

Using the ELM to Explore the Impact of Fake News on Panic Vaccination Intention: Taiwan's COVID-19 Vaccination Phenomenon

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ABSTRACT

The study explores the effects of COVID-19 vaccine fake news on social media from the perspective of the elaboration likelihood model (ELM). The research model theorizes that factors of the central route and factors of the peripheral route influence panic vaccination intention through the third-person effect of fake news, personal norm, and the individual's attitude toward panic vaccination (i.e., the vaccination equivalent of “panic buying”). Data were collected via an online survey with 409 valid responses. The study applies partial least squares (PLS) structural equation modeling (SEM) to test the hypotheses. The findings have theoretical and practical implications and provide insights to help reduce the spread of fake news on social media during an outbreak to better ensure that people are not misled by fake news.

KEYWORDS

COVID-19, Elaboration Likelihood Model, Fake News, Outbreak, Panic Vaccination Intention, Social Media, Social Norms Theory, Third-Person Effect

INTRODUCTION

In January 2020, COVID-19 rapidly disseminated globally and was classified as a global health emergency by the World Health Organization (WHO). Vaccination emerges as the foremost strategy to combat a pandemic. Responding to the crisis, an AstraZeneca (AZ) vaccine was developed, utilizing adenovirus vector (ChAdOx1) technology in a collaborative effort between Oxford University in the United Kingdom and the British-Swedish company AstraZeneca. However, after receiving the AZ

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vaccine, individuals with compromised immunity may experience distinct side effects, including severe pain, fatigue, headaches, muscle soreness, chills, joint discomfort, fever, and, in rare instances, even fatalities linked to low platelet count. While the epidemic persists with rising confirmed cases and shifting mortality rates, the development of other vaccine brands like Moderna and Pfizer-BNT is ongoing. Despite the government's recommendation that people receive the AZ vaccine, people remain skeptical about it. Due to apprehensions about potential side effects, many individuals prefer to wait for other brands of vaccines. This hesitancy can be linked to the proliferation of fake news and misinformation on social media, impacting people's receptiveness to embrace COVID-19 vaccines and dampening their vaccination intention (Gerts et al., 2021; Kang-Xing, 2020).

In response to the COVID-19 pandemic and the quest for vaccine-related information, the general population has turned to platforms like Facebook, Twitter, Instagram, and WhatsApp. However, the growth of the digital world has allowed fake news or misleading information to spread more rapidly via social media. People encounter a high volume of fake news, such as the following: wearing a mask increases the chance of getting infected; the injection of antibiotics can cure COVID-19; 5G mobile networks help spread COVID-19; COVID-19 has been used or developed as a bioweapon; and there are questions about the safety of some vaccines and their effectiveness at preventing COVID-19 (Carey et al., 2022; Loomba et al., 2021). This kind of disinformation continues to either diminish people's intention to get vaccinated (i.e., "vaccination intention") (Sanders et al., 2020; Tsao et al., 2021; Tseng, 2020), or induce people to panic in their pursuit of a particular vaccine (i.e., "panic vaccination," similar to "panic buying"). However, prior studies have paid less attention to how fake news impacts vaccination intention (e.g., Honora et al., 2022; Gursoy et al., 2022; Plechatá et al., 2023; Pokharel et al., 2023). Although some researchers have explored fake news in the context of vaccination (e.g., Samal, 2021; Salas-Paramo & Escandon-Barbosa, 2022), there has been a lack of examination of the impact of social media fake news on people's attitude toward vaccination and their vaccination intention from a theoretical perspective. Past research has also not examined both the positive and negative effects on individuals' attitude toward and intention to panic vaccinate. To fill this knowledge gap, this study provides a theoretical framework to explain the facilitators and inhibitors of individuals' attitude toward panic vaccination and their panic vaccination intention.

The way people accept any vaccine depends on personal values and prevailing public opinion (Thorakkattil et al., 2022). Social media is a big source of information, and people tend to follow their own ideas when judging things. They often think that mass communication affects others more than themselves (Davison, 1983), called the third-person effect. Therefore, it's important to fully understand the extent to which fake news related to AZ vaccines on social media can persuade individuals to panic about getting access to other brands of vaccines. Thus, this study draws upon elaboration likelihood model (ELM), theory of reasoned action (TRA), and social norms theory (SNT) to examine the relationships among the related variables and to predict attitude toward panic vaccination as well as panic vaccination intention. We address the following research questions: 1) To what extent does attitude toward panic vaccination matter in driving panic vaccination intention? 2) Which antecedents have the greatest influence on an individual's attitude toward panic vaccination? 3) Which features of the central route have a greater impact on the third-person effect of fake news? 4) Which kinds of social norms in the peripheral route have a greater impact on personal norm?

