Reducing Fake News Sharing Tendencies: Role of Fear Appeals

Early-stage paper

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ABSTRACT

The term fake news has become a household word. Various sources employ different means of motivating users to follow certain patterns in its propagation. Sources with nefarious ambitions not only spread misinformation and discord but have been known to include malware into the URLs. This study examines the effect of Fear Appeals (physiological, the affective and the cognitive appeals), a subset of the Protection Motivation Theory, on mitigating likelihood of sharing fake news. The results of our experimental study of 109 subjects reveal the differential effect of each type of fear appeals and social media engagement on the percentage of fake shared. This study contributes to fear appeals literature by operationalizing and investigating the efficacy of different appeals. This study provides insights for private and public sectors in the effort to combat the spread of fake news.

Keywords

Fake news, fear, cognitive, physiological, affective.

INTRODUCTION

Fake news can be defined as the deliberate publication of news (or information) that is fabricated, unconfirmed or untrue leading to media bias (Allcott & Gentzkow, 2017; Osatuyi & Hughes, 2018). Recent statistics show that 23% of social media users report that they have shared fake news, with 16% saying they did so by accident and 14% saying they did so intentionally (Torres et al., 2018). Back in the sixties fake news propagation had been alluded to the poorly educated readers (Kapferer, 1989), however since the 2016 elections in the United States, its propagation and its primary source has been attributed to media platforms. Advancements in interactive technologies have exacerbated the generation and propagation of such fake content on the Internet (Maasberg et al., 2018). Increased proliferation of fake news in the workplace dampens public confidence and creates distrust and affects productivity in an organization (Botezatu, 2017). There have been many discussions and commentary with regards to fake news (Allcott & Gentzkow, 2017; Osatuyi & Hughes, 2018), but little attention has given to mitigating its propagation. Extant literature has looked at fake news from perspectives such as propagation (Kim et al., 2018; Kwon et al., 2013), creation (Allcott & Gentzkow, 2017) and effects (Guo, 2009). In this study, we depart from the causal and detection approaches, to empirically test mechanisms that induce fear in the reader for mitigating the spread of fake news. Fear appeals are messages designed to convey the physiological, cognitive and affective arousals of a threat and a user's ability to cope with such threats (Johnston & Warkentin, 2010; Latour & Rotfeld, 1997). Prior research has employed fear appeals as a lens to deter users from system abuse or complying with organizational information systems security policies. For example, public health messages have long used negative-consequence themes in the form of fear appeals to generate attention and motivate action in attempts to persuade users to stop or change destructive behavior. The graphic warnings on

cigarette boxes have been used to evoke fear, and in turn influence smokers' intentions to quit smoking (Kees et al., 2010). In the context of fake news sharing, little prior has employed fear appeals as an intervention to reducing the likelihood of sharing fake news. We therefore seek to answer the following research question: What is the effect of different fear appeals type on the proportion of fake news shared by newsreaders? Fear appeals in this study refers to actions which organizations use to arouse physiological, cognitive or affective reactions that negatively modify employee's fake news sharing behavior. Researchers in Information security have recommended the use of persuasions in changing employee behaviors (Siponen & Vance, 2010; Vance et al., 2013) and fear appeals, a derivative of Protection Motivation Theory is the most utilized mechanism in this effort. We employed a field experiment using three fear appeal types – physiological, cognitive and effect- on one hundred and nine subjects recruited from Amazon Mechanical Turk to test the efficacy of fear appeals in mitigating the spread of fake news.

RELATED LITERATURE

One of the great concerns of IS managers is the threat posed by misinformation where a sender can manipulate the way a receiver interprets the realization of an information structure by changing the precision of the information structure (Pourghomi et al., 2017). Some prior research have indicated that misinformation continues to be one of the top managerial concerns (Kimmel & Audrain-Pontevia, 2010), and given the threats that fake news' misinformation poses in an organizational setting, there is a need to effectively educate and motivate users to not propagate misinformation. Fake news in social media is defined as phony news stories maliciously spread by outlets that mimic legitimate news sources (Torres et al., 2018.) and could mislead readers (Allcott & Gentzkow, 2017). Many studies have focused on the various propagation types and platforms (Allcott & Gentzkow, 2017). Quite recently, fake news stories have been wielded as a sort of

weapon by industries to manipulate and control economic activities (Nieva, 2016). The effect of imminent threat usually results in an individual or organization taking defensive measures to rebut or repair his or her reputation (Maasberg et al., 2018) or in extreme cases caving in to the demands and pressures of the rival sources. Some studies have used exploratory experiment in understanding the impacts of aesthetics and readability of news items on individuals (Maasberg et al., 2018). Several studies have also looked into the detection [1, 30, 33] and the determinants of features that can be attributed to rumors (Kim et al., 2018; Kwon et al., 2013). Little attention has been dedicated to understating intervention in the spread of fake news such as efficacy of fear appeals to moderate the likelihood of individuals sharing of fake news.

