Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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"Others are more vulnerable to fake news than I Am": Third-person effect of COVID-19 fake news on social media users

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ABSTRACT

Fake news have pervaded the social media landscape during the COVID-19 outbreak. To further explore what contributed to fake news susceptibility of social media users, the research 1) integrated a widely-adopted mass communication theory of third-person perception (TPP) with digital disinformation; 2) examined users' social media engagement and individual characteristics toward risk as antecedents of TPP; and lastly, 3) tested TPP of fake news under a context of COVID-19 outbreak, an uncertain situation flooded with baseless news and information. An online survey was conducted on 871 respondents via Amazon Mechanical Turk. As a result, we found that in the context of COVID-19, social media engagement 1) directly increased TPP; and 2) indirectly increased TPP via self-efficacy and perceived knowledge. However, negative affect failed to mediate a positive relationship between communal engagement and TPP, as the respondents rated themselves more attentive to fake news than are others. Therefore, the fact that social media directly and indirectly provoked higher TPP implicates that a potential harm of social media is not confined to a rumor mill that propagates false stories, as widely recognized, but can further extend to an echo chamber to cultivate a slanted belief that he or she is fake-news-proof.

1. Introduction

Eating sea lettuce or injecting disinfectant will prevent you from getting COVID-19. You can test for COVID-19 b y holding your breath for 10 s. Vladimir Putin released 500 lions in Moscow to force people to stay indoors to combat COVID-19 (Fleming, 2020). All these groundless statements are fake news that is currently being combated by scientists. Along with the skyrocketing number of COVID-19 infections worldwide and heightened uncertainty of the crisis, a "massive infodemic," as announced by the World Health Organization (WHO), inflames our media and information environment.

Fake news, or disinformation is defined as fabricated content that mimics traditional news and spreads at a conscious state to serve interests of certain entities or people (Lazer et al., 2018; Shin et al., 2018). The harmful effects of fake news range from the micro level impacting individuals to the macro level concerning media systems. Fake news can (a) mislead people to rely on false information in making judgements; (b) change people's attitudes toward and reception of true news; and lastly, at a macro level, (c) devalue the trustworthiness of entire news systems (Nyhan & Reifler, 2010; Shu et al., 2019). Additionally, as fake news' agenda-setting power was discovered in a recent study (Vargo et al., 2018), numerous concerns have been raised regarding its potential to distract public attention from certain issues and to delegitimize journalistic practices and credibility (Ştefaniţa et al., 2018). In response to such thriving harms that are polluting the information ecosystem (Wardle & Derakhshan, 2017), multidisciplinary efforts have been made to detect fake news on both network (Zhang et al., 2020) and content levels (Sample et al., 2018).

However, despite those efforts to investigate what constitutes fake news propagation and susceptibility, innumerable users are exposed to fake news, particularly on social media where a gatekeeping mechanism to verify information is relatively deficient (Corbu et al., 2020). This threat is likely to be elevated in concert with the lockdowns and social distancing during COVID-19, which have triggered increased usage of social media platforms such as Facebook, Instagram, and WhatsApp by more than 50% (Holmes, 2020). Limited research on social media users' vulnerability to fake news and the situational conditions incited by the idiosyncrasy of the pandemic necessitate an examination of fake news from a receiver-oriented perspective by exploring audiences' attitudes and biases toward COVID-19 fake news effects. Moreover, minimal

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studies have been conducted to explore perceptual discrepancy of fake news (Corbu et al., 2020; Jang & Kim, 2018; Ştefaniţa et al., 2018; Yang & Horning, 2020) which raises the importance of this study that aims to examine the third-person perception (TPP) of fake news under a health crisis context.

Therefore, this research aims to (a) integrate a widely-adopted mass communication theory of third-person perception with digital disinformation to test if socially undesirable content like fake news can elicit TPP as proposed by previous studies; (b) examine users' social media engagement and individual characteristics regarding risk as antecedents of TPP to uncover what constitutes individuals' slanted perspectives on personal vulnerability to fake news; and lastly, (c) test TPP of fake news in the context of the COVID-19 outbreak, an uncertain situation flooded with baseless news and information.

2. Literature review

2.1. Third-person perception

A plethora of research has investigated audiences' perceptual differences of the media effects on themselves and other people (Davison, 1983; Perloff, 1999; Schweisberger et al., 2014; Stavrositu & Kim, 2014). Traditionally, third-person perception (TPP) refers to the perception that communications exert a stronger impact on others than on oneself (Perloff, 1999; Schweisberger et al., 2014). In essence, this perceptual bias manifests itself as two differentiating perceptual processes for oneself and others (McLeod et al., 2001). On the one hand, people tend to underestimate the effects of media messages on themselves (Davison, 1983) through a route of complex and conditional effects in which people rely on situational and complex conditions to explain the effects on themselves (Mcleod et al., 2001). Conversely, people overestimate the effects of media messages on the attitudes of others (Davison, 1983) via a simple heuristic similar to the magic bullet theory of media effects or the exposure-is-effect corollary (Mcleod et al., 2001). The situational and complex factors that have been considered in self-evaluation are disregarded when evaluating media effects on others.

As Perloff (1993) suggested, TPP is contingent upon situations. For instance, when message effects are seen as socially undesirable (e.g., pornography by Gunther, 1995; and violence content by Rojas et al., 1996), third-person effects (TPE) get amplified (Perloff, 1999; Schweisberger et al., 2014). In contrast, positive messages are perceived as being more impactful on self than on others (Golan & Day, 2008). Lastly, the TPE is a two-pronged hypothesis; it does not only encompass the perceptual component but also contains the behavioral component in which people act in correspondence with their judgment of effects on others (Davidson, 1983; Gunther, 1995; McLeod et al., 2011; Tewksbury et al., 2004), which is of great relevance in our current media ecology to understand people's COVID-19 health behavior.

