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Three Preventative Interventions to Address the Fake News Phenomenon on Social Media

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Abstract

Fake news on social media undermines democracies and civil society. To date the research response has been message centric and reactive. This does not address the problem of fake news contaminating social media populations with disinformation, nor address the fake news producers and disseminators who are predominantly human social media users. Our research proposes three preventative interventions - two that empower social media users and one social media structural change to reduce the spread of fake news. Specifically, we investigate how i) psychological inoculation; ii) digital media literacy and iii) Transaction Cost Economy safeguarding through reputation ranking could elicit greater cognitive elaboration from social media users. Our research provides digital scalable preventative interventions to empower social media users with the aim to reduce the population size exposed to fake news.

Keywords social media, transaction cost economics, fake news, psychological inoculation

1   Introduction

Fake news on social media has successfully disrupted democratic processes and institutions in a number of countries and challenges the idea of what defines a civil society (Bradshaw & Nelson, 2019). Fake news spreads faster, further and lasts longer than facts on the same message topic (Vosoughi, Roy, & Aral, 2018). Information disorders like fake news diffuse on and between social media networks through two mechanisms: social network contagion (Kane, Alavi, Labianca, & Borgatti, 2014) and algorithmic promotion ("trending topics") gathered from user data. Liking, sharing, and commenting on fake news posts contributes to contagion and algorithmic promotion. User attitudes changed by exposure to fake news rarely revert back to the original attitude on a topic due to a number of behavioural (Ecker, Lewandowsky, & Tang, 2010), psychological (Griskevicius et al., 2009) and cognitive vulnerabilities (De keersmaecker & Roets, 2017; Lewandowsky, Ecker, & Cook, 2017; Pennycook & Rand, 2019). Thus, fake news radicalises a large number of social media users who develop in group and out group attitudes reinforced by filter bubbles and echo chambers (Del Vicario, Quattrociocchi, Scala, & Zollo, 2019) reinforcing trust in their beliefs over facts (Moravec, Minas, & Dennis, 2019).

The phenomenon of 'fake news' on social media came to the world's attention in 2016 with two events: the Brexit Referendum (89up, 2018) and, the U.S. Presidential election (Allcott & Gentzkow, 2017). Researchers from many disciplines responded to the fake news phenomenon and a cross discipline 16 author article published in Science ("The Science of Fake News") (Lazer et al., 2018) identified two areas of research foci: user empowerment and social media structural change. The research response focused on understanding the phenomena, identifying fake news content, and reconfirmation of human vulnerabilities from previous phenomena such as MMR vaccination hesitancy (Aquino et al., 2017), conspiracy theories (Lewandowsky, Gignac, & Oberauer, 2013) and propaganda (Voigtlander & Hans-Joachim, 2015). To date, the research on fake news is message centric, reactive, and does not address the volume of exposed and effected social media users.

We seek to address gaps in the research to date, focussing on fake news producers and social media users that propagate the content, rather than the message content; preventative intervention rather than curative response with the goal of reducing the population exposed to fake news. Therefore, we ask:

RQ: How can preventative interventions impact the diffusion of fake news on social media?

If social media users are the primary source of diffusion (Allcott, Gentzkow, & Yu, 2019; Shin, Jian, Driscoll, & Bar, 2018) then focussing on user empowerment and structural change that directly influences user behaviours presents an opportunity to impact fake news diffusion. We propose three preventative interventions which could impact user actions through greater cognitive elaboration (Moravec, Kim, & Dennis, 2020) and explore them in three sub research questions.

First, psychological inoculation mimics medical inoculation and has extensive success in face to face settings, with some initial success in online environments (Roozenbeek & van der Linden, 2019).

Sub RQ1: How does psychological inoculation impact the diffusion of fake news on social media?