The study follows this structure. Section 2 examines existing literature on the ELM, along with the third-person effect of fake news, social norms theory, and TRA. In Section 3, we detail the research model (figure 1) development and hypotheses formulation. Section 4 outlines our research methodology, encompassing measurement development, survey administration, and data analysis outcomes. Section 5 offers a thorough summary of results, explores theoretical and managerial implications, acknowledges limitations, and concludes the study.

LITERATURE REVIEW

Elaboration Likelihood Model (ELM)

The ELM, introduced by Petty and Cacioppo (1986), delves into how individuals process information, especially on social media, ranging from superficial to in-depth cognitive engagement (Petty et al., 1983). This model identifies two primary routes to persuasion: the “central route” and the “peripheral route.” The choice between these routes hinges on the depth of cognitive information processing, termed “elaboration.” The extent of elaboration individuals engage in depends on various factors, including motivation and ability (Petty & Wegener, 1999). When individuals deem information as valuable, persuasive, or helpful, they engage deeply with it, leading to more enduring attitude changes. Conversely, the peripheral route, characterized by minimal cognitive effort, results in individuals spending less time scrutinizing the information (Chang et al., 2020). Consequently, attitude changes influenced by this route are often temporary. Research has utilized the ELM to explore factors influencing both central and peripheral routes. Chou et al. (2022) highlighted the role of quality indicators for both routes. Cyr et al. (2018) emphasized the moderating effect of prior knowledge, while Zhou (2017) examined privacy control’s influence on both routes. Yang (2015) discussed the moderation of peripheral cues on purchase intention, and Ho and Bodoff (2014) explored how processing depth affects attitude persistence. These studies underscore the ELM’s relevance in understanding intricate information settings, particularly on social media.

Within the central route, individuals equipped with sufficient motivation and cognitive capabilities engage deeply with persuasive information, leading to potential adjustments in their attitudes. The essence of the information plays a crucial role during this cognitive journey. Prior research has explored diverse variables associated with the central route, such as information quality, information accuracy, information completeness, and argument quality (Chang et al., 2020; Chou et al., 2022; Zhou, 2017). Within this framework, the central route influences attitudes through critical evaluation of vaccination-related messages (Li et al., 2021; Wang et al., 2009; Kwon & Chung, 2010). Thus, this study considers factors such as their “self-efficacy” in discerning fake news, their level of “issue-involvement” concerning vaccine-related matters, and their past “fact-checking experience.” Additionally, the perceived “social undesirability” of information and the assessment of “argument quality” are influential (Cheng & Chen, 2020; Lee & Tamborini, 2005). Such factors demand intensive cognitive engagement.

In today’s era, marked by the widespread dissemination of fake news, the importance of fact-checking experience is paramount, thus warranting its emphasis in our central route analysis. In this study, “reading features” is defined as a second-order construct encompassing self-efficacy, issue-involvement, and fact-checking experience. “Information features” are another second-order construct that includes social undesirability and argument quality. While “reading features” pertain to individual media consumption habits, “information features” relate to the inherent characteristics of the media content, such as credibility and presentation. These variables demonstrate how message characteristics influence individuals’ attitude formation, behavioral intention, and subsequent behaviors (Ho & Bodoff, 2014). Intriguingly, while much of the existing literature has focused on the direct influence of information on individual attitudes, there’s a noticeable gap in understanding the phenomenon where mass media’s influence on others surpasses its impact on oneself, termed the third-person effect (Davison, 1983). This study aims to explore how the central route impacts the third-person effect of fake news, and the relationships between attitude toward panic vaccination.

The peripheral route suggests that when individuals either lack the motivation or the cognitive resources to deeply process information, they tend to rely on superficial cues or emotional factors. This route demands less cognitive effort and is more influenced by the source’s credibility, emotional appeals, and other peripheral cues (Shi et al., 2018). Previous research has highlighted factors related to the peripheral route, including source credibility, post popularity,

trustworthiness, and reputation (Bhattacharjee & Sanford, 2006; Chang, 2020; Shi et al., 2018; Zhou, 2017). Such studies have underscored the impact of source credibility, trustworthiness, and subjective norm influences on attitudes (Bhattacharjee & Sanford, 2006; Fishbein & Ajzen, 1975; Lowry et al., 2012). Within this framework, the peripheral route influences attitudes by relying on surface-level vaccination-related information, requiring minimal cognitive effort (Li et al., 2021; Wang et al., 2009; Kwon & Chung, 2010).