To explain this discrepancy, many scholars refer to the psychological mechanisms such as attribution theory (Gunther, 1995; Hoffner et al., 1997; Rucinski & Salmon, 1990), self-serving motivations (Gunther & Mundy, 1993; Mcleod et al., 2001), biased optimism (Gunther & Mundy, 1993; Paul et al., 2000), the need for self-enhancement (Gunther & Mundy, 1993; Hoorens & Ruiter, 1996; Mcleod et al., 2001), self-categorization theory (Reid & Hogg, 2005), and media effects schemas (Perloff, 1993).

Among these explanatory mechanisms, ego-defense and ego-enhancement mechanisms are the key theoretical constructs in explaining why the TPP gap becomes wider for undesirable news and why desirable messages diminish TPP (Gunther & Mundy, 1993). The ego-defense mechanism occurs when people use defensive mechanisms to resist negative feelings and maintain positive perceptions about the self in response to conflicts and problems, negative media effects, and undesirable messages (Chen et al., 2017). A concept in a similar vein, ego-enhancement refers to the psychological process whereby people act in certain ways to feel good about themselves and enhance self-esteem (Boyle et al., 2008). To maintain and enhance self-esteem, people perceive themselves as more cognitively sophisticated than others and, consequently, better equipped to counter the media influences where others cannot (Boyle et al., 2008; Chen, 2017; Paul et al., 2000).

Besides, ego-defense and ego-enhancement mechanisms are closely linked with biased optimism, which is revealed as another theoretical base that underpins TPP. Two tenets constitute biased optimism in social comparative judgements: (a) people believe that they are more likely than others to encounter desirable experiences and (b) people believe that positive events are more likely to happen to them than to others (Chen, 2017; Paul et al., 2000). From this perspective, people are expected to hold different perceptions of media effects on themselves compared with others (Chen, 2017). As a matter of fact, some people argue that TPP is an exemplar of optimistic bias in the context of media effects (Chen, 2017).

Exhibited in the studies by Ştefăniţă (2018), and Jang and Kim (2018), the ego-enhancement need and the optimism bias are the factors that underlie people's TPP of fake news. Furthermore, prior works have found that the TPP holds firm when people evaluate the influences of fake news (Corbu et al., 2020; Jang & Kim, 2018) which we also aim to examine through the first hypothesis below:

H1: There is a third-person effect on perception of fake news regarding COVID-19.

2.2. Communal social media engagement and TPP

With the advent of health crises, a growing number of people utilize social media as a health information channel (Lin et al., 2016). One reason is that social media platforms facilitate access to information and connectivity as they host political and social discussions where the public freely shares and communicates health information and concerns (Davies, 2009). Such user participation and interaction, afforded by social media platforms are termed "social media engagement" (Prahalad & Ramaswamy, 2004). There has been an attempt to dimensionalize social media engagement, as Lim et al. (2015) developed and operationalized three levels of engagement: functional, emotional, and communal. Among the three dimensions, communal engagement measures how users feel a sense of belonging within a virtual community in social media by interacting with other users in a value-adding process (Chen, 2011; Lim et al., 2015). Social media communal engagement spotlights the social interactions among users in a collaborative community on social media (Lim et al., 2015).

TPP has been widely established as a persistent and robust mechanism across a variety of online channels, such as personal and media blogs, and digital news (Schweisberger et al., 2014; Stavrositu & Kim, 2014). Concerning social media effects on TPP, two competing mechanisms have been introduced based on the two corollaries from the original TPP framework: social distance and target corollary. The social distance corollary to TPP posits that as the comparison groups become more socially distant, the more TPP gap stretches (Eveland et al., 1999; McLeod et al., 1997). Applying social distance corollary to social media context, Stavrositu and Kim (2014) maintained that a higher level of interpersonal communication enhanced by social media technology reduces the perceived social distance between oneself and others. Furthermore, they explained that a decreased perceptual gap is attributed to a bandwagon effect as people tailor their attitudes to others' social proof and injunctive norms (Cialdini et al., 1991; Stavrositu & Kim, 2014). These effects are further escalated when users are exposed to social media metrics that legitimize and enhance the normative appeal of the others' views and eventually, entices them to jump on the bandwagon to lessen the perceived distance (McLeod et al., 1997; Stavrositu & Kim, 2014). From this vein, social media might reduce TPP. Conversely, the target corollary made a compelling argument regarding the potential exacerbating effect of social media interactions on the TPP (Stavrositu & Kim, 2014). According to McLeod et al. (1997), the target corollary of the TPP states that those groups, being seen as the target of a

specific communication or media messages, will induce higher TPP. Owing to the intense social interactions that underlie the communal dimension of social media use, users are also in a position as observers, who infer others' degree of exposure to COVID-19 fake news. Accordingly, people with high levels of social media communal engagement would estimate others' likelihood of exposure to COVID-19 disinformation as higher (Stavrositu & Kim, 2014).

Despite these competing mechanisms, the target corollary argument was more empirically substantiated in the context of health information in social media (Stavrositu & Kim, 2014). Since this study concentrates on the perceptual gap of COVID-19 disinformation, the following hypothesis is formulated:

H2: Communal engagement in social media positively predicts a TPE on perception of fake news regarding COVID-19.

2.3. Mediators of communal engagement and TPP

Furthermore, an increasing number of studies demonstrate that effects, exerted by social media use rely on differences in individual characteristics such as personality traits and the ability to process information (Kim et al., 2013; Yoo & Gil de Zuniga, 2014). As social media affordances allow users to customize their communication and information channels by selecting news information and the community they choose to interact with, individual characteristics have become critical mediators in examining social media effects on cognition, attitudes, and behaviors (Boyd & Ellison, 2008; Choi et al., 2017; Glynn et al., 2012). From this standpoint, individual characteristics such as perceived hazard knowledge, negative emotion, and self-efficacy are examined as critical mediators between communal engagement in social media and third-person perception of fake news, as visualized in Fig. 1.

