p. 84). The ability of identifying expertise and authority, which imply the knowledge and skills of the source, has been widely recognized as a key component of source credibility in early persuasion research (e.g., Stiff, 1994; Fogg & Tseng, 1999). These cues may trigger authority heuristics, which are consistent with the endorsement-based heuristics pertaining to the quality and reliability of message content (Hilligoss & Rieh, 2008; Sundar, Oeldorf-Hirsch, & Garga, 2008). For instance, individuals tend to trust and follow the advice given by the websites of other organizations (Briggs, Burford, De Angelis, & Lynch, 2002). Authority cues assist in the evaluation of source credibility, especially in risk and health issues, given the inequality of information flow between content producers and consumers. Previous research suggests that individuals were more influenced by a medical expert or official authorities, as such tweets generated by American Heart Association (Westerman et al., 2014).

Another set of agency cues identified by Sundar (2008) are identity cues. Identity cues are those that trigger credibility
perceptions based on the allowance of users’ self-identity assertion through agency affordances on social media (Sundar, 2008). Given information anonymity and aggregated authorship online, information associated with individual identities, such as the tweets posted by a peer on Twitter, might imply its content quality to a perceivable receiver who assess a peer’s identity cues may overlook their personal idiosyncrasies, and focus instead on the received affiliation with the peer (Lee, 2006). Thus, a tweet from a peer would enhance credibility appraisal to an extent that would not be found in response to a tweet from a stranger.

Previous studies on authority and peer information sources during nation-wide disasters have provided consistent support for their high credibility (e.g., Lachlan, Spence, & Eith, 2014). Sundar (2008) has suggested that authority heuristics are especially effective in impacting younger adults and youths who are more accustomed to obedience. This research also suggests that younger adults would be influenced by peers and group insiders (Sundar, 2008). Social networking and information aggregation on social media provide potential for peer-to-peer credibility assessment, which may also undermine traditional authorities (Flanagin & Metzger, 2008, 2013). It is, therefore, important to re-evaluate the persuasive effects of authority and identity cues in social media.

However, compared with legacy media, social media afford users multiple distributed authority cues instead of a single authority based on scarcity and hierarchy, which enhanced authority heuristics (Madden & Fox, 2006). As the uncertainty and information inequity in health and risk situations could not guarantee the consistency of peer cues during health and risk events, authority cues influenced decisions (Sundar, Xu, & Oeldorf-Hirsch, 2009). Given that Sundar (2008) found that authority cues are among the most robust criteria in the credibility research literature, the following hypotheses are proposed:

H1. Higher levels of credibility will be assigned to tweeted risk information from an expert than that originating from a peer.

H2. Higher levels of credibility will be assigned to tweeted risk information from a peer than that originating from a stranger.

1.4. Bandwagon cues

The third type of agency cues under consideration are bandwagon cues, which trigger credibility processing that employs the following logic: “if others think that this is a good story, then I should think so too” (Sundar, 2008, p. 83). Previous studies indicate that the perceived trustworthiness of a website or a source may be based on aggregated feedback (c.f. Flanagin & Metzger, 2008, 2013). There is ample evidence that people utilize networks of peers and social computing applications for credibility evaluations, such as recommendation agents on Amazon or eBay; regardless of individual opinions regarding a product, people may be more reliant on collective comments and testimonials for purchase decision making (Flanagin & Metzger, 2008, 2010; DeAndrea, Van Der Heide, Vendemia, & Vang, 2015; Van Der Heide & Lim, 2015). Studies by Sundar and Nass (2001) and Sundar, Knobloch-Westerwick, and Hastall (2007a, 2007b) identified bandwagon heuristics as the most powerful cognitive shortcuts for evaluating online news, with the results that the news stories selected by other users received the highest ratings. Further, bandwagon cues with negative valance were revealed to influence cognitive processing more than the cues with positive valance (Chevalier & Mayzlin, 2006).