This study considers factors the “media credibility” of information sources, the “emotional contagion” within the public, the “expected benefits” following vaccination, and the influence of the beliefs of significant others, often referred to as “social norms.” Yazdanmehr and Wang (2016) introduced a nuanced perspective. They highlighted that apart from subjective norm, the other two norms, which are the injunctive norm and the descriptive norm, can also mold personal norm. However, past research has not explored whether the norms of others (injunctive norm, descriptive norm, and subjective norm) within the peripheral route influence the relationship between personal norm and attitude toward panic vaccination. This study seeks to investigate these relationships.

The Third-Person Effect of Fake News

The “third-person effect” is a substantiated phenomenon, particularly in the context of fake news on social media. Introduced by Davison (1983), it posits that individuals often perceive contentious messages as having a greater impact on others than on themselves. Subsequent research has expanded on this concept. David and Johnson (1998) delved into the role of self-perception, while Cohen and Davis (1991) explored its manifestation in negative political advertising. More recently, Chen and Fu (2022) emphasized the role of public health awareness in predicting this effect. Over the years, the focus has been on understanding how media messages affect individual attitudes and their perceptions of others’ reactions. For instance, Chung and Kim (2021) observed that a pronounced third-person effect correlates with a decreased propensity to share fake news, highlighting its potential as a tool against misinformation. This effect isn’t confined to fake news; it spans various media content, from contentious products like cigarettes (Nix & Pickett, 2017) to explicit content (Chen et al., 2015), racial topics (David et al., 2002), political campaigns (Wei & Lo, 2007), and even propaganda (Golan & Lim, 2016).

The digital era, marked by the swift spread of misinformation on social platforms, has amplified the relevance of the third-person effect. Corbu et al. (2020) pointed out that individuals often consider themselves more skilled at identifying fake news than their peers. This perception is further influenced by factors such as self-efficacy and perceived knowledge, as highlighted by Yang & Tian (2021) in relation to COVID-19 misinformation. The effect intensifies when the content is seen as socially undesirable (Schweisberger et al., 2014) or when misinformation is perceived as a broader societal issue, prompting calls for stricter regulations (Baek et al., 2019). While there has been considerable research on the third-person effect, its adaptability and implications in various communication contexts, particularly in public health, have been inadequately addressed. The societal consequences of the third-person effect, especially concerning misinformation about the readily available COVID-19 vaccine, remain largely uncharted. This study seeks to fill this void by zeroing in on fake news related to the vaccine. We aim to explore how central route factors affect the third-person effect within the context of fake news and to evaluate its influence on attitudes surrounding panic vaccination.

Social Norms Theory (SNT)

The SNT, developed by Perkins and Berkowitz (1986), explores the impact of social norms on individual actions. Their research on college students’ drinking patterns revealed that individuals often misjudge peer behaviors, adjusting their actions based on these misconceptions, which can sometimes be more influential than actual behaviors. This understanding has been pivotal in addressing high-risk behaviors, such as substance abuse (Bewick et al., 2008; Perkins, 2002; Latkin et al., 2010;

McAlaney et al., 2011), with interventions aimed at rectifying these misperceptions showing promise in reducing such behaviors (Haines & Spear, 1996).

Central to this theory are the concepts of injunctive norm and descriptive norm (Cialdini et al., 1990). In certain studies, subjective norm is categorized within injunctive norm, both representing the idea that individuals engage in specific behaviors under external social pressures (Rivis & Sheeran, 2003). Injunctive norm convey societal expectations and values (Yazdanmehr & Wang, 2016), while descriptive norm pertain to perceptions of others' behaviors (Cialdini & Trost, 1998). Studies suggest that injunctive norm typically have a more profound influence than descriptive norm (Cialdini et al., 1990; Smith et al., 2008). Yazdanmehr and Wang (2016) further differentiated between subjective and injunctive norm. Subjective norm place a greater emphasis on the viewpoints of significant individuals, whereas injunctive norm extend beyond influential figures, warranting separate measurements for each. The study also delves into how individuals internalize these norms, integrating them into personal beliefs (Yazdanmehr & Wang, 2016). This internalization process results in the formation of personal norm (Schwartz, 1977; Schwartz & Howard, 1981), which can guide behavior even without external pressures (Perugini et al., 2003).

The SNT offers a comprehensive lens to understand how social norms, and their perceptions, impact behaviors. It's been instrumental in devising strategies to address high-risk behaviors. However, while previous research has often treated social norms as a standalone theory, only a few studies have investigated them as a strategy for individuals to interpret persuasive information. Building on insights from Yazdanmehr and Wang (2016), this study will classify social norms into injunctive norm, descriptive norm, and subjective norm categories to delve deeper into their influence on personal norm and how the personal norm affects the relationship between attitude toward panic vaccination.