Digital media literacy is an established p-12 subject in Nordic countries (Kupianainen, Sintonen, & Suoranta, 2008) and has been effective in some Australian contexts (Mingoia, Hutchinson, Gleaves, & Wilson, 2019; Notley & Dezuanni, 2019). Media literacy develops critical thinking skills and literacy in media structure, form and content. Hence, the next sub question addressed in this study is:

Sub RQ2: How does digital media literacy training impact the diffusion of fake news on social media?

Lastly, Transaction Cost Economics (TCE) safeguarding in network environments (Jones, Hesterly, & Borgatti, 1997) provides a mechanism that would effect reputation rankings of all users who participate in fake news diffusion. Modelled on the way movie productions use past performance of actors and crew for future employment and reflecting the way that production of assets has moved beyond a dyadic exchange, reputation rankings is a form of network governance independent of the formal rules of the market. Reputation ranking would see historical support for authors and content later identified as fake news would not only effect the reputation of the author, but those who contributed to the diffusion of this harmful information (Jones et al., 1997). Hence, we ask:

Sub RQ3: How does transaction cost economics safeguarding through reputation ranking impact the diffusion of fake news on social media?

The focus on user empowerment equips users of all forms of social media and has the potential to transfer to offline physical environments (Chan, Ghose, & Seamans, 2016).

This proposed research addresses the research gap in social media user empowerment to better detect fake news using three interventions to promote greater cognitive effort; 1) Psychological inoculation – which mimics medical inoculation to strengthen user defences on existing attitudes; 2) digital media literacy – to understand social media message construction and message motive; and 3) transaction cost economics safeguarding to impose user reputation ranking based on past performance. The potential contribution of this research moves from curative responses to preventative interventions focused on user empowerment and greater cognitive elaboration in message evaluation.

2 Theoretical Background

In this section we outline two approaches to empowering social media users and one social media structural change. Based on our review and analysis of the related literature, our research proposes two individual interventions, psychological inoculation, and digital and media literacy, and one structural change, the imposition of safeguarding mechanisms based on users' previous social media exchanges.

2.1 Psychological Inoculation

Psychological inoculation (McGuire, 1961) uses a medical metaphor that gives resistance to messages seeking attitude change. By inoculating users with weakened attack messages user attitudes users are inoculated against stronger more persuasive messages. The original research proposed four mechanisms in inoculation theory. First, users are informed of the threat of an attach ("threat"), second, users are given a weakened form of the message attack to defend their attitude ("refutation preemption"), third, a period of delay is enforced ("delay") between the defence and the final, full-strength attack ("attack").

Since 1961, scholars have extended the boundaries and varied the mechanisms involved in psychological inoculation (Pfau et al., 1997). A recent meta-analysis (Banas & Rains, 2010) of nearly fifty years of research has confirmed that psychological inoculation successfully intervenes against persuasive messages. Some of the extended boundaries swapped active refutation preemption - where users initiate the defence of their attitude, to passive - being provided with materials to assist their defence of attitude. Other successful variations include a different refutation preemption to the final message attack form and varying the delay length or omitting the delay between the refutation preemption and attack. The meta-analysis confirms that psychological inoculation defends user's attitude on an issue, it only needs the first two stages of the process, that is the threat, and refutation pre-emption (Banas & Rains, 2010).

2.2 Digital Media Literacy

Social media has changed audience engagement (Nelson & Taneja, 2018). The ubiquity of smart phones and internet access creates an always available audience to consume media messages and breaks the form of news distribution found in previous media forms (e.g. terrestrial television, radio, newsprint). Unlike previous media forms of the 19th and 20th century, social media not only changes news consumption patterns, it also provides the tools to create, promote and share content (Hobbs, 2010).

While all social media users have the tools to create, consume, and share media content, most users do not have the skills to comprehend the new media forms (De keersmaecker & Roets, 2017; Moravec et al., 2019). Digital media literacy creates skilled users with creative, analytical and critical thinking skills to support informed engagement with the broader community and society (Tully, Vraga, & Bode, 2019).