Mixed evidence has been offered concerning the influence of bandwagon heuristics when placed alongside other identity heuristics. For instance, Sundar et al. (2009) suggested that bandwagon and peer cues were more persuasive than authority cues for commercial decisions on Amazon; yet authority cues were more effective when bandwagon or peer cues were inconsistent. There is also a dearth of data concerning the effects of bandwagon heuristic specifically in the context of Twitter. Lee and Sundar’s (2012) explored the source credibility of health messages on Twitter, and found that professional accounts with large numbers of followers were perceived to be more credible than a layperson with the same numbers of followers; whereas a layperson account with large numbers of followers retweeting a high-authority source was perceived to be less credible than a layperson account with the same numbers of followers retweeting a low-authority source. Compared to Lee and Sundar’s (2012) study, the current study designates retweets, a phenomenon unique to Twitter, to invoke bandwagon heuristics, emphasizing the collective inputs of its agency feature. To provide a clear cohesive guideline for the source credibility perceptions in risk and health communication, the current study attempts to explore the influence power among the three agency heuristics on Twitter. Therefore, the following research question is posited:

RQ1. Will authority, identity, and bandwagon heuristics differ in their ability to induce source credibility in Twitter risk messages?

2. Methods

To examine the hypotheses and research question in the current study, a 2 (no retweet vs. retweets) × 3 (messages from an expert vs. messages from a peer vs. messages from a stranger) post-test only quasi-experiment was conducted using an online survey. A mock Twitter page was created to represent a user who devoted a few of their most recent posts to disseminate information regarding a recent rise in drug-resistant Gonorrhea.

Participants were informed about the research opportunity in class and were directed to a website for the study. Participants first read the informed consent and after choosing to continue, were randomly assigned to one of the experimental conditions. Respondents were asked to take their time to view the page. After viewing the Twitter page, participants were directed to respond to a questionnaire concerning their perceptions of source credibility and other demographic questions.

2.1. Participants

Participants (N = 696) were recruited from undergraduate classes at a large Southern university and through social media. Extra credit was offered in exchange for students’ participation. Among these participants, 44.1% (n = 307) were males and 55.9% (n = 365) were females, ranging in age from 18 to 79 years (M = 20.89, SD = 6.43). A large majority of the participants were Caucasians (71.4%), followed by Asians (9.2%), African Americans (7.6%), Latinos (4.9%), and other races.

2.2. Materials

Participants were randomly assigned to view one of the six mock Twitter pages. The Twitter pages were designed to display a profile owner whose most recent tweets involved information concerning the rise of the drug-resistant Gonorrhea. This topic was chosen as it was a health risk which was not covered extensively by media near the time of the data collection. Gonorrhea is a relevant health threat to all sexually active persons including a college audience, thus making the topic relevant to the chosen sample. In addition, the topic does not necessarily present immediate dangers to participants such as an earthquake; participants would perceive
the Twitter page as real without immediate updates. The Center for Disease Control and Preventions (CDC) Twitter account was adapted as the expert user (authority heuristic), given that an “official” user associated with the topic would be more realistic. A student Twitter profile was adapted as the peer user, given that participants would perceive this user as an in-group member; and a random Twitter account without any specific affiliation identification was adapted as the “stranger” user.

Six mock Twitter pages presented conditions with different message sources and different update patterns of tweets. The first Twitter page represented the CDC, with no retweets or replies in the messages. The second Twitter page represented a college student Twitter page with no retweets or replies in the messages, who self-identified as affiliated with the Southern university by using its branding in the cover image. The third Twitter page was an account page of a stranger, without any retweets, reply messages, or any specific identification information. The fourth Twitter page was the stranger profile page with obvious retweets from the CDC. The fifth Twitter page was the stranger’s page with obvious retweets from peers with the university identity avatars. Finally, the sixth Twitter page was the stranger's page with obvious retweets from other random strangers without any identifications. Retweets and Reply conditions for the CDC and peer were not used, as it was determined highly unlikely that the CDC would retweet messages from a layperson and such conditions would not be ecologically valid.