THEORY AND HYPOTHESES DEVELOPMENT

Protection motivation comprises threat appraisal and the coping appraisal used by individuals to protect themselves (Maddux & Rogers, 1983). Fear from the threat influence individuals coping mechanism deployed for protection. However, fear appeals derivative of protection motivation theory categorizes the appraisals of a threat and the subsequent reactions to that threat. The state of fear is an unpleasant emotional state that is due to either physiological, cognitive, or affective arousal that may motivate behavioral responses aimed at alleviating the threat (Kees et al., 2010). Fear appeals arousal that is generated in subjects, leads to stronger persuasion responses to the stimuli they are exposed to such as barrage of news items (Latour & Rotfeld, 1997) and thus mitigates negative behaviors. The fear appeals in this study refers to actions that organizations take to modify and control such behavior at the workplace. There is considerable evidence in literature that suggests a positive linear relationship between message acceptance and fear-arousing conditions (Johnston & Warkentin, 2010; Kees et al., 2010). It can be noted that fear can be a deliberative emotion and some fear appeals can assist an individual in its recognition of, and

confrontation with, contingent events (Pfau, 2007). This may help in motivating and preventing negative behaviors as is the focus of this study. This study extends the danger control model espoused by the Fear Appeals Model (Johnston & Warkentin, 2010; Kees et al., 2010). The three main forms of appeals which elicit different behaviors from subjects include physiological, affective and cognitive fear arousal types (Berger, 2011; Hu et al., 2012). Physiological arousal varies frequently and considerably and is influenced by a variety of everyday events, including the presence of others, physical exertion, and exposure to emotionally charged stimuli like fear-arousing ads, or political or religious messages (Sanbonmatsu & Kardes, 1988). It is characterized by activation of the autonomic nervous system, and the mobilization provided by this excitatory state may reduce sharing (Berger, 2011). Situations that heighten arousal should boost social transmission, regardless of whether they are positive or negative (e.g., panics) in nature (Berger, 2011). Affective or emotional arousal can trigger physical arousal, such as in the Fight-or-Flight reaction. Emotions might be essential because of their motivational role, reflecting Hume's dictum that reason is a slave of passions. Many acts appear to be connected to the emotional state of the agent, and this is often accounted for by proposing that emotions produce desires, or that desires are that constitutive components of emotions (Starkey, 2008). Cognitive appeals are arousal with the tendency to engage into thinking about the appropriate coping response (Ruiz & Sicilia, 2004). Empirical findings in studies finds that social tie variety and cognitive homogeneity are important predictors of fake news awareness and trust in network. This appeal can lead to affective arousal, such as when we get excited about a new discovery though the centrality of cognition sets apart the account of emotions (Starkey, 2008). Cognitive content, that is, words suggestive of reasoning and information processing, such as cause, know, or ought to are rational processes incorporate attributes and beliefs about an entity or item being evaluated.

Effect of Fear Arousal

Fear is believed to affect persuasion by arousing drives in the individual which increase interest in and attention to the message or commitment to the product over and above the non-aroused conditions (Brooker, 1981). Research on commitment in marketing suggests that individuals with higher levels of commitment defend their attitudes by presenting counter arguing messages that undermine attitudes (Raju & Unnava, 2006). Commitment may come about when an individual utilizes his emotions in the assessment or purchasing of an item. Thus, the lack of any arousal may leave an individual without the drive or the energy to counter efforts of fake news thus are more likely to believe a false story and thus share. Therefore, it is expected that:

H1. Participants in the no warning control group are more likely to share fake news than those in the treatment group.

Effect of Physiological Fear Arousal

Argumentation caused by physiological arousal is facilitated and therefore different in individuals with low commitments (Raju & Unnava, 2006) as some individuals may exaggerate their feelings, while others may underplay (Oshikawa, 1972) them. As defined, Physiological arousal is the psychological state of having one's senses and/or organs being awoken or stimulated to a point of perception. In the context of fear appeal, it is a reactionary response to the fear factor stimuli (Schachter & Jerome, 1962). In this instance, consumers with greater physiological arousals may convince themselves that their decision was correct (Oshikawa, 1972). Thus, physiological arousals induce actions and trigger a stronger reaction relative to other forms of fears that may override one's initial decision or indecision even when emotions are at play. Affective as defined in psychology could range from a spectrum of emotions through at least seven distinct Darwinian emotional systems which are revealed by behaviors evoked by electrical and chemical

stimulation of homologous subcortical regions of the brain (Panksepp, 2010). They include rage, fear, panic, and grief. Thus, we hypothesize:

H2. Participants in the physiological warning group are less likely to share fake news than those in affective and cognitive group.