Theory of Reasoned Action (TRA)

The TRA, proposed by Fishbein and Ajzen (1975), is a foundational social psychology model that elucidates the relationship between personal attitudes and behavior. It emphasizes the roles of attitudes and subjective norm in determining behavioral intentions. In this theory, behavioral intention, indicative of one's readiness to act, is a primary predictor of actual behavior. Attitudes reflect personal feelings about a behavior, while subjective norm capture perceived social pressures. Both attitudes and subjective norm affect behavioral intentions, which then influence actual behavior. The more positive or robust these attitudes and norm, the stronger the behavioral intention, increasing the likelihood of action (Ajzen, 1985; Davis, 1989; Venkatesh et al., 2012; Li et al., 2016). This theory has been applied across various fields, including information management, offering insights into the link between attitudes and actions. However, there's a research gap concerning the third-person effects, especially in public health. Few studies have delved into how third-person effects affect attitudes and intentions. Our study leverages the TRA to investigate the third-person effect's impact on attitudes and intentions, aiming to enrich the existing research landscape (Paul et al., 2000; McLeod et al., 2001; Zhao & Cai, 2008).

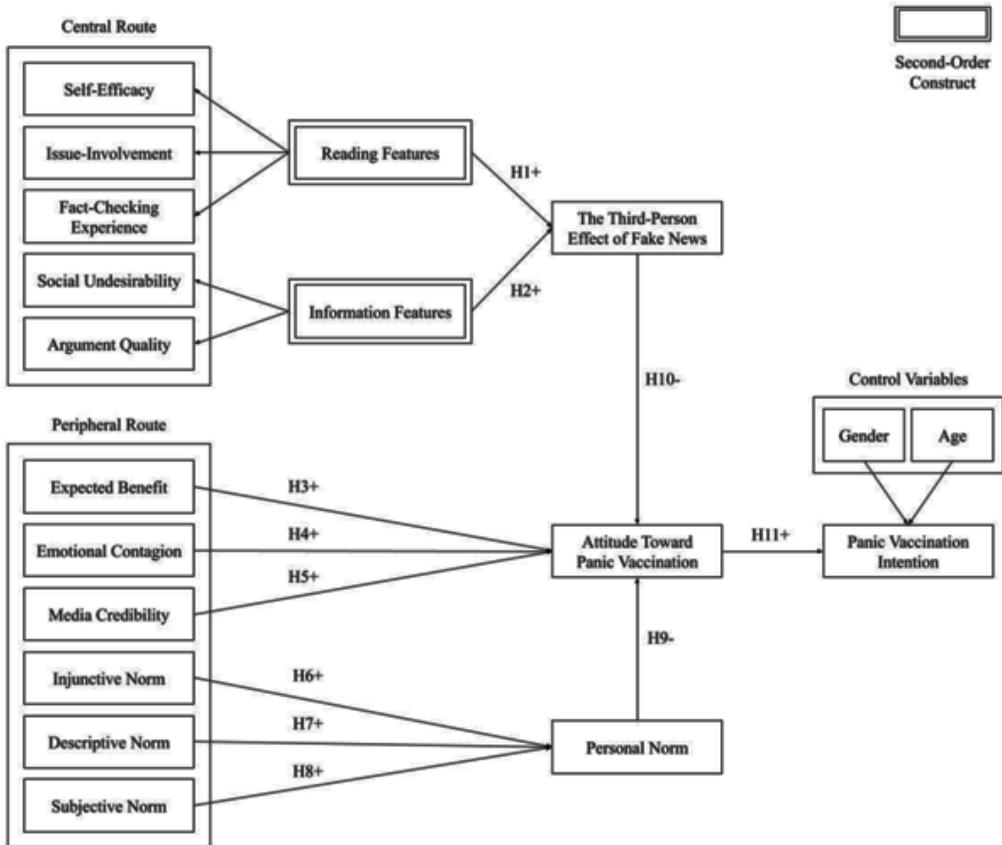
RESEARCH MODEL AND RESEARCH HYPOTHESES

See Figure 1.