2.3.1. Negative affect

Negative affect refers to "an underlying dimension of a broad set of emotional states, comprising fear, anger, sadness, etc. (Wolniewicz et al., 2018). Research on emotional responses to crises has put a premium on negative affect owing to its relative intensity and notable impact on people (Folkman & Moskowitz, 2000; Wolniewicz et al., 2018). For example, according to the theory of emotional contagion (Hartfield et al., 1994), an expression of negative affect naturally activates emotional contagion as one's emotional expression automatically leads another person to mimic their behavior of sharing affective state. Research on how emotions spread across social networks, namely, emotional contagion, has been conducted primarily by examining the propagation of negative emotions rather than positive ones (Cacioppo et al., 2009). Considering disease outbreak, empirical studies revealed that negative emotions toward health crises were found to be more pervasive in social media (Chew & Eysenbach, 2010; Signorini et al., 2011; Song et al., 2017). A higher degree of emotional contagion of negativity implies a potential role for active social media usage in increasing negative affect toward COVID-19, during which, for example, Americans reported to experiencing undue fear, anxiety, panic and depression (Liu & Huang, 2020).

According to Wolniewicz et al. (2018), emotion modulates the dynamics of people's crisis responses by framing their perceptions of the situation. Thus, as an important facet of the epidemic circumstances, perceptions of the fake news should be skewed by people's emotional states as well. While several previous works examined the relationships between emotions and TPP, they considered TPP as the causal factor for emotional outcomes (e.g., Liu & Huang, 2020), or viewed emotions as the mediator between TPP and attitudinal or behavioral changes (e.g., Kim, 2014; Kim, 2016), or included the emotion as an underlying dimension of the TPP (Chen & Ng, 2017). Departing from these approaches, the present study places negative affect as a predictor of TPP by referring to the downward comparison, defined as making comparisons with others who are worse off than oneself (Festinger, 1954). Downward comparison has been extensively studied as a coping mechanism to alleviate a perceived threat (Gibbons & Gerrard, 1991) and negative affect in the interest of self-enhancement (Liu & Huang, 2020). Likewise, the ego-defense mechanism is known to operate unconsciously at times when people feel threatened and overwhelmed (Chen, 2017).

We argue that those who experience higher levels of negative emotions on social media tend to employ downward social comparisons for underestimating COVID-19 fake news' influence on oneself and overestimating for others, eventually amplifying TPP. As a result, the following hypothesis has been generated:

H3: Communal engagement in social media positively predicts a TPE on perception of fake news regarding COVID-19, mediated by negative affect.

2.3.2. Perceived knowledge

Perceived hazard knowledge is the amount of current knowledge and familiarity one perceives to hold with respect to a risk issue (Flynn & Goldsmith, 1999; Griffin et al., 2008). Perceived knowledge differs from

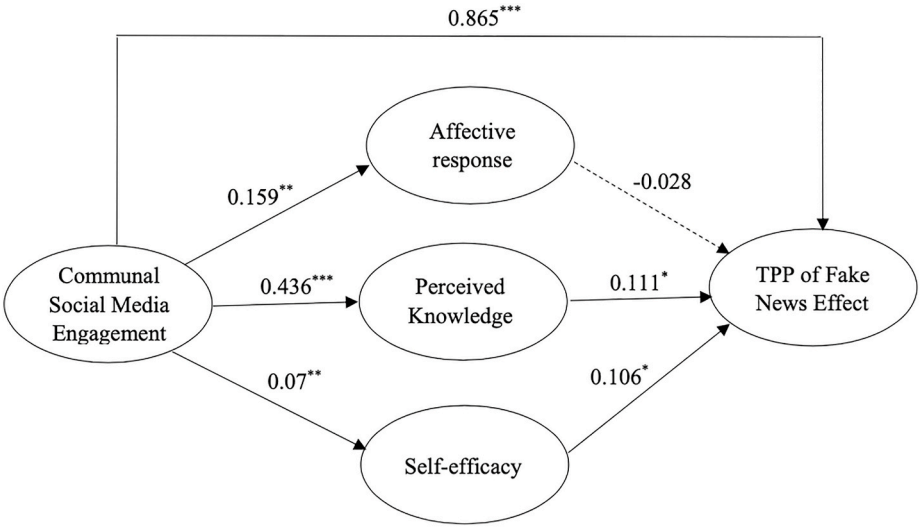

Fig. 1. Hypothesized Research Model; The dotted lines indicate non-significance; ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. The sources of the variables include: Communal social media engagement (Lim et al., 2015); Affective response (Griffin et al., 1999); Perceived knowledge (Ter Huurne & Gutteling, 2008); Self-efficacy (Ter Huurne & Gutteling, 2008); TPP (Bae et al., 2019).

factual or objective knowledge in a way that factual knowledge is stored in an interconnected memory network whereas perceived knowledge is based on metacognitive judgments about their own knowledge (Raaijimakers & Shiffrin, 1980; Schäfe, 2020). Moreover, effects of different media outlets on perceived and factual knowledge have been extensively studied. For instance, scholars found that reading newspapers increased factual knowledge (Hollander, 1995) whereas TV news escalated perceived knowledge and eventually broadened the discrepancy between factual and perceived knowledge (Park, 2001). In the context of digital media, empirical findings confirmed that social media facilitate the illusioned feeling of being informed due to the frequent and repeated exposures to the information or topic (Ran, Yamamoto, & Xu, 2016; Müller et al., 2016) and ease of processing information on news feeds that are superficial and therefore, require less cognitive energy (Schäfer, 2020). In other words, social media affordances and information settings enable users to foster higher perception of knowledgeability (Schäfe, 2020).

According to Price, Huang, and Tewksbury (1997), people with greater belief in their knowledge and involvement with a topic are inclined to perceive others as more susceptible to media messages due to the underestimation of others' knowledge. They concluded that higher perceived knowledge consequently increases TPP of media effects (Price et al., 1997). Furthermore, numerous studies on TPP contended that higher perceived, subjective knowledge induced TPP of news coverage whereas factual, objective knowledge did not show such an effect (Larosa, 1989; Salwen & Driscoll, 1997; Salwen & Dupagne, 2001). Overall, these studies underline that people who have higher perceived knowledge about a certain issue are more likely to perceive others as lacking knowledge on the same issue and are de facto more susceptible to media messages than they are. A positive relationship between knowledge and TPP has been examined empirically in the context of pornography (Lo & Wei, 2002) and political news consumption (Rucinski & Salmon, 1990). This study attempts to test such a relationship in the context of a health crisis by proposing the hypothesis as follows:

H4: Communal engagement in social media positively predicts third-person effect on perception of fake news regarding COVID-19, mediated by perceived knowledge.

