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Pal, Anjan; Goh, Dion Hoe-Lian; Chua, Alton Yeow Kuan

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Salient Beliefs about Sharing Rumor Denials on the Internet

Anjan Pal

Wee Kim Wee School of
Communication & Information,
Nanyang Technological University
31 Nanyang Link, WKWSCI
Building, Singapore 637718.
(65) 86950289
anjanpal5@gmail.com

Alton Y. K. Chua

Wee Kim Wee School of
Communication & Information,
Nanyang Technological University
31 Nanyang Link, WKWSCI
Building, Singapore 637718.
(65) 67905810
altonchua@ntu.edu.sg

Dion Hoe-Lian Goh

Wee Kim Wee School of
Communication & Information,
Nanyang Technological
University
31 Nanyang Link, WKWSCI
Building, Singapore 637718.
(65) 67906290
ASHLGoh@ntu.edu.sg

ABSTRACT

In the era of social media, rumors spread faster and wider than ever before. After a rumor spreads, its effect can be curbed by issuing online refutation messages known as denials. Notwithstanding the potential of denials to reduce Internet users' likelihood to be misinformed, they generally remain less pervasive than rumors. Hence, there is a need to identify how users can be enticed to share denials. Informed by the literature, this paper argues that users' salient beliefs about sharing rumor denials could influence their intention to share such messages. Salient beliefs refer to beliefs about a behavior that are cognitively easy to access at any moment, and serve as primary determinants of performing the behavior. As a part of a larger ongoing project, this paper conducts a survey to identify salient beliefs about sharing rumor denials. The following salient beliefs were identified: Sharing denials help to spread the truth. Friends and the online community would encourage the behavior of sharing rumor denials. Source credibility of denials facilitates sharing of such messages. Significance of the findings and future research directions are highlighted.

Categories and Subject Descriptors

H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval – *Information Filtering*. H.3.5 [Information Storage and Retrieval]: Online Information Services – *Data Sharing*.

General Terms

Management, Measurement, Reliability, Verification.

Keywords

Denial; misinformation; online rumor; salient belief; social media.

1. INTRODUCTION

In the era of social media, online rumors become viral easily through electronic word-of-mouth. When they turn out to be false, they spark off unnecessary panic and anxiety [1]. The wide accessibility of false rumors not only diminishes the reliability of online information but also has detrimental effects on the society [2]. Rumors can even hamper the reputation of organizations [3]. For example, one of the fast food chain market leaders McDonald's was rumored on the Internet to be using red worm meat in its hamburgers. As a result of the tarnished reputation, its sales went down by about 30% in parts of the United States [3].

A possible way to address the threat of rumors on the Internet is the use of online rumor denials. In this paper, online rumor denials refer to messages communicated to users of the Internet mostly by authoritative sources to refute rumors, and spread the truth [4]. Prior studies suggest that rumor denials are effective in combatting rumors on the Internet [4, 5]. Exposure to denials reduces users' belief in rumors, and thus lowers individuals' rumor sharing propensity [5].

However, while comparing the spread of rumors and their denials in online setting, prior studies found the former to be more pervasive [6, 7]. Unlike rumors that can become viral easily, denials are likely to be muted. Even the spread of false information has been widely investigated in online setting [2, 6, 8] while the spread of refutation messages has hitherto attracted little scholarly attention. This serves as a call for identifying how users can be enticed to share rumor denials.

Therefore, as a part of a larger ongoing project that seeks to promote the virality of online rumor denials, this paper employs the theory of planned behavior (TPB) as a theoretical lens to understand users' beliefs about the behavior of sharing such messages. The TPB has demonstrated its value in identifying salient beliefs from a range of other beliefs [9, 10, 11]. In particular, salient beliefs refer to beliefs about a behavior that are cognitively easy to access at any moment, and serve as primary determinants of performing the behavior [10, 12, 13]. They are most likely to come to individuals' mind about a given behavior without prompting.

Informed by literature [10, 11, 13, 14], this paper argues that when rumor denials incorporate salient beliefs about the behavior

of sharing, the messages would stand a good chance to be shared. Messages incorporating salient beliefs about a target behavior have been effective in positively influencing the behavior in several offline contexts such as picking up litter [10], and motivating teenagers to wear helmets while cycling [14]. Beliefs such as picking up litter sets a good example for others, and parents would expect teenagers to wear bicycle helmets emerged as salient in such settings.

However, such an approach of understanding salient beliefs has neither been widely applied in the online setting nor in the context of rumors. Therefore, salient beliefs about sharing online rumor denials remain largely unknown.

Hence, the objective of this paper is to identify salient beliefs about sharing online rumor denials through the lens of the TPB. Its significance is two-fold. First, the paper draws from the literature, and applies the concept of salient beliefs in the context of sharing online rumor denials. Such an attempt has not been explored hitherto. Second, by identifying salient beliefs about sharing denials on the Internet, the paper highlights possible ways in which online rumor denials should be phrased in order to influence the target behavior of sharing such messages.

The remainder of the paper is structured as follows. The following section reviews the literature. This is followed by the methodology, which explains the procedures for questionnaire design, data collection, and method of analysis. The results are presented next. This is followed by a discussion of the key findings and a conclusion that provides notes on limitations, research significance, and potential directions for future research.