Effect of Affective Fear Arousal

Fear arousals with regards to affection leads to processing of coping response and self-efficacy information, which implies that messages that presents threatening information must also change perceptions of the efficacy of maladaptive coping responses before subjects consider alternatives (Tanner et al., 1991). Individuals thus when engaged with the affective arousal may become likely to receive warning cues and thus refrain from activities. A comparison between fear appeal treatment groups reveals that the stronger fear appeal may result in emotional arousal effects (Henthorne et al., 1993) which in turn means they are more likely to make split decisions that do not particularly conform to higher elaboration (as espoused by the Elaboration Likelihood Model). They are thus less likely to engage in risky security behaviors because they may over act on their emotions and exaggerate risks and perceived threats. Cognitive, or intellectual, arousal is about mental stimulation which involves the exploration, learning and discovering of phenomena (Schachter & Jerome, 1962). It is hypothesized that:

H3. Participants in the affective warning group are less likely to share fake news than those in cognitive.

Effect of Cognitive Fear Arousal

Individuals engaging in their cognitive processes may be more apt to refrain from engaging in risky behaviors. This is particular true as seen in the Elaboration Likelihood model where

individuals who engage in their central routes extend more cognitive efforts and make less rash decisions (Kobsa et al., 2016). A recent study further demonstrated that individuals who do not use any of their cognitive processes for decision making have less likelihood of making informed discussions and are less resistive to temptation (Fedorikhin & Patrick, 2010). Therefore, the higher the cognition expended the higher the resistance to temptation. For high fear arousal, the premise is that increasing the level of problem elaboration reduces the likelihood of individuals engaging in potential risky behaviors compared with individuals who do not. Affective arousal, however, can suppress cognitive arousal, such as when anger or lust leads to unwise decisions. We therefore hypothesize that:

> *H4. Participants in the cognitive group are less likely to share fake news relative to the no warning group.*

METHODOLOGY AND ANALYSIS

Subjects and Experimental Flow

One hundred and fifty-three participants were recruited using Amazon's Mechanical Turks' outsourcing portal for the experiment. The total number of valid responses was one hundred and nine. After measuring pre-experimental factors much as level of social media engagement with a scale adopted from (Yang et al., 2017) and demographics, participants were randomly assignment into four experimental conditions. They were treated to the following arousals as espoused by the Fear Appeal theory, "Cognitive (CG)," Physiological (PY), "Affective (AF)" and "Control (CON)". Table 1 is an illustration of the four-fear appeals type. Then subjects were presented with eight set of news (four fake news and four real news, see appendix for news items) and were asked to choose seven news options to shares with their social network and to indicate how they would respond to various news items either using Share, Like or Follow (Downs et al., 2007).

Cognitive (CG)
Consequences of fake news includes the introduction of malware embedded in images, links. "These tactics are no longer the sole space of criminal organizations or spammers but are now used by nation states to attack or spread propaganda, compromise systems, inflict physical damage, or conduct espionage.
Physiological (PY)
Fake news can cause your computer to crash!!! Be Warned!!!!
Affective (AF)
Control (CON)
Click Next to Control

Table 1. illustration of fear appeals type

Analysis Strategy and Results

We analyzed and tested our hypotheses using the analysis of covariance (ANCOVA). Our dependent variable, fake news sharing, was measured as the number of fake news a subject selected to share with their social network from a total of eight (8) real and fake news stories. The effect of subject's social media engagement was controlled given that most fake news are spread on social

media platforms. An overall descriptive view of the results among the four treatment conditions are shown in Table 1. There was a total of one hundred and nine valid responses in this study. The hypotheses testing is summarized in Table 2.

Hypotheses	Mean Difference	F-value	P-value	Supported
H1. Participants in the no warning control group are more likely to share fake news than those in the treatment group.	2.46	3.159	0.028	Yes
H2. Participants in the physiological warning group are less likely to share fake news than those in affective and cognitive group.	-0.65		0.046	Yes
H3. Participants in the affective warning group are less likely to share fake news than those in cognitive.	-0.504		0.23	No
H4. Participants in the cognitive group are less likely to share fake news relative to the no warning group.	0.144		1.00	No
Control: Subjects degree of social media engagement will positively relate to their likelihood of sharing fake news	4.58	5.881	0.017	Yes