2.3.3. Self-efficacy

Self-efficacy refers to a personal control that allows an individual to cope with uncertain and challenging situations (Bandura, 1977). According to social cognitive theory (Bandura, 1977), one's self-efficacy is derived from four sources, which are (a) mastery experience, (b) vicarious experience, (c) verbal or social persuasion, and (d) physiological state. Mastery experience indicates one's own successful experiences whereas vicarious experience deals with others' experience that one has observed. Verbal or social persuasion refers to social proof of one's ability to complete a given task successfully or overcome a challenge (Bandura, 1977). These sources of self-efficacy can be enhanced through social media, a repertoire of efficacy information. According to Strecher et al. (1986), people are not automatically endowed with self-efficacy from a simple exposure to regular information as efficacy information is what directly instigates self-efficacy. As a result, the availability of efficacy information on social media, elevates efficacy belief (Bandura, 1977). For instance, social media users acquire skills and knowledge on risk through the vicarious experience they observe and learn in a social media community (Hu et al., 2018). Successful experiences of experts and professionals they encounter and interact with in the social media community can function as credible sources of learning and information to cultivate self-efficacy (Deci & Ryan, 1985; Hu et al., 2018).

A positive relationship between TPP and self-efficacy has been established through studies in different disciplines including political communication (Jang & Kim, 2018; Lin, 2014), health communication (Lee & Park, 2016) and technology (Lee & Tamborini, 2005). A positive effect, actioned by self-efficacy over TPP can be explained through people's belief that their perceived control of an issue (Brosius & Engel, 1996). This potentially creates an optimistic bias that negative outcomes of the issue, in this context, being affected by fake news, will occur to others more frequently than to themselves (Lee & Tamborini, 2005). Weinstein (1980) also corroborated that people with higher perceived control over negative events underestimate the possibility that they will occur to themselves than to others. Similarly, under a fake news context, Jang and Kim (2018) demonstrated that individuals with high political efficacy evaluated others to be more susceptible to fake news, which is considered negative and socially undesirable. Hence, a positive relationship between communal engagement and TPP, mediated by self-efficacy is hypothesized as below:

H5: Communal engagement in social media positively predicts third-person effect on perception of fake news regarding COVID-19, mediated by perceived self-efficacy.

3. Methodology

In order to examine aforementioned hypotheses, an online survey has been conducted on 985 respondents. Before conducting a main survey, a pilot study of 80 respondents has been undertaken to validate measures and test survey instruments.

3.1. Samples

871 out of 985 survey responses were considered valid as a sample size. Invalid responses were filtered out through a cross-checking procedure in which responses were deleted if their answers to a repeated question with the exact same content do not coincide. Among 871 respondents, more than a half were males with 61.8%. Approximately, 57.7% respondents were whites, followed by Asian-Americans (22.8%), Hispanic (9.3%), and African-Americans (8.0%). In terms of age, an age group ranging from 28 to 37 showed the highest proportion (42.0%). Additionally, 42.4% of respondents were shown to be Democrats. In regards with general social media usages, 74.7% of the respondents use social media websites at least several times a day. 53.1% of the respondents found to be exposed to news and information about COVID-19 on social media several times a day. Among those, 39.6% of the respondents receive COVID-19 related information on Facebook, followed by YouTube (25.5%), and Twitter (18.8%). For COVID-19 new exposure on social media, 54.8% of the respondents were exposed to COVID-19 news on social media several times a day, followed by 17.5% once a day and 13.1% hourly. For general social media use, 59.1% of the participants used social media several times a day, followed by 17.2% hourly and 14.0% once a day. To ensure the validity of the tested model, age, gender, ethnicity, COVID-19 news exposure on social media, and general social media use frequency have been controlled. Considering that COVID-19 is perceived as a politicized issue and our finding suggests that Democrats ($M = 5.63$, $SD = 5.60$) reported a significantly higher TPP gap than did Republicans ($M = 3.19$, $SD = 2.63$), $F(3, 867) = 10.87$, $p < 0.001$, we controlled the party affiliation variable to test the sole effects of social media engagement and the three mediators over TPP.

3.2. Questionnaire design and implementation

The participants were asked to fill out a 13-min online survey questionnaire which consists of 23 questions. The survey questionnaire was formulated in Qualtrics and published in Amazon Mechanical Turk (MTurk), a crowdsourcing platform to recruit respondents and provide paid tasks. The reliability and validity of MTurk as a sampling tool has been established through empirical research (Coppock, 2018). The survey questionnaire is comprised of 11 questions from which 6 variables were used and is on a seven-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). The specific items for each variable are

described in Table 1. The other 7 questions measured frequency, intensity and dimensions of the participants' social media engagement. The last 5 questions were about the respondents' demographic information.

3.3. Measures

For this study, 6 variables were measured through 14 survey items in the questionnaire besides the control variables, as portrayed in Appendix. In the survey, the following variables were examined: 1) Fake news gap ($M = 4.75$, $SD = 5.43$): calculated as the difference score subtracting self-perception (3 items; $\alpha = 0.88$) from others' perception of fake news (3 items; $\alpha = 0.91$) (Bae et al., 2019; Conners, 2005); 2) Self-efficacy (4 items; $\alpha = 0.84$): The extent to which an individual expects to be able to mitigate the risks adequately with the newly information (Ter Huurne & Gutteling, 2008), 3) Negative affect (3 items; $\alpha = 0.91$): Emotional reactions to a risk which can potentially affect risk judgements and subsequent information seeking behaviors (Griffin et al., 1999) and include anger, worry, and anxiety (Griffin et al., 2008), 4) Perceived Knowledge (4 items, $\alpha = 0.77$): The amount of knowledge people possess about COVID-19 (Ter Huurne & Gutteling, 2008), and 5) Communal social media engagement (3 items, $\alpha = 0.92$): a communal dimension of social media engagement regarding COVID-19 (Lim et al., 2015; Tian et al., 2021).