2. LITERATURE REVIEW

This research is underpinned by the TPB. It has been widely used to model human behavior, and inform the development of messages persuading individuals to engage in a target behavior [10, 11]. According to the TPB [9], behavioral intention is predicted by three factors: attitude, subjective norms, and perceived behavioral control. Attitude refers to individuals' evaluation of the behavior, which may be either positive or negative. Subjective norms refer to the perceived social pressure to perform the behavior. Perceived behavioral control refers to the perceived ease of performing the behavior, and the extent that performing the behavior is under volitional control.

These three factors are determined by three categories of beliefs, namely, behavioral beliefs, normative beliefs, and control beliefs respectively [10, 11]. Behavioral beliefs are those that can result in positive outcomes of a target behavior. Normative beliefs refer to the perceived behavioral expectations of one's important social referent individuals or groups on performing a target behavior. Control beliefs encompass the factors that facilitate performing a target behavior.

As shown in Fig. 1, the TPB suggests that the three belief categories determine behavioral intention by affecting attitude, subjective norms and perceived behavioral control [10, 11]. This in turn suggests that these belief categories can also help promote the behavioral intention to share online rumor denials. To do that requires identifying salient behavioral beliefs, salient normative beliefs, and salient control beliefs—which is the purpose of this paper.

The present study reviewed literature to identify potential beliefs about sharing online rumor denials. The following behavioral

beliefs that could entice users to share online rumor denials were identified: Sharing denials helps to spread the truth [5, 15], and reduce individuals' belief in rumors [4, 5]. It decreases individuals' likelihood to engage in rumor sharing behavior [5, 16]. Sharing denials reduces individuals' chances of being deceived by rumors [17, 18]. It allows users to engage in conversation through which individuals seek other related information about the situation to meet their informational needs [16, 19, 20]. This collaborative information seeking behavior and social exchange is notable in drawing attention of others in the online community [5, 19]. Sharing denials makes individuals feel good, and enhance reputation [20, 21]. In addition, it creates more opportunities for others to share the messages further [22]. The behavioral beliefs are listed in Table 1.

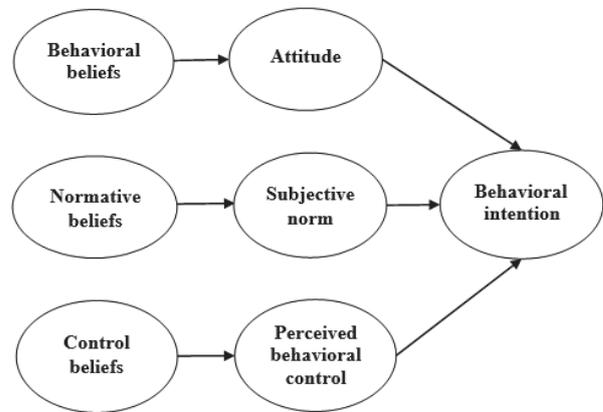


Figure 1. The links between beliefs and behavioral intention.

Table 1. List of behavioral beliefs

Behavioral Beliefs (BB _i)	References
BB1: Sharing denials will help to spread the truth.	[5], [6], [15]
BB2: Sharing denials will help to reduce belief in rumors.	[4], [5]
BB3: Sharing denials will help to reduce the spread of rumors.	[5], [16]
BB4: Sharing denials will minimize the chances of being deceived.	[17], [18]
BB5: Sharing denials is good for engaging in conversation.	[19], [20]
BB6: Sharing denials will help to get other related information.	[16]
BB7: Sharing denials will help to draw attention of others.	[5, 19]
BB8: Sharing denials will make me feel good.	[20], [21]
BB9: Sharing denials will enhance my reputation.	[20], [21]
BB10: Sharing denials will create more opportunities for others to share the messages further.	[16], [22]

In terms of normative beliefs, family members' encouragement could influence the behavior of sharing denials [22]. Friend

circles could also have an impact on users' intention to share denials [22, 23]. Some works found that when rumors have gained traction on the Internet, authorities often engage with public to debunk them [24]. Sharing denials could also be viewed as a norm for the online community in general [17, 23]. The normative beliefs are listed in Table 2.

Table 2. List of normative beliefs

Normative Beliefs (NB _i)	References
NB1: Family members would encourage me to share rumor denials.	[22]
NB2: Friends would encourage me to share rumor denials.	[22], [23]
NB3: Authoritative sources would encourage me to share rumor denials.	[24]
NB4: Online community would encourage me to share rumor denials.	[17], [23]

With respect to control beliefs, credible sources of denials could prompt sharing [4]. Intention to share is often triggered when denials cover a topic of common interest [20]. The tendency of sharing denials could be high among users who are motivated to help others and feel a sense of belongingness to the online community [20, 21]. Individuals' high perceived importance of messages is also responsible in the formation of behavioral intention of sharing those messages [16]. Individuals tend to share denials if they are confident of their knowledge and ability to assess the veracity of the messages [20, 21]. Conceivably, it is imperative for individuals to have time to share denials [25]. Additionally, individuals might wish to have full control over their privacy settings in order to share denials [26]. The control beliefs are listed in Table 3.