2.3. Measures

After viewing the mock Twitter page, participants were guided to complete a posttest survey about source credibility. McCroskey and Teven’s (1999) source credibility scales with three separate constructs (i.e., competence, goodwill, and trustworthiness) were used. Each of the constructs consists of six separate semantic differential type items, anchored with two antonyms (e.g., moral-immoral) and a seven-point response scale ranging from 1 to 7. Overall scale reliability was 0.95; reliability coefficients of 0.93 for competence, 0.87 for goodwill, and 0.92 for trustworthiness. This scale has been used similarly in previous online source credibility analyses by Westerman et al. (2014), Edwards, Spence, Gentle, Edwards, and Edwards (2013), and Westerman et al. (2012), with acceptable reliabilities ranging from 0.76 to 0.90.

3. Results

3.1. Authority and identity heuristics

H1 and H2 predicted that authority cues would be most effective at inducing credibility perceptions, followed by those from peers, and then those from strangers. To test the hypotheses, a one-way multivariate analysis of variance (MANOVA) with Helmert contrasts was performed to compare the differences among the conditions of an expert’s, a peer’s, and a stranger’s Twitter pages without any retweets. Twitter user identity were treated as independent variables, whilst three dimensions of source credibility perceptions, including competence, goodwill, and trustworthiness, were measured as dependent variables. The dependent variables were analyzed in clusters based on their conceptual relatedness, significant Pearson’s r, and insignificant Box’s M test (see Table 1).

The analysis produced a significant multivariate main effect for manipulation, Wilk’s $\Lambda = 0.82$, Multivariate $F(6, 636) = 10.94$, $p < 0.001$, $\eta^2_p = 0.09$, $(1 - \beta) = 1.000$, suggesting significant differences between the three identities for source credibility perceptions. Hermert contrasts showed that participants viewing the conditions of the CDC Twitter page significantly perceived higher levels of competence ($M = 4.72, SD = 1.21$), goodwill ($M = 4.60, SD = 1.11$), and trustworthiness ($M = 4.78, SD = 1.10$) than those in the conditions of the peer and stranger Twitter page. The results found no significant differences between the conditions of a peer’s Twitter page and a stranger’s in perceiving the three dimensions of source credibility (see Table 2). Therefore, higher levels of credibility were assigned to tweeted risk information from an expert than that originating from a peer; H1 was supported. However, there were no significant different levels of credibility perceptions assigned to tweeted risk information from a peer and that from a stranger (see Table 2); therefore, H2 was not supported.

3.2. Interactions among different identity and bandwagon heuristics

To answer RQ1 and compare the effects of authority, identity, and bandwagon heuristics and their interactions on the three dimensions of source credibility perceptions, a two-way MANOVA with 2 (no retweet vs. retweets) $\times$ 3 (messages from an expert vs. messages from a peer vs. messages from a stranger) design was conducted. Retweet pattern and risk message source identity were treated as two independent variables. The dimensions of source credibility, namely competence, trustworthiness, and goodwill, were measured as three continuous dependent variables. The dependent variables were analyzed in clusters based on their conceptual relatedness, significant Pearson’s r, and insignificant Box’s M test (see Table 3).

The MANOVA yielded a significant multivariate interaction effect between retweet pattern and risk message source identity, Wilk’s $\Lambda = 0.94$, $F(6, 1310) = 7.25$, $p < 0.001$, $\eta^2_p = 0.03$, $(1 - \beta) = 1.000$, a significant multivariate main effect for retweet presence, Wilk’s $\Lambda = 0.99$, $F(3, 655) = 3.08$, $p = 0.027$, $\eta^2_p = 0.01$, $(1 - \beta) = 0.721$, and a significant multivariate main effect for risk message source identity, Wilk’s $\Lambda = 0.96$, $F(6, 1310) = 4.46$, $p < 0.001$, $\eta^2_p = 0.02$, $(1 - \beta) = 0.986$. Thus, the results suggested that there were differences in the pattern of source credibility perceptions on Twitter’s risk messages based on their source identities and retweet patterns. The follow-up univariate statistics for each dependent variable are reported below.