To further elaborate on the measures, the fake news perception measure was adopted from and was modified and expanded to measure perception of others' susceptibility to COVID-19 fake news. We specifically reflect three dimensions of TPP in our measurement: news attention, content persuasion, and behavior persuasion. They were asked if the fake news 1) attracted attention from self/others; 2) persuaded self/others; and 3) influenced decisions of self/others (See Appendix A). The third-person effect was operationalized by calculating a difference score between self-perception and others' perception of fake news (Conners, 2005). In addition, to measure individuals' communal engagement in social media, one of the three dimensions (functional, emotional, and communal) from Lim et al. (2015)'s social media engagement scale has been adopted. Among numerous scales to quantify level of social media engagement (Ellison et al., 2007; Bodroža & Jovanović, 2016; Li et al., 2016; Jenkins-Guarnieri et al., 2013), this study adopts communal engagement in social media (Lim et al., 2015) because it conforms to its research objective: exploring how mass-personal interaction in the social media community regarding COVID-19 expands people's perception gap of fake news vulnerability. Such decision is endorsed by Sigerson et al. (2017) who underlined the importance of considering research intention in choosing a proper social media scale. All other variables are implemented by information seeking models such as risk information seeking and processing (RISP; Griffin et al., 1999; Griffin et al., 2008) and framework of risk information seeking (FRIS; Ter Huurne & Gutteling, 2008).

Table 1
Confirmatory factor analysis (CFA) for the measurement model.

Factor	Items	Loadings	CR	AVE
Negative affect	Affect1	0.89 (***)	0.91	0.77
	Affect2	0.88 (***)		
	Affect3	0.86 (***)		
Perceived Knowledge	Know1	0.71 (***)	0.86	0.61
	Know2	0.84 (***)		
	Know3	0.76 (***)		
	Know 4	0.81 (***)		
Efficacy	Effi1	0.75 (***)	0.78	0.47
	Effi2	0.70 (***)		
	Effi3	0.61 (***)		
	Effi4	0.67 (***)		
Communal social media engagement	CE1	0.94 (***)	0.96	0.89
	CE2	0.94 (***)		
	CE3	0.96 (***)		

$\lambda^2/df = 3.45$, CFI = 0.98, TLI = 0.97, RMSEA = 0.053 [0.046, 0.060], SRMR = 0.042.

4. Results

4.1. Testing the measurement model through confirmatory factor analysis

Prior to performing confirmatory factor analysis (CFA) to ensure the validity and reliability of the measurement, Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity have been conducted via SPSS. As a result, KMO was 0.82 (>0.80) and Bartlett's test was statistically significant ($\chi 2$ (190) = 10,707.04, $p < 0.001$) which validates the appropriateness of factor analysis (Hair et al., 2009). CFA with the maximum likelihood estimation was performed via Mplus 7.3. As portrayed in Table 2, the factor loadings were statistically significant ($p < 0.001$) with overall factor loadings ranging from 0.61 to 0.96 which were higher than the threshold value of 0.5 (Hair et al., 2009). As a result, the model validated that all 4 latent variables are explained by the survey items corresponding to each variable. The composite reliability (CR) values fell under a range of 0.78 and 0.96 which is equal and above the threshold value of 0.70 (Fornell & Larcker, 1981). The CR values fulfilling the criteria demonstrate a good reliability of the measurement model. The average variance extracted (AVE) values ranged from 0.47 to 0.89 of which is above the threshold value of 0.50 (Fornell & Larcker, 1981). Even though the AVE of Efficacy (0.47) did not meet the requirement, it was near a threshold value of 0.50. Generally, the measurement model showed an acceptable model fit of which indices met the criteria ($\lambda^2/df = 3.45$, CFI = 0.978, TLI = 0.972, RMSEA = 0.053 [0.046, 0.060], SRMR = 0.042), ensuring its validity and reliability (See Table 1; Bentler & Bonett, 1980; Browne & Cudeck, 1993; Hu & Bentler, 1999).

4.2. Testing hypotheses through structural modeling

In terms of a model fit, as demonstrated in Table 3, the structural model ($\lambda^2/df = 2.96$, CFI = 0.974, TLI = 0.965, RMSEA = 0.047 [0.042, 0.053], SRMR = 0.041) met the required criteria to be considered an acceptable model (Bentler & Bonett, 1980; Browne & Cudeck, 1993; Hu & Bentler, 1999). The first hypothesis that tested the third-person effect on fake news perception was supported after conducting a paired-samples *t*-test. There was a significant statistical difference in the scores between the self-perception of fake news ($M = 4.90$, $SD = 1.38$)

Table 2
CE=Communal social media engagement; Affect = Negative affect toward COVID-19; Efficacy = Self-efficacy to cope with COVID-19; Knowledge = perceived knowledge regarding COVID-19; Gap = COVID-19 fake news perception gap. Significance level: ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Path	Proposed Direction	Standardized Coefficient	Bootstrap [95% CI]	Result
H2: CE → Gap	+	0.865 (***)	[0.013, 0.077]	Supported
H3: CE → Affect → Gap	+	–	[-0.014, 0]	Not Supported
CE → Affect	+	0.159 (**)	–	–
Affect → Gap	+	−0.028	–	–
H4:CE → Knowledge → Gap	+	–	[0.015, 0.075]	Supported
CE → Knowledge	+	0.436 (***)	–	–
Knowledge → Gap	+	0.111 (*)	–	–
H5: CE → Efficacy → Gap	+	–	[0.002, 0.014]	Supported
CE → Efficacy	+	0.070 (**)	–	–
Efficacy → Gap	+	0.106 (*)	–	–

and others' perception of fake news ($M = 3.31$, $SD = 1.65$): t (df = 870) = −25.84, $p < 0.001$ (two-tailed).