Table 3. List of control beliefs

Control Beliefs (CB _i)	References
CB1: Credible source of denial would encourage me to share it.	[4]
CB2: Shared interest of others about denial would encourage me to share it.	[20]
CB3: My motivation to help others would encourage me to share rumor denials	[20], [21]
CB4: My sense of belongingness to the online community would encourage me to share rumor denials.	[21], [24]
CB5: Importance of denial would encourage me to share it.	[5], [16]
CB6: My knowledge to judge the truthfulness of denial would encourage me to share it.	[20], [21]
CB7: My ability to verify denial would encourage me to share it.	[20], [21]
CB8: Availability of time would encourage me to share rumor denials.	[25]
CB9: Full control in my privacy setting would encourage me to share rumor denials.	[26]

3. METHODOLOGY

3.1 Questionnaire Design

The questionnaire contained two parts. The first part obtained participants' level of agreement with each of the 23 beliefs (10 behavioral beliefs + 4 normative beliefs + 9 control beliefs) identified from the literature as described in Section II. The second part of the questionnaire obtained participants' demographic information such as age, gender and educational qualification.

To develop the first part, a two-step approach was followed. In the first step, methods employed to design questionnaire in prior works related to the TPB were carefully reviewed. A methodological shift could be identified.

In some of the earlier works [9, 10, 13], every belief was converted into two questionnaire items: one tracking perceived agreement, and the other measuring perceived importance. Beliefs that showed relatively large product of perceived agreement and perceived importance were deemed to be salient.

Recent works however criticized the approach [27, 28]. This is because multiplying responses to two related items can result in statistically uninterpretable results as the products become highly susceptible to measurement errors. To alleviate the problem, an emerging body of literature recommends converting every belief into a single questionnaire item that would capture perceived agreement [27, 29]. These works suggest that the product of perceived agreement and perceived importance is not more informative than perceived agreement alone because when participants strongly agree with a belief, they are also likely to deem it as important and vice-versa. Therefore, asking both agreement and perceived value per belief is a redundant option. In fact, prior work empirically confirmed that capturing perceived agreement alone without the multiplicative component is the most parsimonious and reliable way to model the relation between salient beliefs and intention [27].

Informed by the recent methodological development, this research refrains from capturing perceived importance of the identified beliefs. Instead, it decided to convert each belief into a single questionnaire item that would capture participants' level of agreement. The questionnaire items were worded keeping in mind the context of online rumor denials.

The second step involved pre-tests. Five research assistants who were involved in Information Science research, and had the experience of coming across online rumors in the last two years were selected. They were asked to comment on the ease of understanding of the questionnaire items.

Based on their comments, the questionnaire items were iteratively rephrased until their coverage, face validity, and clarity were deemed satisfactory by all the five individuals. This practice of pre-testing to convert a belief into a questionnaire item has been widely followed in related works [11, 27].

The final questionnaire used a 7-point Likert-scale ranging from 1 (strongly disagree) to 7 (strongly agree). With respect to behavioral beliefs, participants were asked to indicate their level of agreement with statements such as "Sharing rumor denials will help to spread the truth" (BB1), and "Sharing rumor denials will help to reduce belief in rumors" (BB2). Similarly, with respect to normative beliefs, participants were asked to indicate their level of agreement with individuals or groups such as "family

members” (NB1) and “friends” (NB2) who would encourage the behavior of sharing rumor denials. Likewise, with respect to control beliefs, participants were asked to indicate their level of agreement with factors such as “Source credibility of rumor denials” (CB1) and “Shared interest of others about rumor denials” (CB2) that would make them likely to share the messages. The order of presenting the questionnaire items was counter-balanced to control for order effects. The questionnaire was administered using Qualtrics, a platform to conduct web-based survey.

3.2 Data Collection

To recruit participants, an advertisement was created. Hard copies of the advertisement were posted on notice boards of a large public university in Southeast Asia. In addition, soft copies of the advertisement were disseminated through the researcher’s social media accounts of Facebook and Twitter. Such approaches to invite study participation through advertisement have been widely employed in many prior works on Internet-related research where the population being studied—the entire community of Internet users worldwide—is not possible to be selected randomly [30, 31].

Informed by prior works [32, 33], the advertisement specified three eligibility criteria for participation befitting the context of this research. One, participants must have some social media presence. This ensured that they would be able to identify themselves with the behavior of sharing online messages. Two, participants must have had the experience of looking for online health information in the recent past. This meant that the participants were appropriate for the task at hand. Three, they must be aged between 21 and 60 years old. This was done to avoid recruiting vulnerable groups such as children and senior citizens.

Participants who voluntarily contacted the researcher indicating that they met the eligibility criteria were recruited. The URL of the survey website was sent to the participants via email. The survey website contained the informed consent upfront. Participants were informed that they are free to withdraw from the participation at any point of time.

After getting the agreement with the consent, participants were introduced to rumors and their denials. For this purpose, the website contained the following statements: “False rumors on the Internet have become a growing concern. To combat such rumors, authoritative sources often issue denials. Specifically, denials refer to messages that refute rumors in an attempt to present the truth.” Thereafter, participants were given two examples online rumor denials as shown in Fig. 2. Informed by prior works [34, 35], participants were instructed to imagine that they come across rumor denials on the Internet. Then, they were asked to answer the questionnaire.