Reading Features

Self-efficacy reflects an individual's confidence in their abilities (Chen & Cheng, 2020). Higher self-efficacy often leads individuals to think that the media has a greater impact on others (Jensen & Hurley, 2005). Issue-involvement relates to how personally relevant an issue is perceived (Vefeiadis et al., 2020). Increased involvement can widen the gap between individuals' perceptions of how media messages affect themselves and others (Perloff, 1989). Fact-checking experience reflects an

Figure 1. Research model



individual’s history of proactively verifying message quality on social media. When individuals are unaware that they are reading fake news, they often perceive it as real news. However, upon fact-checking and confirming it as fake news, people may tend to believe that this harmful content affects others more than themselves. These three features are related to individuals involved in a reading activity and are therefore classified as reading features. The term reading features refers to the degree to which an individual involved in a reading activity has the confidence to deal with the cognitive process of understanding specific information presented in the news media (Cheng & Chen, 2020). Understanding the language of the message presented on the news requires strong reading features because these reading features help the individual comprehend the meaning of words, distinguish between true and false statements, and scrutinize the facts (McQuarrie & Munson, 1992; Ștefăniță et al., 2018). Thus, when encountering fake news (i.e., incorrect news on COVID-19), individuals with strong reading features can determine whether the news is deceptive and feel that they are not affected by the fake news to the extent that others are affected. Therefore, we hypothesize that:

H1: Reading features positively affect the third-person effect of fake news.

Information Features

Social undesirability is the extent to which individuals perceive that the content of an article has a negative impact on society. Perloff (1999) discovered that people’s judgments about a message’s

influence are influenced by the nature of the message content. Past studies have demonstrated that individuals tend to experience a high degree of the third-person perception when the message is perceived as socially undesirable (Lim, 2017). This phenomenon primarily arises when media content is seen as socially undesirable (Paul et al., 2000). Argument quality refers to an individual perception of the clarity, bias, and consistency of the content in an article. Gunther and Mundy (1993) argue that when individuals perceive the argument quality in a message as low, they tend to believe they are intelligent enough to resist the message's influence. They think they won't be swayed by the arguments and that others without relevant expertise will be influenced. These two features are associated with the quality of messages providing compelling evidence and are therefore classified as information features. The term information features refers to the quality of messages offering powerfully persuasive evidence and asserting that they are worth reading (Chung et al., 2015), and, therefore, deserve to be believed. In reality, people reading the news media tend to perceive it as a collection of messages that are received and understood. For example, people tend to hold back and not be influenced when they discover that a piece of news regarding the COVID-19 vaccines is not worth reading because the argument is extremely weak and is thus not worthy of being believed (Cheng & Chen, 2020). However, other people may accept the news suggestion or idea if they cannot judge the argument as strong or weak, or true or false. Therefore, we hypothesize that:

H2: Information features positively affect the third-person effect of fake news.

Expected Benefit

The term expected benefit refers to good and positive results that an individual anticipates or looks forward to occurring in the future (Kuo, 2013). Expected benefit provides a useful metric by which people can evaluate whether an act or reaction is worthy of being done. For example, if people find taking a vaccine to protect against COVID-19 helps them avoid getting infected with the disease, their attitudes and willingness to actually get vaccinated are likely to increase. As various COVID-19 vaccine brands begin to provide vaccinations, individuals obtain information through multiple channels such as news and social media. One might expect that receiving a particular brand of vaccine may cause more serious side effects, or that it may cost more in the future to mitigate or treat possible side effects. Therefore, in order to avoid possible future risks and costs, individuals may tend to have a positive attitude toward panic vaccination, which in turn affects their panic vaccination intentions toward a specific brand of vaccine. Therefore, we hypothesize that:

H3: Expected benefit positively affects attitude toward panic vaccination.

Emotional Contagion

Emotional contagion refers to the spread of moods from one person to another within a group (Doherty, 1997). Individuals, during the course of their interactions with others, automatically, unconsciously, and continuously mimic or synchronize with the facial expressions, movements, voices, and emotions of their counterparts (Hatfield et al., 1993). In emotional contagion, empathy is central to understanding the transfer of feelings among people (Pitt et al., 1995). For example, comforting people by hugging shows empathy. As other brand vaccines became gradually available for vaccination, due to the proliferation of all kinds of relevant true and false information and reports, news and social media were often flooded with information about vaccine supply being unstable. These reports included scenarios where vaccine supply exceeded demand, uncertain arrival times, and even discussions targeting specific vaccine brands. The recurrent exposure to such reports and discussions regarding post-vaccination adverse events has emotionally connected individuals with the suffering, frustration, and hardship experienced by those affected. It can be inferred that an individual's emotions are influenced by emotional contagion. People develop emotional contagion

by learning of the pain, frustration, and torture felt by infected people, which motivates them to adopt a positive attitude toward vaccination and increases their willingness to be vaccinated. Therefore, we hypothesize that:

H4: Emotional contagion positively affects attitude toward panic vaccination.