Consistent with CFA, maximum likelihood estimation has been conducted to run structural equation modeling (SEM) to test the hypothesized paths as illustrated in Table 2. First, communal social media engagement ($\beta = 0.865$, $p < 0.001$) positively affected TPP, thereby supporting H2. Furthermore, H3, H4, and H5, proposed mediating roles of negative affect, perceived knowledge, and self-efficacy between social media engagement and TPP. As a result, negative affect failed to mediate communal engagement's effect over TPP as negative affect did not significantly predict TPP whereas communal engagement predicted negative affect ($\beta = 0.159$, $p < 0.01$). This failure to support mediation was also evidenced by the 95% confidence interval (CI) for bootstrap [-0.014, 0], which included 0 in the range. On the other hand, communal engagement in social media positively predicted TPP, mediated by perceived knowledge with a 95% CI of [0.015, 0.075]. Communal engagement positively predicted perceived knowledge ($\beta = 0.436$, $p < 0.001$), which exerted a direct effect over TPP ($\beta = 0.111$, $p < 0.05$). Pertaining to H5, self-efficacy mediated the positive relationship between communal engagement and the fake news perception gap, as 0 did not fall under the 95% CI [0.002, 0.014]. Communal engagement positively predicted self-efficacy ($\beta = 0.07$, $p < 0.01$), which also significantly increased TPP ($\beta = 0.106$, $p < 0.05$). Overall, three out of four proposed mediation paths in our research model have been supported (see Table 2). Among the predictor variables to fake news perceptual gap, communal engagement in social media exerted the strongest positive effect.

5. Discussion

As a result of conducting an online survey, our study validated that TPP of COVID-19 fake news susceptibility is prevalent among our respondents. As aforementioned, the TPP bias is constituted of two distinct perceptual processes: (a) a conditional and complicated process for the self and (b) a magic bullet paradigm process for the other (McLeod et al., 2004). Interestingly, in the perception for the self, our participants scored significantly higher in COVID-19 fake news attention ($M = 3.82$, $SD = 1.83$) than in the other two items of TPP, content persuasion ($M = 3.09$, $SD = 1.81$) and behavior persuasion ($M = 3.03$, $SD = 1.88$). By contrast, concerning the perception for the others, participants scored not only all three items higher than self-perception measures but also congruently high within themselves. In other words, although a large portion of the respondents were attracted to fake news, fake news did not exert cognitive and behavioral effects on them as they were not subject to content and behavioral persuasion. However, when conceiving fake news' effect on others, they adhere to a hypodermic needle model; they believe the other would be more exposed to fake news, and this exposure would translate into substantial cognitive and behavioral effects.

5.1. Social media effects on TPP

As mentioned earlier, a growing body of literature is vested in examining TPP in relation to the specific functionality of social media (Schweisberger et al., 2014; Stavrositu & Kim, 2014; Tsay-Vogel, 2016). Some maintained that social media affordances can close the gap by elevating perceived personal relevance and shrinking the social distance with other users (Schweisberger et al., 2014; Stavrositu & Kim, 2014). Others argued that social media engagement makes people overestimate others' exposure to fake news and reinforce TPP, upholding the exposure-is-effect corollary (Eveland et al., 1999; Stavrositu & Kim, 2014). Our research corroborates the latter vein in the context of the COVID-19 pandemic in a way that our respondents rated others as targets who are both attracted (exposure) and eventually, submitted to content and behavioral persuasion by fake news (effect).

Also, we shed light on an alternative mechanism to explain the positive relation between social media communal engagement and TPP from the social distance corollary as well. The social distance corollary to TPP states that as the comparison groups become more different and distant from the self, the TPP gap stretches (Eveland et al., 1999). In our case, pertaining to the social presence and belongingness of communal engagement, people with high social media communal engagement might perceive their online community members as intimate and similar, meaning that they have more bounded group identification and categorization. Therefore, participants with high levels of communal engagement tended to perceive the "hypothetical others" as out-group members and might have reported higher evaluations of COVID-19 fake news effects because they are viewed as socially distant (Tsay-Vogel, 2016). This standpoint goes back to the long-standing argument of social media population segmentation and polarization, which has been evidenced across a wide range of areas (e.g., marketing by Canhoto et al., 2013; news consumption by Flaxman et al., 2013; ideological segregation by Flaxman et al., 2013; and public concerns by Zhao et al., 2018).

5.2. The mediating roles of perceived knowledge and self-efficacy

Consistent with the previous findings on the positive effect of knowledge over TPP (Larosa, 1989; Salwen & Driscoll, 1997), individuals with higher perceived knowledge regarding COVID-19 demonstrated higher perceptual gap between self and others' susceptibility to fake news. This can be explained by the observation that those who perceive themselves to have higher knowledge than others tend to believe in their informational capacity to resist incorrect information better than do others (Salwen & Driscoll, 1997). Knowledgeable individuals are more likely to believe that those who are less interested in the risk issue and news in general are more vulnerable to fake news due to their inability to differentiate incorrect content (Rucinski & Salmon, 1990). This hints that information saturation and mass exchange of COVID-19 information within the social media communities (Liu et al., 2021) eventually shaped people's perception of their own knowledge as being greater than others' and therefore, boosted the biased estimation of fake news susceptibility. Within the fake news context, knowledge functions as a protective mechanism with corrective power against disinformation. Eventually, an illusion of knowledgeability to combat disinformation allows users to foster assumed invincibility against fake news.

Similarly, the social presence individuals achieve through an active community interaction (Biocca et al., 2003; Lim et al., 2015) and a supportive network of other community users can empower individuals' self-efficacy to cope with COVID-19 through reinforcing efficacy information like social proof and normative approval (Hu et al., 2018). Elevation of one's self-efficacy, facilitated by community engagement in social media subsequently led them to downplay their own susceptibility to socially undesirable content like fake news to fulfill and maintain their efficacy beliefs (Scharrer & Leone, 2008). To maintain the self-image and ego that correspond to their efficacy beliefs, users relied on optimistic bias, expressed in a form of self-other asymmetry (Gunther, 1995; Yang & Horning, 2020). This finding was also endorsed by the Pew Research Center's (2016) survey on the severity of fake news and the optimism toward individuals' own capacity to identify fake news (Yang & Horning, 2020).