3.3 Data Analysis

To identify salient beliefs within a belief category, a two-step approach was followed. The first step involved identifying the belief that showed the highest level of agreement among the participants (B_{Highest})—specifically indicated as BB_{Highest} for behavioral beliefs, NB_{Highest} for normative beliefs, and CB_{Highest} for control beliefs.

Rumor Denial 1



Rumor Denial 2

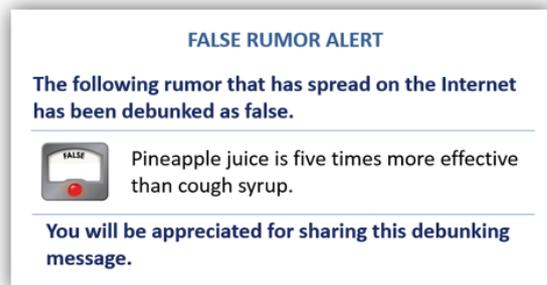


Figure 2. Example of two online rumor denials.

This step would confirm BB_{Highest}, NB_{Highest}, and CB_{Highest} as a salient behavioral belief, a salient normative belief, and a salient control belief respectively. However, it would not enable identifying if any other beliefs within a belief category could also be salient.

Hence, the second step involved statistically determining if any other beliefs within a belief category showed as high a level of agreement as that of the B_{Highest}. For this purpose, correlation analyses followed by paired-samples t-tests were employed [36].

Based on this step, a belief was deemed salient when it met the following criteria: (1) its level of agreement showed a positive relation with that of the B_{Highest} in the correlation analysis [36, 37], (2) its level of agreement was not significantly lower than that of the B_{Highest} in the paired-samples t-test [10, 38]. Thus, this step allowed identifying beliefs within a belief category that showed lower levels of agreement than that of the B_{Highest} albeit non-significantly. The beliefs identified from the two steps together constituted the salient beliefs.

4. RESULTS

Data were obtained from 276 participants, 118 of whom were females. Almost 60% of them aged between 21 and 30 years. Another 35% of the participants aged between 31 and 40 years while the rest aged 41 years or older. With respect to educational qualification, 63.4% of the participants had a Bachelor’s degree. Another 34.1% of the participants had a Master’s degree. The remainder indicated a Doctoral degree as their highest qualification.

With respect to the behavioral beliefs, the participants most strongly agreed that rumor denials help spread the truth (BB1: 5.92 ± 1.486). The participants indicated the strongest agreement for the normative belief that their friends would encourage sharing denials (NB2: 5.58 ± 1.642). In terms of the control beliefs, the participants indicated the strongest agreement that credible sources of denials would make them likely to share denials (CB1: 6.11 ± 1.247). These three beliefs are henceforth referred as BBHighest, NBHighest, CBHighest respectively. The descriptive statistics are summarized in Table 4.

To identify salient behavioral beliefs, BBHighest (BB1) was correlated and compared with the other beliefs in the belief category. The results are shown in Table 5. The correlation indicated that BBHighest was positively correlated with BB2. The comparison indicated that BBHighest was significantly higher than all other beliefs. Hence, BBHighest (BB1) was deemed as the only salient behavioral belief.

To identify salient normative beliefs, NBHighest (NB2) was correlated and compared with the other beliefs in the belief category. The results are shown in Table 6. The correlation indicated that NBHighest was positively correlated with NB4. The comparison indicated that NB4 was significantly higher than NB1 and NB3 but not NB4. In other words, the agreement of NB4 was positively correlated and not significantly lower than that of NBHighest. Hence, NBHighest (NB2) and NB4 were deemed as the salient normative beliefs.

To identify salient control beliefs, CBHighest (CB1) was correlated and compared with the other beliefs in the belief category. The results are shown in Table 7. The correlation indicated that CBHighest was not positively correlated with any other beliefs. The comparison indicated that CBHighest was significantly higher than all other beliefs. Hence, CBHighest (CB1) was deemed as the only salient control belief.

5. DISCUSSION AND CONCLUSION

This paper relied on the TPB as its theoretical lens to identify salient beliefs about sharing online rumor denials. In particular, it reviewed the literature to draw a possible set of beliefs. The extent to which the participants agreed with each of the beliefs was tested using a questionnaire. The following salient beliefs could be identified: Sharing rumor denials help to spread the truth (the behavioral belief category). Friends and the online community encourage the behavior of sharing rumor denials (the normative belief category). Source credibility of rumor denials encourage sharing (the control belief category).

The behavioral belief that sharing denials help to spread the truth (BB1) emerged as salient. Previous studies also found that the need to spread the truth was important in several contexts such as health-related issues, political conflicts, and disaster-related crises [5, 16]. Such contexts are conducive for rumors to grow. To refute rumors, sharing denials inherently drawn users' belief about to spread the truth [5, 15]. This paper extends the literature by showing empirically that the need to spread the truth could be a salient belief in the context of sharing online rumor denials in rumoring phenomena. However, in contrast to previous studies [20, 21] that suggested the other beliefs such as sharing denials will make individuals feel good (BB8) by enhancing their reputation (BB9), this paper could not find them salient in the context of sharing rumor denials.