Media literacy has five key components. First, message construction - all messages have a structure and form; second, message construction has a specific grammar syntax and materials specific to the media form; third, different audience members interpret the same message differently; fourth, messages represent a specific attitude on an issue, and omit and sometimes obfuscate many different attitudes on that issue, and lastly, media messages are created to gain some advantage that maybe social, financial, political or psychological in nature (Jolls & Thoman, 2008).

2.3 Transaction Cost Economics Safeguarding

In any exchange of goods, services or information there are operational costs and transaction costs. While operational costs are the most important in making the decision, the imposition of formal transaction governance often adds unnecessary costs and reduces the effectiveness of the exchange. Transaction Cost Economics (Williamson, 1987) is a behavioural economic theory that decides whether the good or service is kept within the firm, or sourced from the market, or partially sourced from the market and the firm (hybrid). It aims to avoid legalistic and legislative governance in the form of an informal governance and dispute mechanism between the parties involved in the transaction.

Jones and colleagues (Jones et al., 1997) expanded TCE hybrid governance to include network governance. This boundary expansion extends TCE beyond a dyadic exchange to a network perspective. This network perspective makes TCE suitable for imposing a governance framework on exchanges of information in online social networks. Network governance in exchanges involving multi node exchanges creates problems which can be safeguarded and coordinated by social mechanisms from members in the network (Jones et al., 1997). While coordination of online social networks lies with the platform providers, safeguarding can be deployed by nodes in the network through social mechanisms. Jones and colleagues identified three social mechanisms to resolve exchange problems: restricted access; collective sanctions and reputation ranking. For restricted access and reputation, the amount of restriction and reputation ranking needs the right amount since too little or too much safeguarding impacts the effectiveness of the network governance.

Media literacy, psychological inoculation and safeguarding assets in Transaction Cost Economic theory are defensive actions designed to protect an asset or attitude from opportunistic behaviour. Each intervention responds to a threat with a proactive defence utilising skills acquisition and literacy, refutation defence or explicit safeguarding. Each method prepares users with the ability to defend themselves from subsequent fake news attacks. In the next section we explain the proposed method to explore the effectiveness of these approaches on fake news.

3 Proposed Method

In this section we provide an overview of our research focus on user empowerment interventions. Participants will be sourced by using social media, noticeboards at community centres, shopping centres and professional staff, and student noticeboards where the research team is based.

3.1 Study 1 - Preventative user empowerment

Study 1 addresses sub research questions 1 and 2. We have recruited participants to explore two preventative interventions: psychological inoculation and digital media literacy. After participants have viewed a plain language statement and provided informed consent they will complete demographic and psychological (Big 5 "OCEAN") information before being divided evenly into three groups: i) psychological inoculation treatment, ii) digital media literacy treatment and iii) a control group. All groups will view a brief video (7-8 minutes) of the treatment (or control - a video about our university) before being shown 10 social media posts. The randomised social media posts contain a combination of factual and false information posts. Posts contain content that is familiar to most social media users.

For each post participants are asked to rate their likelihood to share, like (favourite), comment favourably, comment negatively on a seven-point Likert scale (extremely unlikely, moderately unlikely, slightly likely, neither likely nor unlikely, slightly unlikely, moderately unlikely, extremely unlikely). After viewing 10 social media posts all participants view a debriefing presentation identifying the factual and false posts including sources (e.g. Snopes, ABC Fact check) that confirmed the post status. Participates can initiate a distress protocol at any stage and exit the study at any time.

Our expectation based on previous research is that we should see some effect in the likelihood to share fake news (disinformation, malicious information) social media posts. The novelty of this study is that it takes place in an online only setting and does not involve physical interaction with participants.

3.2 Study 2 - Social Media Structural Change

Our second experiment addresses sub research question 3 and will ask participants to test the imposition of user reputation ranking by imposing a safeguarding mechanism on the transaction (message sharing)- part of TCE theory. Safeguarding is a mechanism used to protect assets. Assets of low specificity require no safeguarding. However, once the asset has unique attributes and characteristics, the failure to safeguard is considered an unrelieved hazard (Williamson, 1987). Studies (Shao et al., 2018) have used machine learning, natural language processing, and mining existing fact checking corpus of historical social media posts identified as fake news. This historical corpus, means that user accounts that created, shared, liked, or commented on fake news can be identified. Following on from these users who promote fake news would have their reputation ranking negatively impacted.