5.3. Differential impact of negative affect

The result that users with high social media engagement demonstrated higher negative affect toward COVID-19 aligns with a previous finding that emotional contagion of negativity can be enhanced through online interactions on social media networks (Ferrara & Yang, 2015). However, inconsistent with a prior finding that individuals attribute negative media influences to others to overcome anxiety and defend ego (Chen, 2017), the negative affect failed to predict TPP and ended up

with a negative coefficient of −0.03. First, pertaining to our initial theoretical lens of downward social comparison to build the hypothesis, we speculate that the effect of downward social comparison did not play out because the omnipresence of the COVID-19 threat saturated the emotional states of our participants, which inversely influenced their cognitive routes to form TPP. Second, contemplating on the differential perceptual processes behind TPP (McLeod et al., 2001), we suspect this insignificant negative relationship came from the differential influences of the negative affect on the perceptual processes of the self and of the other.

To substantiate the above speculations, we performed an additional correlational analysis to further delve into the relationship between negative affect and different dimensions of TPP measures (news attention, content persuasion, and behavior persuasion; see Appendix). The result showed that negative emotions magnified the perceived impact of fake news on the self ($r = 0.20, p < 0.01$) as well as on others ($r = 0.17, p < 0.01$). Moreover, comparing the coefficients, it induced a stronger effect on the self-perception than on the others-perception which deviates from TPP. In particular, among the three dimensions of TPP, the negative affect had a stronger positive correlation with attention to fake news ($r = 0.22, p < 0.01$) and content persuasion ($r = 0.18, p < 0.01$) for *self* than with those of *others*. To conclude, when experiencing high levels of negative affect, (a) the perceptual discrepancy between the self and others is not large enough to elicit a statistical variation, as the perceived fake news vulnerability was increased congruently for both the self and others; (b) the vulnerability perception is more amplified for the self than for others; and (c) the survey respondents perceive themselves to be attracted to and convinced by COVID-19 fake news more than do others. These exploratory findings partly concur with a line of fake news research, which found that intense emotions, especially negative emotions, prompt susceptibility to fake news, such as an attraction to and trust in fake news (Bakir & McStay, 2018; Martel et al., 2020). The economy of emotions in fake news has established that negative emotions generate more attention and exposure to fake news and subsequently feed on the diffusion of fake news (Bakir & McStay, 2018). Therefore, our deviation from the extant literature on TPP uncovered a vital role of negative affect in conditioning the mechanism behind TPP.

6. Conclusion

6.1. Limitations

However, several limitations remain which call for future research. First, we measured social media engagement at a general level rather than at a platform-specific level. Different platforms are featured by their unique affordances which might shape individual characteristics in response to COVID-19 risk and the degree of TPP in a dissimilar manner. Hence, the validity of this study is subject to future investigation on TPP in association with social media engagement scales that encompass unique features of various platforms. Second, our study did not consider how sources and agencies of fake news can affect users' TPP of fake news. For example, whether they were exposed to fake news from traditional versus new media or from their filter bubbles versus politically opposite sources might induce a different level of TPP. It is imperative for future studies to take these into consideration, concerning that roots and channels, through which fake news spread, greatly vary nowadays. Third, this research has its own idiosyncrasy, namely, COVID-19, about which the fake news might have unprecedented social undesirability and negativity. Therefore, the findings from our research may not be generalized to other message types and issue circumstances. A future line of research can also enrich this path model by inserting and testing the behavioral consequences and antecedents from other TPP theories that were examined under wide-ranging contexts (Jang & Kim, 2018; Lim, 2017; Yang & Horning, 2020). Fourth, the finding that negative affect increased fake news susceptibility for the self more than it did for others compels future research to examine whether high negative affect decreases the biased estimation of fake news.

Lastly, there are a number of external and individual factors that shape people's susceptibility to fake news and intercept people's trust in fake news, upon which our survey could not further delve into. To begin with, people's attitudes toward and emotional connections with the sources (creator or propagator) of mis- and disinformation influence trust in fake news. On the one hand, people's trust in different content creators would generate different levels of trust in the fake news. On the other hand, the social connections and emotional links with the sources also impact individuals' susceptibility to fake news. In this regard, this study treated perceived trust in COVID-19 fake news as a generalized variable without differentiating diverse sources to one's media and respondents' connections to those sources. Future research could dive into the nuanced levels of trust people perceive in different fake news propagators. Further, along this line, political orientation is one of the important connections to the sources of disinformation, considering that COVID-19 has become a polarized and politicized matter. For example, then-president Trump released a false statement that COVID-19 weakens if disinfectant is injected which consequently resulted in deaths of some of his supporters, who believed this misleading information (BBC, 2020). This way, political orientation would influence one's trust in particular fake news pieces. These factors add more uncertainty and complexity to how people perceive and trust the fake news, which calls for future research to disentangle their effects or interplay of effects.

6.2. Theoretical implications

Nonetheless, this study advances TPP literature by empirically exploring what activates optimistic bias and perceptual fallacy toward socially undesirable content, in this case, COVID-19 fake news. More importantly, this study contextualized TPP by exploring it in (a) the COVID-19 situation, (b) the new media environment, and (c) the context of disinformation. First, it examines TPP in the new media environment, where social media has played a crucial role in providing health information owing to the self-quarantine and social distancing policies in place during the COVID-19 crisis (Srivastava et al., 2020). To date, although studies have dedicated close attention to TPP across media and content, this vein of inquiry focused on traditional media (Stavrositu & Kim, 2014). Meanwhile, as aforementioned, recent relevant works have presented contested explanations behind the effects of social media on TPP. This study theoretically contributed to this complicated landscape by corroborating empirically that social media exacerbates TPP through heightening the exposure-is-effect corollary (Stavrositu & Kim, 2014). Furthermore, we expanded and dimensionalized the social media effect by drawing upon the communal aspect, which concentrates on the collective and participatory nature of social media from a user-oriented perspective. In addition, we proposed negative affect, self-efficacy and perceived knowledge as constructs to mediate the relationships from social media to TPP which eventually provides more in-depth evidence about the conditional dynamics for TPP to occur in the new media age.