Table 4. Descriptive statistics of beliefs

	Beliefs	Mean \pm SD
Behavioral Beliefs (BB_i)	BB1: Sharing rumor denials will help to spread the truth.	5.92 \pm 1.49
	BB2: Sharing rumor denials will help to reduce belief in rumors.	5.51 \pm 1.66
	BB3: Sharing rumor denials will help to reduce the spread of rumors.	3.53 \pm 1.85
	BB4: Sharing rumor denials will minimize the chances of being deceived.	3.61 \pm 1.77
	BB5: Sharing rumor denials is good for engaging in conversation.	3.24 \pm 1.58
	BB6: Sharing rumor denials will help to get other related information.	3.26 \pm 1.68
	BB7: Sharing rumor denials will help to draw attention of others.	3.16 \pm 1.67
	BB8: Sharing rumor denials will make me feel good.	2.81 \pm 1.53
	BB9: Sharing rumor denials will enhance my reputation.	2.64 \pm 1.43
	BB10: Sharing rumor denials will create more opportunities for others to share the messages further.	3.56 \pm 1.81
Normative Beliefs (NB_i)	NB1: Family members would encourage me to share rumor denials.	3.63 \pm 1.95
	NB2: Friends would encourage me to share rumor denials.	5.58 \pm 1.64
	NB3: Authoritative sources would encourage me to share rumor denials.	3.78 \pm 1.92
	NB4: Online community would encourage me to share rumor denials.	5.57 \pm 1.65
Control Beliefs (CB_i)	CB1: Source credibility of rumor denial would encourage me to share it.	6.11 \pm 1.25
	CB2: Shared interest of others about rumor denial would encourage me to share it.	3.50 \pm 1.64
	CB3: My motivation to help others would encourage me to share rumor denials.	3.84 \pm 1.84
	CB4: My sense of belongingness to the online community would encourage me to share rumor denials.	3.56 \pm 1.71
	CB5: Importance of rumor denial would encourage me to share it.	3.76 \pm 1.81
	CB6: My knowledge to judge the truthfulness of rumor denial would encourage me to share it.	3.82 \pm 1.91
	CB7: My ability to verify rumor denial would encourage me to share it.	3.79 \pm 1.93
	CB8: Availability of time would encourage me to share rumor denials.	3.64 \pm 1.82
	CB9: Full control in my privacy setting would encourage me to share rumor denials.	3.10 \pm 1.76

Table 5. Correlation and paired-sample t-test results for behavioral beliefs (BB_i)

Other BB _i	Correlation of BB _{Highest} with other BB _i	t-test of BB _{Highest} with other BB _i
BB2	0.51*	t(275) = 4.30*
BB3	-0.09	t(275) = 16.02*
BB4	-0.15	t(275) = 15.47*
BB5	-0.29*	t(275) = 18.10*
BB6	-0.36*	t(275) = 16.91*
BB7	-0.42*	t(275) = 17.21*
BB8	-0.28*	t(275) = 21.47*
BB9	-0.24*	t(275) = 23.72*
BB10	-0.19	t(275) = 15.35*

Table 6. Correlation and paired-sample t-test results for normative beliefs (NB_i)

Other NB _i	Correlation of NB _{Highest} with other NB _i	t-test of NB _{Highest} with other NB _i
NB1	-0.20	t(275) = -11.64*
NB3	-0.38*	t(275) = 10.13*
NB4	0.78*	t(275) = .220

Table 7. Correlation and paired-sample t-test results for control beliefs (CB_i)

Other CB _i	Correlation of CB _{Highest} with other CB _i	t-test of CB _{Highest} with other CB _i
CB2	-0.07	t(275) = 20.44*
CB3	-0.05	t(275) = 16.66*
CB4	-0.12	t(275) = 18.93*
CB5	-0.11	t(275) = 16.93*
CB6	-0.14	t(275) = 15.73*
CB7	-0.97	t(275) = 16.14*
CB8	-0.91	t(275) = 17.91*
CB9	-0.29*	t(275) = 20.58*

The salient normative belief was that friends (NB2) and the online community (NB4) would encourage the behavior of sharing rumor denials. The other beliefs related to family members (NB1) and authoritative sources (NB3) emerged as non-salient. Results indicated that the generalized social referents tend to be influential in online setting which contradicts with many other specific social referents such as family members identified in prior studies on offline contexts [14, 39]. The reason could be because information sharing behavior on online setting tend to be directed to the larger online community in general rather than merely constrained by a specific individual [17, 40, 41]. This finding not only highlights the subjective norms that play around in online context but also extends the literature of online users' community directed message sharing behavior in the context of

sharing rumor denials [41, 42]. Even though perceived interest in a particular rumoring phenomenon can vary from individual to individual, online rumoring phenomena in general captivate attention from a large online community. This could be due to not only the accessibility of rumors on the Internet by anyone at any time from any place but also their faster and wider propagation on social media [21].