3.2.1. Competence

A significant disordinal interaction effect of risk message source identity and retweet pattern was detected on competence perceptions, $F(2, 657) = 21.33$, $p < 0.001$, $\eta^2_p = 0.06$. Table 4 reports the means and standard deviations associated with this interaction. More specifically, participants perceived the highest levels of source competence about a target Twitter user when viewing the CDC Twitter page without any retweets ($M = 4.72, SD = 1.21$); whereas participants perceived the lowest level of source competence when viewing a peer’s Twitter page without any retweets ($M = 3.50, SD = 1.24$). The results also yielded a significant main effect for risk information source identity on competence, $F (2, 657) = 12.48$, $p < 0.001$, $\eta^2_p = 0.04$; yet, no main effect for retweet pattern was found, $F (2, 657) = 1.31$, $p = 0.253$. Due to the higher-order interaction, no further analyses for main effects were undertaken.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Competence</th>
<th>Trustworthiness</th>
<th>Goodwill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>0.780***</td>
<td>0.652***</td>
<td>0.742***</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box’s M test $= 9.90'$</td>
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<td></td>
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<tr>
<td>$N = 323$</td>
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<td></td>
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</tr>
</tbody>
</table>

Note: *** $p < 0.001$, * $p < 0.638 > 0.01$. 

Table 1: One-way MANOVA: multicollinearity of competence, goodwill, and trustworthiness.
3.2. Trustworthiness

A significant disordinal interaction effect of risk message source identity and retweet pattern was also detected on trustworthiness perceptions, $F(2, 657) = 7.99, p < 0.001, \eta^2 = 0.02$. Table 5 reports the means and standard deviations associated with this interaction. More specifically, participants perceived the highest levels of source trustworthiness about a target Twitter user when viewing the condition of the CDC Twitter page with no retweets ($M = 4.78, SD = 1.10$), followed by the conditions when participants viewed a stranger retweeting risk information from peers ($M = 4.43, SD = 1.17$), and a stranger retweeting the CDC ($M = 4.18, SD = 1.14$). Moreover, participants perceived the lowest levels of source trustworthiness about a target user when viewing the condition of a peer’s Twitter page with no retweets ($M = 3.84, SD = 1.24$). The results also yielded a significant main effect for risk information source identity on competence, $F(2, 657) = 9.12, p < 0.001$, $\eta^2 = 0.03$; yet, no main effect for retweet pattern was found, $F(2, 657) = 0.50, p = 0.482$. Due to the higher-order interaction, no further analyses for main effects were undertaken.

3.2.3. Goodwill

Consistently, a significant disordinal interaction effect of risk message source identity and retweet pattern was detected on trustworthiness perceptions, $F(2, 657) = 14.05, p < 0.001, \eta^2 = 0.04$. Table 6 reports the means and standard deviations associated with this interaction. More specifically, participants perceived the highest levels of source goodwill about a target user when viewing the condition of the CDC Twitter page with no retweets ($M = 4.60, SD = 1.11$), whereas participants perceived the lowest levels of source goodwill when viewing a peer’s tweets with no retweets ($M = 3.93, SD = 1.26$). Importantly, participants viewing the condition of a stranger retweeting peers ($M = 4.43, SD = 1.12$) were more likely to perceive higher levels of goodwill than those viewing the condition of a stranger retweeting the CDC ($M = 4.21, SD = 1.20$). The results also yielded a significant main effect for risk information source identity on competence, $F(2, 657) = 4.60, p = 0.10, \eta^2 = 0.01$; yet, no main effect for retweet pattern was found, $F(2, 657) = 1.60, p = 0.207$. Due to the higher-order interaction, no further analyses for main effects were conducted.

### Table 2

<table>
<thead>
<tr>
<th>Credibility</th>
<th>$F$</th>
<th>$df$</th>
<th>$\eta^2$</th>
<th>Helmert contrast 1</th>
<th>Helmert contrast 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>10.936*</td>
<td>6636</td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goodwill</td>
<td>11.84*</td>
<td>2230</td>
<td>0.17</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>23.43*</td>
<td>2230</td>
<td>0.13</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

Note: *$p < 0.001$. 10.936 = Exact statistics, Helmert Contrast 1 = Condition of CDC without retweets compared with condition of peer without retweets + condition of stranger without retweets; Helmert Contrast 2 = Condition of peer without retweets compared with condition of stranger without retweets.