Although several recent studies found that TPP holds in risk- and health-related messages (e.g., Lee & Park, 2016; Lim, 2017; Wei et al., 2008), this study represents one of the first attempts in extending TPP to a global pandemic context. COVID-19 is an idiosyncratic pandemic, especially due to its high novelty and uncertainty. Consequently, people's growing demands for information have not been sufficed by the conventional journalistic resources (Marconi, 2020), thereby prompting individuals to engage more with social media than they usually would. Moreover, increased social media dependency for acquiring health information might have elevated the possibility for users to encounter disinformation and observe how others grapple with it. As a result, deriving and testing our research model from the pandemic-specific informational environment, the study provided insights into how informational uncertainty affects individuals' subsequent estimation of their and others' perceptual judgment. Lastly, the study incorporated

fake news into TPP research as socially undesirable content, which has long been found to escalate TPP (Ştefăniţă et al., 2018). By adopting fake-news-specific dimensions of TPP, the study discovered that perceived susceptibility toward fake news was found to halt at the level of exposure for the self while extending to cognitive and behavioral persuasion for others which upholds and elaborates the dual-process model of TPP (McLeod et al., 2004).

6.3. Practical implications

Our findings of this study also induced practical implications for journalists, media practitioners, and health communicators. The ubiquity and personal relevance of COVID-19 induced information overload and exhaustion on social media (Liu et al., 2021). The finding that the information-rich environment during health crises can create illusioned knowledgeability and optimistic bias against health disinformation underlines the importance for health communicators to convey corrective information to the public in a timely and unambiguous manner. It is imperative for health communicators to consider how to communicate information on social media in a way that distinguishes it from the groundless misinformation. COVID-19 has also reshaped the journalistic cycle between interpersonal messages and mass news stories. Social media has been integrated into journalists' sources to constantly monitor and report online information and conversations on COVID-19 for their news stories (Marconi, 2020). Accordingly, it is essential to explore the perceptual bias of social media users whose voices markedly constitute mainstream news content nowadays. More importantly, these stories from the biased users simultaneously return to the social media landscape as a valid news form, legitimized and empowered by source credibility of the news brands and thus, sustain the cyclical dissemination of disinformation. This establishes the importance of journalists investing more effort to fact-check social media information and to correct false information. Lastly, the finding on users' overconfidence in being able to discern falsified content pinpoints the limitations of workshops, curricula, and applications, dedicated to media literacy which wrongfully assume that users are passionate enough to actively and voluntarily utilize these resources to combat misinformation (Liu, 2017). Hence, media practitioners should devote attention to a tendency that users have less motivation to spend additional time, effort, and money on something they already feel competent to manage (Liu, 2017). A failure to take this into account can curb the effectiveness of media literacy education which highlights the need to address the overconfidence effect as a part of the media literacy content.

In conclusion, the fact that social media directly and indirectly provoked higher TPP implies that a potential harm of social media is not confined to a rumor mill that propagates false stories, as widely recognized, but can further extend to an echo chamber to cultivate a slanted belief that he or she is fake-news-proof.

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APPENDIX

Table 1
Descriptive statistics for the measurement model.

Measures	Mean	S.D.
1) Self fake news perception (α = 0.88)	9.93	4.94
Fake news regarding COVID-19 attracted MY attention (Fake_S1)	3.82	1.83
The content of fake news regarding COVID-19 was persuasive to ME (Fake_S2)	3.09	1.81
Fake news influenced MY decisions regarding COVID-19(Fake_S3)	3.03	1.88
2) Other fake news perception (α = 0.91)	14.69	4.14
Fake news regarding COVID-19 attracted OTHERS' attention (Fake_O1)	4.90	1.53
The content of fake news regarding COVID-19 was persuasive to OTHERS (Fake_O2)	4.84	1.52
Fake news influenced OTHERS' decisions regarding COVID-19 (Fake_O3)	4.94	1.46
3) Self-efficacy (α = 0.84)	5.84	0.83
I would be able to protect myself against the possible COVID-19 infections (Effi1)	5.72	1.07
I would be able to do what I have to do when I hear about COVID-19 infection in my surroundings (Effi2)	5.84	1.04
I would be able to react in the right way if COVID-19 infection happens in my surroundings (Effi3)	5.90	.97
I would be able to get and make sense of information about risks related to COVID-19 (Effi4)	5.92	.95
4) Negative affect (α = 0.91)	4.74	1.64
I feel tense (Affect1)	4.62	1.79
I feel anxious (Affect2)	4.72	1.77
I feel at ease (Affect3)	4.88	1.78
5) Perceived knowledge (α = 0.77)	5.52	0.87
I know a lot about COVID-19 at the moment (Know1)	5.45	1.13
I know physical hazards of COVID-19 (Know2)	5.61	1.04
I know a lot about COVID-19 infections occurred in my local area (Know3)	5.28	1.36
I know a lot about how to prevent COVID-19	5.73	0.99
6) Communal social media engagement (α = 0.92)	3.11	1.27
I will share my opinions about COVID-19 with other readers of this social media post (CE1)	3.16	1.33
I will contribute to the social media community by adding useful information about COVID-19 (CE2)	3.15	1.36
I will interact with other social media users by using the hashtags related to COVID-19 (CE3)	3.03	1.41

Note. Cronbach's alpha (α) for scale reliability; Seven-point Likert Scale, ranging from 1 to 7 (higher score means stronger agreement); S.D.: Standard Deviation. The sources of the variables include: Communal social media engagement (Lim et al., 2015); Affective response (Griffin et al., 1999); Perceived knowledge (Ter Huurne & Gutteling, 2008); Self-efficacy (Ter Huurne & Gutteling, 2008); TPP (Bae et al., 2019).

Table 2
Model Fit Indices of CFA model and the structural model.

Fit Index	λ^2/df	CFI	TLI	RMSEA [90% CI]	SRMR
Criteria	<5.00	>.95	>.95	<.08	<.05
Measurement Model	3.45	.978	.972	.053 [.046, .060]	.042
Structural Model	2.96	.974	.965	.047 [.042, .053]	.041

Note CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

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