The salient control belief was that source credibility of denials would encourage sharing (CB1). Credible source of messages is known to inspire confidence in various online contexts such as evaluating brand information, and measuring Yahoo! answer quality [3, 43, 44]. Prior studies on rumor denials also found that source credibility increases the effectiveness of such messages in debunking rumors [4]. Thus, the current finding extends the literature of denial efficacy into the way of influencing their shareability. Rumor denials could be developed by incorporating the essence of source credibility to make them persuasive toward influencing shareability. Contrary to previous studies [20, 26] however, other control beliefs such as full control in my privacy setting (CB9), and shared interest of others about denials (CB3) did not appear as salient in the analysis, and may not have prominent role in influencing the target behavior.

The paper has two limitations, which could be addressed in future research. First, it exposed the participants to only health-related rumor denials. Even though such rumors are common on social media, future research could expand the context of investigation to rumors from diverse themes. This will further allow investigating the extent to which persuasion works when accounting for individuals' political and religion orientations. Second, this paper recruited participants using convenience sampling. Future research could study rumormongering on the Internet by employing random sampling as a way to enhance generalizability.

The significance of this paper is two-fold. First, it applies the concept of salient beliefs in the context of sharing online rumor denials. Such an approach has been widely used to promote behaviors in offline contexts yet received limited attention in the online setting. This paper extends the scholarly understanding of salient beliefs about an online behavior. Second, by identifying salient beliefs about sharing online rumor denials, the paper highlights possible ways in which denials should be phrased in order to enhance users' intention to share such messages. Future research could build on this paper along with works such as [45] to evaluate the effectiveness of denials in combating rumors on the Internet. Given that the process of refutation is not an easy task, the underlying mechanism of sharing rumor denials could be investigated to evaluate the efficacy of the process in combating online rumors.

6. ACKNOWLEDGMENTS

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7. REFERENCES

- [1] Ahern, K. R., and Sosyura, D. 2015. Rumor has it: Sensationalism in financial media. *The Review of Financial Studies* 28, 7 (Jul. 2015), 2050-2093. DOI=<https://doi.org/10.1093/rfs/hhv006>