Our treatment introduces a 10-point scale (1/2 star to 5 stars) reputation ranking of the user based on their previous actions. New users and verified bot accounts are not rated. Participants in the treatment group in Study 2 will be informed that their own reputation ranking will be affected if they favourable share, like, or comment on posts identified as fake news. The control group will not receive this information but still see user accounts with the star ranking. As in Study 1, users will be shown a

randomised combination of 10 factual, disinformation and malicious information social media posts and asked to rank their likelihood to share, like, comment favourable, and comment negatively on the post. Participants who favourably like a fake news social media post would be informed that their own reputation ranking has been negatively affected and asked if they wish to reverse their action.

4   Discussion

We expect our research to contribute to both research into the fake news phenomenon and help social media organisations empower users to self-manage their fake news exposure. The contribution to psychological inoculation research is that it is used in an online digital setting. Nearly all psychological inoculation research occurs face to face with the researchers and participants being co-located(Banas & Rains, 2010). Our research is online and would extend the preliminary work (Roozenbeek & van der Linden, 2019) done with psychological inoculation in social media settings.

Like psychological inoculation research, most media literacy interventions occur in face to face instructor led settings (Hobbs, 2010). This research provides media literacy training beyond the boundary of P-12 education classroom settings. Further, it extends media literacy as a skill suitable for all age groups and all social media users.

The contribution to research is twofold. First, we demonstrate the novel use of Transaction Cost Economic theory especially network governance and safeguarding to social media. Further, we extend this theory beyond a dyadic exchange between the market and the firm to the idea of a network of market suppliers and network governance in online digital social networks like social media.

The contribution to practice is that our research offers digital, scalable, online, low resource cost training to all social media users across all social media platforms. It provides a short training module that equips social media users with the necessary tools to better detect disinformation and fake news and make informed decisions about what they share and promote (organically and algorithmically) within and between social media networks.

Our research differs from most fake news social media research to date by focussing on message producers and disseminators rather than message content, and on preventative strategies rather than curative responses. The majority of research across multiple disciplines focuses on users and their actions and vulnerabilities (Aquino et al., 2017; Schmidt, Zollo, Scala, Betsch, & Quattrociocchi, 2018; Zuk, Zuk, & Lisiewicz-Jakubaszko, 2019), the process and effect of fact checking (Shao et al., 2018), correcting the record (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012; Shin, Jian, Driscoll, & Bar, 2017), and medical misinformation especially vaccine hesitancy (Aquino et al., 2017). The overwhelming majority of this research focuses on fake news campaigns while in progress or after they have impacted social media platforms and users. Our research focusses on reducing fake news exposure and empowering users to make better informed decisions about what they share and promote.

5   Conclusion

Our research responds to Lazer et al.'s (Lazer et al., 2018) call for future research to focus on user empowerment and social media structural change to address the fake news phenomenon. Psychological inoculation and digital media literacy empower users to demonstrate greater cognitive elaboration when encountering disinformation and harmful information. TCE safeguarding introduces structural change by changing focus from message content to message producer and distributor. The introduction of reputation rankings based on previous performance enforces network governance on social media.

One of the limitations of this research is that our cohort are Australian users of social media and may not be representative of all social media users. The second limitation of our study is the sample size. We expect approximately 150 participants for both user empowerment and structural change studies and any findings may not be statistically significant. Our research is at the stage where we have recruited participants and are about to conduct the studies and collect data. Once we have sufficient number of completed experiments we expect to start data analysis before the end of the calendar year. If our research is successful we would expect to see future research focus on other preventative interventions that empower users through greater cognitive elaboration.

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