### Table 3

<table>
<thead>
<tr>
<th>Variables</th>
<th>Competence</th>
<th>Trustworthiness</th>
<th>Goodwill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.759***</td>
<td>0.646***</td>
<td>0.747***</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box’s M test = 26.09*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 663</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: *$p < 0.001$, $p = 0.687 > 0.01$.

### Table 4

<table>
<thead>
<tr>
<th>Risk message source identity</th>
<th>Retweet presence</th>
<th>Retweet absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>n M SD</td>
<td>n M SD</td>
<td></td>
</tr>
<tr>
<td>The CDC</td>
<td>130 3.72 1.30</td>
<td>132 4.72 1.21</td>
</tr>
<tr>
<td>Peer</td>
<td>74 3.97 1.21</td>
<td>74 3.50 1.24</td>
</tr>
<tr>
<td>Stranger</td>
<td>136 3.81 1.29</td>
<td>117 3.62 1.27</td>
</tr>
</tbody>
</table>

Note: Interaction effect on Competence, $F(2, 657) = 21.33, p < 0.001, \eta^2 = 0.06$.

### Table 5

<table>
<thead>
<tr>
<th>Risk message source identity</th>
<th>Retweet presence</th>
<th>Retweet absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>n M SD</td>
<td>n M SD</td>
<td></td>
</tr>
<tr>
<td>The CDC</td>
<td>130 4.18 1.14</td>
<td>132 4.78 1.10</td>
</tr>
<tr>
<td>Peer</td>
<td>74 4.43 1.17</td>
<td>74 3.84 1.24</td>
</tr>
<tr>
<td>Stranger</td>
<td>136 4.16 1.32</td>
<td>117 3.94 1.09</td>
</tr>
</tbody>
</table>

Note: Interaction effect on trustworthiness, $F(2, 657) = 7.99, p < 0.001, \eta^2 = 0.02$.

### Table 6

<table>
<thead>
<tr>
<th>Risk message source identity</th>
<th>Retweet presence</th>
<th>Retweet absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>n M SD</td>
<td>n M SD</td>
<td></td>
</tr>
<tr>
<td>The CDC</td>
<td>130 4.21 1.20</td>
<td>132 4.60 1.11</td>
</tr>
<tr>
<td>Peer</td>
<td>74 4.43 1.12</td>
<td>74 3.93 1.26</td>
</tr>
<tr>
<td>Stranger</td>
<td>136 4.22 1.26</td>
<td>117 3.96 1.21</td>
</tr>
</tbody>
</table>

Note: Interaction effect on goodwill, $F(2, 657) = 14.05, p < 0.001, \eta^2 = 0.04$. 

4. Discussion

The current study examined the MAIN model (Sundar, 2008) and investigated how people evaluate the source credibility of tweets based on non-content attributes. Specifically, six experimental conditions within a risk/health domain were compared; these conditions were designed to elicit three forms of heuristics on a user page, including authority, identity, and bandwagon heuristics. The results suggest heuristics impacted source credibility perceptions of tweets; different heuristics impact perceived credibility at different levels. These findings, as well as limitations and directions for future research, are discussed below.

First, respondents who viewed the CDC Twitter page without any retweets perceived the highest competence among all the conditions. Further, there were significant differences for perceived goodwill and trustworthiness between the tweets on the CDC Twitter page and the other conditions. Compared to identity and bandwagon heuristics, the data suggests that the authority heuristics triggered by the expert agency on Twitter would serve as the strongest combination of heuristics in inducing source credibility evaluations. Additionally, the findings are consistent with previous research on health information seeking. People are prone to seek...
health risk information directly from official government websites or the accounts of health officials, as these are likely perceived to be more credible (e.g., Sundar, Rice, Kim, & Sciamanna, 2011; Spence et al., 2015).