Media Credibility

Media credibility refers to an individual's perceptions of the news in terms of accuracy, fairness, trustworthiness, completeness, and reliability (Metzger et al., 2003). For the audience, the essence of media credibility lies in the news sources, the messages that journalists present, and the medium itself (Ayeh, 2015). Media credibility pertains to an individual's level of trust in their subjective perception of the media (Gunther, 1992). This trust can be influenced by several factors, including the depth of message content and the design and complexity of the media (Flanagin & Metzger, 2007). For example, when the information received (i.e., news related to COVID-19) is perceived as believable, most viewers may realize that this is a serious disease that can threaten their health, which can lead to a mental state that renders them susceptible to attitude toward panic vaccination. Drawing from the prevalence of negative information about the AZ vaccine on current social media in Taiwan, it can be inferred that individuals, when perceiving higher media credibility of these platforms, are more likely to place trust in the negative information regarding AZ presented to them. This trust leads to persuasion, resulting in the belief that the AZ vaccine is not trustworthy. Consequently, individuals tend to develop a positive attitude toward receiving internationally recognized vaccines other than the AZ vaccine as a preferred choice. Therefore, we hypothesize that:

H5: Media credibility positively affects attitude toward panic vaccination.

Social Norms

Injunctive norm pertain to the degree to which society endorses or condemns an individual's involvement in particular behaviors, with an individual's decision to adhere to injunctive norm being driven by the anticipation of social incentives or penalties (Smith et al., 2008). More specifically, the term injunctive norm refers to an individual's perception of how relevant others approve or disapprove of a specific behavior in society (Yip & Schweitzer, 2022). Injunctive norm help determine whether a behavior is acceptable within a specific group and can even influence personal behavior (LaBrie et al., 2010). For example, most people see that drinking excessive amounts of alcohol causes drinkers to feel embarrassed, ashamed, and guilty. To prevent the occurrence of such situations, individuals will restrain themselves for the sake of moral norms. Such restrictions will gradually form self-regulation, developing into a specific part of one's personal values. Building upon this, the study suggests that a significant portion of society perceives receiving a specific brand of vaccine as a negative act, which subsequently influences an individual's perspective on this action. There is a proclivity to internalize the act of not being among the first to receive a vaccine from a particular brand as part of one's moral duty to conform to societal norms, gain social incentives, or evade social consequences. Therefore, we hypothesize that:

H6: Injunctive norm positively affects personal norm.

The term descriptive norm refers to an individual's perception of how to act properly with others in a particular situation (Yazdanmehr & Wang, 2016). Descriptive norm can, directly or indirectly, guide individuals by leading or advising them to perform a specific behavior (Anderson & Agarwal, 2010), bringing their personal behaviors in line with others' norms. In general, descriptive norm are

based on the notion that if everyone is engaging in a specific behavior in each situation, it is considered the expected behavior (Cialdini et al., 1990; Sheeran & Orbell, 1999). For example, most people are used to clapping at the end of a speech or lecture. The desire to clap shows that the individual likes or admires the public performance, which also reveals conformation to the descriptive norm of others. Therefore, in a specific situation, when most people in society engage in particular behaviors, individuals are more likely to perceive it as the right behavior, aiming to gain social support or establish what is deemed appropriate. They may internalize this behavior as part of their personal moral obligations (Thibaut, 2017; Venkatesh et al., 2003). As long as the behavioral attributes are considered to be widespread and general, the norms will soon become rules of thumb, unconsciously assimilating themselves into individuals' personal values and becoming part of their personal norm. This study suggests that due to the newness of COVID-19 vaccines and the absence of long-term data, individuals may rely on societal behavior as a guide for proper vaccination conduct, seeing it as correct and integrating it into their personal moral obligations. Therefore, we hypothesize that:

H7: Descriptive norm positively affects personal norm.

Subjective norm refer to the social pressure that an individual perceives regarding whether to engage in a specific behavior. The sources of this pressure include individuals or groups external to the decision-maker who have influence over their decisions (Ajzen, 1980). It can also be described as adhering to an accepted standard or behavior of which important others approve (Hsu & Chiu, 2004). Prior to taking action or conforming to social norms, individuals typically consider the potential consequences of their behavior, and these considerations are influenced by subjective norm. Subjective norm can strongly persuade individuals to perform or not perform behaviors that may be typical in society (Polites & Karahanna, 2012). In this context, Herath and Rao (2009) suggest that this phenomenon is linked to individuals' tendency to align with the expectations of significant others. Over time, these behavioral attributes will be aggregated unconsciously and internalized to later become a specific part of the individual's personal values. This study suggests that due to individuals' inclination to meet the expectations of significant others, they are likely to follow the opinions of these important individuals regarding the administration of a specific brand of vaccine first. They perceive this as the right behavior and internalize it as part of their personal moral obligations. Hence, we hypothesize that:

H8: Subjective norm positively affects personal norm.