Table 2. Results

DISCUSSION AND IMPLICATIONS

Fear Appeals: Physiological arousals have been known to be very effective in the marketing industry, ensuring that fear arousals lead to changes in attitudes (Kees et al., 2010). For example, an individual initially wanting to make a purchase due to the colorful packaging of an item but changes his mind after reading the warning label on the packaging. According to the theory of emotion (Schachter & Jerome, 1962), physiological arousal determines the intensity of arousal and the awareness of the arousal situation which in turn determines the type of feeling to be

experienced (Singh & Churchill, 1987). When individuals are expose to a sea of news items including real and fake news, they are tempted to read and share the news with their social network. However, this study suggested that warning when presented to such a reader would elicit such behavior as reaction (physiological), feelings (affective) or thoughts (cognitive) when they attempt to share the news items. The same logic may apply in such an instance where an individual is influenced by the fake news story. However, when presented with a physiological warning message that causes a change of heart thereby motivating the individual to resist the urge to accept or/and share the news. The coefficient for Physiological arousals was significant against all other arousals including the control groups as an intervention in mitigating the sharing of fake news, indicating that the higher the physiological arousal, an individual experiences, the less likely he or she was to share fake news. This is in line with psychology literature on the use of physiological arousal in classrooms (Sanbonmatsu & Kardes, 1988). This is consistent with a study that showed that high arousal-inducing contents tend to be shared more than content that does not induce the same level of arousal except in the case of physiological that causes individuals to take preventive actions for protection (Berger, 2011).

Implications for Research

This study makes several contributions to the literature on Fear Appeals and Fake news. First, this study applies Fear Appeals as an intervention to the propagation of fake news. By further explicating the physiological, cognitive, and affective dimensions of fear appeals, we show the efficacy of each dimension in threat coping such as the against the propagation of fake news. We find that individuals aroused by physiological tendencies tend to supersede all other prior arousals received from invention and leads to action on the part of the subject that leads them not share fake news. These findings highlight that individuals who are introduced to physiologically inducing

messages would be less likely to engage in the propagation of misinformation. We demonstrate that Fear Appeal arousals are significant deterrents of the propagation of misinformation.

Implications for Practice

Our results indicate several ways in which individuals' susceptibilities to sharing fake news can be successfully altered to encourage safer behaviors and practices. Given that the manipulation of the various Fear Appeal types was consistent in producing decreasing susceptibility to sharing fake news, training programs can be created to focus on increasing awareness using these fear appeals arousals with regards to such encounters of fake news. Furthermore, educating the work force or increasing awareness through such means as posters or desktop backgrounds on the dangers of fake news and its propagation, though it may not curb this menace outright, may limit their susceptibility to misinformation. It is also possible that individuals with high social media can be specifically tailored with tools that may provide warnings to prevent the clicking or attempted sharing of fake news at workplaces.

FUTURE DIRECTION

Our experimental results show that some fear appeals are effective at preventing the propagation of fake news. It further shows that physiological arousals are the most effective of the Fear Appeals arousals at preventing the propagation of misinformation. These findings provide important insights for future research and practice focused on reducing the threat posed by fake news. A major limitation is that we did not measure the positive nature of the arousal hence, the results could work both ways. For example, sending a physiological arousal as a stimulus for sharing fake news may mean the individual may end up sharing the fake news even when he or she is aware that the news article is not authentic. Future studies may try to use both negative and positive messages in the studies of fake news thereby mitigating and understanding the various

idiosyncrasies of the emotions at play. Furthermore, future studies may want to explore the neurological process of mitigating the spread of fake news by investigating biological reactions to interventions.

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Appendix A - Experimental Flow

The experiment would be introduced ad instructions presented to the respondent. Consent would be provided in the consent form

Step 1: Pre-experiment factors would be measured Groups would be segmented to 4 Step

2: Show Respondents the different fear appeals Group 1: Physiological Arousal Group 2: Cognitive (Txt) Group 3: Affective (Images) Group 4: None (Control)

Step 3: Measuring Social Media Engagement

Step 4: Subjects would be given 4 fake news + 4 real news to review randomly Subjects would be asked to share (Not more than 2/3sharing) maybe share 5 of the 8 (The remnant of the original 4 would determine their inclinations) Ask who they would like to share with. Ask why they want to share? Family, Friends, Colleagues.

Appendix B – Sample news items and Social Media Engagement Measurement

Measurement Items: Social Media Engagement adapted from [59]	Strongly Disagree			Neutral			Strongly Agree
Q1 I post likes and comments on other's social media platforms.	1	2	3	4	5	6	7
Q2 I express my feelings on social media platforms.	1	2	3	4	5	6	7
Q3 I interact with others socially on social media platforms.	1	2	3	4	5	6	7
Q4 Anything related to social media grabs my attention.	1	2	3	4	5	6	7
Q5 I spend a lot of time on social media platforms.	1	2	3	4	5	6	7

Appendix C- Sample of News Items