- [2] Pal, A., and Chua, A. Y. K. 2016. Reviewing the landscape of research on the threats to the quality of user-generated content. In *Proceedings of the Association for Information Science and Technology* (Dec. 2016). ASIST, 1-9. DOI= 10.1002/pr2.2016.14505301077
- [3] Xiong, G., and Bharadwaj, S. 2013. Asymmetric roles of advertising and marketing capability in financial returns to news: Turning bad into good and good into great. *American Marketing Association* 50, 6 (Nov. 2013), 706-724. Retrieved from https://media.terry.uga.edu/socrates/publications/2013/09/fin_alxiong_and_bharadwaj_2013pdf.pdf (June, 2016)
- [4] Bordia, P., DiFonzo, N., Haines, R., and Chaseling, E. 2005. Rumors denials as persuasive messages: Effects of personal relevance, source, and message characteristics. *Journal of Applied Social Psychology* 35, 6 (Jun. 2005), 1301-1331. DOI= 10.1111/j.1559-1816.2005.tb02172.x
- [5] Ozturk, P., Li, H., and Sakamoto, Y. 2015. Combating rumor spread on social media: The effectiveness of refutation and warning. In *Proceedings of the Hawaii International Conference on System Sciences* (Mar. 2015). IEEE, New York, NY, 2406-2414. DOI= 10.1109/HICSS.2015.288
- [6] Wen, S., Jiang, J., Xiang, Y., Yu, S., Zhou, W., and Jia, W. 2014. To shut them up or to clarify: Restraining the spread of rumors in online social networks. *IEEE Transactions on Parallel and Distributed Systems* 25, 12 (Dec. 2014), 3306-3316. DOI= 10.1109/TPDS.2013.2297115
- [7] Starbird, K., Maddock, J., Orand, M., Achterman, P., and Mason, R. M. 2014. Rumors, false flags, and figital vigilantes: Misinformation on Twitter after the 2013 Boston Marathon Bombing. In *Proceedings of the iConference* (Mar. 2014). iConference, 654-662. DOI= <https://doi.org/10.9776/14308>
- [8] Chen, X., Sin, S. C. J., Theng, Y. L., and Lee, C. S. 2015. Why students share misinformation on social media: Motivation, gender, and study-level differences. *The Journal of Academic Librarianship* 41, 5 (Sep. 2015), 583-592. DOI= <https://doi.org/10.1016/j.acalib.2015.07.003>
- [9] Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50, 2 (Dec. 1991), 179-211. DOI= [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- [10] Brown, T. J., Ham, S. H., and Hughes, M. 2010. Picking up litter: An application of theory-based communication to influence tourist behaviour in protected areas. *Journal of Sustainable Tourism* 18, 7 (May. 2010), 879-900. DOI= <http://dx.doi.org/10.1080/09669581003721281>
- [11] Han, H., Hsu, L. T. J., and Sheu, C. 2010. Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management* 31, 3 (Jun. 2010), 325-334. DOI= <https://doi.org/10.1016/j.tourman.2009.03.013>
- [12] Salleh, S. M., and Laxman, K. 2014. Investigating the factors influencing teachers' use of ICT in teaching in Bruneian secondary schools. *Education and Information Technologies* 19, 4 (Dec. 2014), 747-762. DOI= <https://doi.org/10.1007/s10639-013-9251-2>
- [13] Steckenreuter, A., and Wolf, I. D. 2013. How to use persuasive communication to encourage visitors to pay park user fees. *Tourism Management* 37, (Aug. 2013), 58-70. DOI= <https://doi.org/10.1016/j.tourman.2013.01.010>
- [14] Quine, L., Rutter, D. R., and Arnold, L. 2001. Persuading school-age cyclists to use safety helmets: Effectiveness of an intervention based on the Theory of Planned Behaviour. *British Journal of Health Psychology* 6, 4 (Nov. 2001), 327-345. DOI= 10.1348/135910701169241
- [15] Rahu, M. 2003. Health effects of the Chernobyl accident: Fears, rumours and the truth. *European Journal of Cancer* 39, 3 (Feb. 2003), 295-299. DOI= [https://doi.org/10.1016/S0959-8049\(02\)00764-5](https://doi.org/10.1016/S0959-8049(02)00764-5)
- [16] Abdullah, N. A., Nishioka, D., Tanaka, Y., and Murayama, Y. 2015. User's action and decision making of retweet messages towards reducing misinformation spread during disaster. *Journal of Information Processing* 23, 1 (Jan. 2015), 31-40. DOI= <http://doi.org/10.2197/ipsjip.23.31>
- [17] Fine, G. A. 2007. Rumor, trust and civil society: Collective memory and cultures of judgment. *Diogenes* 54, 1 (Feb. 2007), 5-18. DOI= <https://doi.org/10.1177/0392192107073432>
- [18] Godson, R., and Wirtz, J. J. 2011. *Strategic denial and deception: The twenty-first century challenge*. New Brunswick, NJ, Transaction Publishers.
- [19] Abdullah, N. A., Nishioka, D., Tanaka, Y., and Murayama, Y. 2017. Why I retweet? Exploring user's perspective on decision-making of information spreading during disasters. In *Proceedings of the Hawaii International Conference on System Sciences* (Jan. 2017). HICSS. 432-441. DOI= <http://hdl.handle.net/10125/41202>
- [20] Oh, S., and Syn, S. Y. 2015. Motivations for sharing information and social support in social media: A comparative analysis of Facebook, Twitter, Delicious, YouTube, and Flickr. *Journal of the Association for Information Science and Technology* 66, 10 (Apr. 2015), 2045-2060. DOI= 10.1002/asi.23320
- [21] Cheung, C. M., and Lee, M. K. 2012. What drives consumers to spread electronic word of mouth in online consumer-opinion platforms. *Decision Support Systems* 53, 1 (Apr. 2012), 218-225. DOI= <https://doi.org/10.1016/j.dss.2012.01.015>
- [22] Garrett, R. K. 2011. Troubling consequences of online political rumoring. *Human Communication Research* 37, 2 (Mar. 2011), 255-274. DOI= 10.1111/j.1468-2958.2010.01401.x
- [23] Lee, H., Park, H., and Kim, J. 2013. Why do people share their context information on Social Network Services? A qualitative study and an experimental study on users' behavior of balancing perceived benefit and risk. *International Journal of Human-Computer Studies* 71, 9 (Sep. 2013), 862-877. DOI= <https://doi.org/10.1016/j.ijhcs.2013.01.005>
- [24] Andrews, C., Fichet, E., Ding, Y., Spiro, E. S., and Starbird, K. 2016. Keeping up with the tweet-dashians: The impact of 'official' accounts on online rumoring. In *Proceedings of the ACM Conference on Computer-Supported Cooperative Work*