Personal Norm

Personal norm encompass an individual's internal ethical guidelines, shaping their decisions to engage in specific actions within particular contexts (Wan et al., 2012). These norms represent an individual's intrinsic moral obligation to carry out these behaviors, driven by anticipated self-rewards or consequences (Schwartz, 1977). The term personal norm refers to a principle or unique value held by an individual that has a binding effect upon his or her actions and serves to guide, control, or regulate behavior (Hein, 2022). In practice, behavioral standards or patterns are moral beliefs (Merhi & Ahluwalia, 2019) which do not change even when others fail to control their own inappropriate behavior and take unreasonable action. When an individual follows personal norm, they experience intrinsic self-rewards like satisfaction or achievement; conversely, failing to do so can lead to intrinsic self-punishments such as regret or guilt. For example, people who have strong personal norm keep calm and rely on their own practical wisdom when dealing with COVID-19 disease news, while others feel panic and fear, leading to unreasonable thoughts and actions. Given the assumption that being the panic vaccination with a specific brand of vaccine is a self-interested behavior while refraining from doing so is altruistic. It is deduced that when an individual adheres to personal norm, refraining

from being the first to vaccinate with an internationally recognized vaccine other than the AZ vaccine becomes a moral obligation. Consequently, the individual develops a negative attitude toward panic vaccination with internationally recognized vaccines other than the AZ vaccine. Therefore, people with strong personal norm are less affected by the negative influence of COVID-19 news.

H9: Personal norm negatively affects attitude toward panic vaccination.

Attitude Toward Panic Vaccination and Panic Vaccination Intention

The third-person effect of fake news refers to how people exposed to fake news from various sources consider the influence of misleading information to have little or no effect on them while having a greater effect on others (Cheng & Chen, 2020). Previous research has demonstrated that the third-person effect can explain certain social behaviors (Chen & Fu, 2022). Individuals often assume that the negative effects of fake news are more significant for others, especially distant individuals (Corbu et al., 2020; Ștefăniță et al., 2018) or those outside their own social group (Jang & Kim, 2018). In the context of false COVID-19 information, some individuals may dismiss it as untrue and irrelevant to their own situation, resulting in no inclination toward panicked vaccination. They may assume that this news induces fear and anxiety in others, motivating them to engage in panicked vaccination. Often, people believe they are immune to fake news and may not develop a positive attitude toward prioritizing vaccination with a specific vaccine brand. In fact, they may even hold negative attitudes toward panicked vaccination with a particular vaccine brand due to their rejection of fake news. Consequently, the third-person effect of fake news is negatively associated with attitudes toward panicked vaccination.

H10: The third-person effect of fake news negatively affects attitude toward panic vaccination.

According to the TRA, the importance of attitude and subjective norm in predicting behavioral intention can vary depending on the context (Fishbein & Ajzen, 1975). In some situations, attitude is the primary predictor of intention (Zhao & Cai, 2008). Tan et al. (2022) explained that attitude influences the intention to engage or not engage in a specific behavior based on the belief that the behavior will lead to favorable outcomes. This belief can be positive if someone thinks that performing the behavior will result in a positive outcome, and vice versa. Attitude toward panic vaccination refers to a mental state involving beliefs, feelings, and tendencies created and caused by the fear of becoming contaminated with COVID-19 (Zhao & Cai, 2008). People who have a strong fear of being infected with COVID-19 may have a strong desire to protect themselves. According to prior literature and news sources, vaccination can be a good means by which to become immune to infection by such diseases (Altmann & Boyton, 2022). When this anticipated outcome can be achieved by vaccination, people who feel panic about the disease will be convinced, guiding their actions and their intentions to become vaccinated. Therefore, we hypothesize that:

H11: Attitude toward panic vaccination positively affects panic vaccination intention.

RESEARCH METHODOLOGY

Measurement Development

Measurement items were adapted from the literature (see Appendix, Table 6). All measurement items were reviewed by the first author, who is a public health expert, to ensure the questionnaire was clear and easy to complete. To help respondents understand the current situation of the outbreak in Taiwan, we showed them the government's vaccine-related policies and the characteristics of vaccines of