Second, the data shows no significant differences between the tweets from a peer and the tweets from a stranger. Respondents perceived the lowest source credibility in the tweets from a peer across all the retweet absent conditions. The experimental design used a college student as the peer profile owner to disseminate drug-resistant Gonorrhea information, and the participants were college students. Although Gonorrhea is a relevant health risk to college students, it may be the case that few discuss it in public. Thus, given the expectation violation from their prior experience, the participants may question the competence of the person and the trustworthiness of the person or information. One might expect to see higher levels of goodwill for this condition, as a peer could be perceived to have a concern about similar others, but that result did not manifest. This could be because once a weak perception is made about a sources competence and trustworthiness, this prevents one from thinking specifically about their intentions. This explanation is speculative and requires further research. Furthermore, there was an absence of identity cues for the stranger across the conditions; participants could not use identity heuristics and prior experience to judge the stranger.

Although not significant, it is worth noting that in the retweet-present conditions the stranger retweeting the peer and stranger retweeting stranger accounts were all higher on the three dimensions of source credibility than were the peer or stranger with retweet-absent conditions. Sundar et al. (2007a, 2007b) proposed that the cue-cumulative effect was invoked when all the cues only trigger the same heuristics. The results further suggest cue-cumulative effect from both bandwagon and identity heuristics. The cue-cumulative effects proposed that the co-presence of more cues would enhance the positive effects of source credibility perceptions. In this condition, the retweeting provided more identity cues for credibility evaluation. Also, more peer cues may overwhelm the expectation violation concerns and create deindividuation effect, which makes participants more susceptible to believe in the messages. Thus, the bandwagon cues and identity cues boosted participants’ evaluations of credibility.

The current findings may also have implications for learning processes associated with at-risk communities, and the ways in which responses to risk communication messages vary across diverse audience groups. Differences in access, message placement and response to risk messages across diverse subpopulations are well documented (Lachlan & Spence, 2009, 2010, 2014; Burke, Spence, & Lachlan, 2010; Lachlan, Burke, Spence, & Griffin, 2009; Lachlan, Spence, & Eth, 2007; Spence, Lachlan, & Burke, 2011). More recent research evidence seems to indicate that authoritative cues may be especially effective in informing and motivating members of historically underserved groups through some expectation violation process. When messages are targeted specifically toward at-risk communities, messages embedded with authority cues may come as a surprise and underscore the importance of the risk in question, in turn driving elaboration and/or perceptions of source credibility (Spence, Lachlan, Westerman, et al., 2013; Spence, Lachlan, Spates, & Lin, 2013). Future research should examine the separate and combined effects of authoritative, bandwagon, and identity cues across diverse audience groups.

4.1. Limitations

This study has some limitations. First, each mock Twitter page only displayed one page of tweets addressing the risk health topic, which may affect ecological validity. In a natural setting, individuals are able to scroll back through previous tweets to see what other topics a page owner tweeted about. Also, although Gonorrhea is an acute health risk, it is not an urgent one that inherently requires highly-frequent updates. Thus, this might affect credibility judgments, especially on the peer condition. A future study may choose another risk health topic to test. Although a convenience sample of college students was used in the experiment, this was intentional because of the presence of a peer condition and thus the sample was selected for the experimental manipulation (Spence & Lachlan, 2010; Spence, Lachlan, & Rainear, 2016). Although college students are heavy social media consumers, and the Gonorrhea topic is relevant to the sample, future studies may also look at how other populations respond to a similar topic.

5. Conclusion

The current study examined heuristic processing on source credibility evaluations regarding a risk health topic. The results suggest that participants view authority cues as the most credible. Thus, it is critical for public health communities or federal agencies to use social media to directly communicate with the public during health risk situations. Also, when a public health organization or other official agencies are not available to reach certain public communities, having more people, as well as members of the same community disseminate the information on social media may achieve similar effects.

Overall, the findings indicate that authority cues most influence source credibility perceptions. The findings also demonstrate cue-cumulative effects where different heuristics triggered by various agency cues may increase the credibility perceptions. Future studies should continue to test other types of cues in the MAIN model, and investigate the cumulative effects during the information processing on social media.

References