- & *Social Computing* (Feb. 2016). ACM, New York, NY, 452-465. DOI= 10.1145/2818048.2819986
- [25] Tripathy, R. M., Bagchi, A., and Mehta, S. 2013. Towards combating rumors in social networks: Models and metrics. *Intelligent Data Analysis* 17, 1 (Feb. 2013), 149-175. DOI= 10.3233/IDA-120571
- [26] Jung, J., Shim, S. W., Jin, H. S., and Khang, H. 2016. Factors affecting attitudes and behavioural intention towards social networking advertising: A case of Facebook users in South Korea. *International Journal of Advertising* 35, 2 (Mar. 2015), 248-265. DOI= <http://dx.doi.org/10.1080/02650487.2015.1014777>
- [27] Chan, D. K. C., Hardcastle, S., Dimmock, J. A., Lentillon-Kaestner, V., Donovan, R. J., Burgin, M., and Hagger, M. S. 2015. Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the theory of planned behavior. *Psychology of Sport and Exercise* 16, 2 (Jan. 2015) 164-174. DOI= <https://doi.org/10.1016/j.psychsport.2014.03.002>
- [28] Chan, D. K. C., Fung, Y. K., Xing, S., and Hagger, M. S. 2014. Myopia prevention, near work, and visual acuity of college students: Integrating the theory of planned behavior and self-determination theory. *Journal of Behavioral Medicine* 37, 3 (Jun. 2014), 369-380. DOI= <https://doi.org/10.1007/s10865-013-9494-9>
- [29] Sullivan, B. O., McGee, H., and Keegan, O. 2008. Comparing solutions to the 'expectancy value muddle' in the theory of planned behaviour. *British Journal of Health Psychology* 13, 4 (Nov. 2008), 789-802. DOI= 10.1348/135910708x278306
- [30] Benson, V., Saridakis, G., and Tennakoon, H. 2015. Purpose of social networking use and victimisation: Are there any differences between university students and those not in HE? *Computers in Human Behavior* 51, (Oct. 2015), 867-872. DOI= <https://doi.org/10.1016/j.chb.2014.11.034>
- [31] Satici, S. A., and Uysal, R. 2015. Well-being and problematic Facebook use. *Computers in Human Behavior* 49, (Aug. 2015) 185-190. DOI= <https://doi.org/10.1016/j.chb.2015.03.005>
- [32] Johnson, T. J., and Kaye, B. K. 2014. Credibility of social network sites for political information among politically interested Internet users. *Journal of Computer-Mediated Communication* 19, 4 (May. 2014), 957-974. DOI= 10.1111/jcc4.12084
- [33] Pentina, I., and Tarafdar, M. 2014. From "information" to "knowing": Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior* 35, (Jun. 2014), 211-223. DOI= <https://doi.org/10.1016/j.chb.2014.02.045>
- [34] Utz, S., Kerkhof, P., and van den Bos, J. 2012. Consumers rule: How consumer reviews influence perceived trustworthiness of online stores. *Electronic Commerce Research and Applications* 11, 1 (Jan. 2012), 49-58. DOI= <https://doi.org/10.1016/j.elerap.2011.07.010>
- [35] Qi, J. S. J., Banerjee, S., and Chua, A. Y. 2017. Analyzing Medical Personnel's Perceptions of Online Health Rumors. In *Proceedings of the International MultiConference of Engineers and Computer Scientists* (Mar. 2017), IAENG, Hong Kong, 457-460. Retrieved from http://www.iaeng.org/publication/IMECS2017/IMECS2017_pp457-460.pdf (March, 2017).
- [36] França, J. A., Diniz, M. G., Bernardes, V. F., Costa-Silva, R. C., Souza, R. P., Gomez, R. S., and Gomes, C. C. 2017. Cohesin subunits, STAG1 and STAG2, and cohesin regulatory factor, PDS5b, in oral squamous cells carcinomas. *Journal of Oral Pathology & Medicine* 46, 3 (Jun. 2016), 188-193. DOI= 10.1111/jop.12474
- [37] Von Haeften, I., Fishbein, M., Kasprzyk, D., and Montano, D. 2001. Analyzing data to obtain information to design targeted interventions. *Psychology, Health & Medicine* 6, 2, 151-164. DOI= <http://dx.doi.org/10.1080/13548500125076>
- [38] Clayton, R. B., Leshner, G., and Almond, A. 2015. The extended iSelf: The impact of iPhone separation on cognition, emotion, and physiology. *Journal of Computer-Mediated Communication* 20, 2 (Jan. 2015), 119-135. DOI= 10.1111/jcc4.12109
- [39] Vayro, C., and Hamilton, K. 2016. Using three-phase theory-based formative research to explore healthy eating in Australian truck drivers. *Appetite* 98, 1 (Mar. 2016), 41-48. DOI= <https://doi.org/10.1016/j.appet.2015.12.015>
- [40] Postmes, T., and Brunsting, S. 2002. Collective action in the age of the Internet mass communication and online mobilization. *Social Science Computer Review* 20, 3 (Aug. 2002), 290-301. DOI= <https://doi.org/10.1177/089443930202000306>
- [41] Burkell, J., Fortier, A., Wong, L. L. Y. C., and Simpson, J. L. 2014. Facebook: Public space, or private space? *Information, Communication & Society* 17, 8 (Jan. 2014), 974-985. DOI= <http://dx.doi.org/10.1080/1369118X.2013.870591>
- [42] Munar, A. M., and Jacobsen, J. K. S. 2014. Motivations for sharing tourism experiences through social media. *Tourism Management* 43, (Aug. 2014), 46-54. DOI= <https://doi.org/10.1016/j.tourman.2014.01.012>
- [43] Jin, S. A. A., and Phua, J. 2014. Following celebrities' tweets about brands: The impact of twitter-based electronic word-of-mouth on consumers' source credibility perception, buying intention, and social identification with celebrities. *Journal of Advertising* 43, 2 (Apr. 2014), 181-195. DOI= <http://dx.doi.org/10.1080/00913367.2013.827606>
- [44] Chua, A. Y., and Banerjee, S. 2015. Measuring the effectiveness of answers in Yahoo! Answers. *Online Information Review* 39, 1, 104-118. DOI= <https://doi.org/10.1108/OIR-10-2014-0232>
- [45] Einwiller, S. A., and Kamins, M. A. 2008. Rumor has it: The moderating effect of identification on rumor impact and the effectiveness of rumor refutation. *Journal of Applied Social Psychology* 38, 9 (Sep. 2008), 2248-2272. DOI= 10.1111/j.1559-1816.2008.0039.x