various brands. Before filling out the first part of the questionnaire, respondents saw the information summarized into three figures (see Appendix, Figures 3, 4, and 5) which we had given them to read. All the information from the figures was obtained from the news and social media, as well as from reports from Taiwan's Centers for Disease Control (CDC) and the Ministry of Health and Welfare. Figure 3 in Appendix is the infographic for the outbreak in Taiwan, which shows the sequence of who can receive publicly-funded vaccines, outlines the various strains of the COVID-19 virus, and shows the vaccine brands that are available in other countries. We also summarized the information from Pfizer (BNT), Moderna, AZ, Johnson & Johnson, Medigen, and United Biomedical, Inc. (UBI), as well as the information on the arrival of vaccines and the adverse events of vaccination in Taiwan (see Appendix, Figure 4). Figure 5 in Appendix shows excerpts of discussions about the AZ vaccine on major social media in Taiwan. After the respondents read and understood these figures, they answered the first part of the questionnaire, which covers emotional contagion, expected benefit, attitude toward panic vaccination, subjective norm, and panic vaccination intention. The second part of the questionnaire was a compilation of several fake news stories related to COVID-19 vaccines published by Taiwan FactCheck Center in 2021. We removed the sensitive words and formatted it into fake news material in a Line group message string for respondents to read (see Appendix, Figure 6). The second part of the questionnaire covered social undesirability, argument quality, the third-person effect of fake news, media credibility, issue-involvement, self-efficacy, fact-checking experience, descriptive norm, personal norm, and injunctive norm. Lastly, respondents answered questions about demographic information and vaccination behavior. At the end of the questionnaire, we provided vaccine-related clarification information published by the Taiwan FactCheck Center in 2021, which was used here to ensure respondents were not misled by the fake news information shown in the questionnaire (see Appendix, Figure 7). All items were measured via a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

Survey Administration

In 2022, an average of approximately 21.5 million individuals were active social media users in Taiwan, as reported by OOSGA (2023). This figure represents about 89.4% of the total population, which was 23 million in 2022. The research model underwent testing using data gathered from social media users within Taiwan. The web survey was distributed across platforms including Facebook, Instagram, a Bulletin Board System (BBS), and virtual communities. The survey targeted individuals who were at least 18 years old, resided in Taiwan, and regularly engaged with social media platforms. A warm invitation was extended to these eligible participants. As an incentive, 30 randomly selected respondents were offered NTD\$100 cash vouchers. The survey was conducted online and anonymously, taking place between June 29 and July 10, 2021. These samples constitute convenience samples. From the 708 respondents who took part in the survey, a total of 299 questionnaires were excluded due to incomplete or problematic responses. This left 409 complete and valid responses available for data analysis, resulting in a response rate of 57.8%. Demographic information about the respondents is presented in Table 1, while their vaccination behavior is outlined in Table 2.

Data Analysis

Data analysis utilized the two-step approach recommended by Anderson and Gerbing (1988). The first step involved the analysis of the measurement model, while the second step tested the structural relationships among latent constructs. The aim of the two-step approach is to establish the reliability and validity of the measures before assessing the structural model. For our analysis, SmartPLS 4.0 was employed to evaluate both the measurement model and the structural model. Notably, the research model proposed in this study is intricate in nature, characterized by the presence of high-order constructs. As highlighted by Dash & Paul (2021), PLS-SEM techniques are adept at addressing the complexities associated with such models and their higher-order constructs.

Table 1. Demographic information of respondents (N = 409)

Measure	Items	Freq.	Percent	Measure	Items	Freq.	Percent
Gender	Male	197	48%	Age	<25	138	34%
	Female	212	52%		25-30	96	23%
Education	Below High School	2	1%		31-35	58	14%
	High School	38	9%		36-40	46	11%
	College/ University	243	59%		41-45	17	4%
	Graduate School	126	31%		46-50	16	4%
Living Status	Live Alone	68	17%		51-55	20	5%
	Live With Family	306	75%		56+	18	4%
	Live With Roommates	35	9%				

Table 2. Vaccination behavior of respondents (N=409)

Measure	Items	Freq.	Percent	Note
Vaccinated	Yes	39	10%	
	No	370	90%	
Brand Being Vaccinated	AstraZeneca	29	66%	
	Moderna	8	18%	
	Others	2	5%	Medigen/ UBI test subjects
Most Trusted Vaccine	AstraZeneca	147	36%	
	Moderna	347	85%	
	Pfizer-BNT	297	73%	
	Johnson & Johnson	95	23%	
	Medigen	50	12%	
	UBI	29	7%	
	Others	12	3%	Sinopharm and Novavax
Least Trusted Vaccine	AstraZeneca	111	27%	
	Moderna	7	2%	
	Pfizer-BNT	22	5%	
	Johnson & Johnson	79	19%	
	Medigen	255	62%	
	UBI	246	60%	
	Others	33	8%	Vaccines made in China (Sinovac, Sinopharm, CanSinoBio, and etc.)

Measurement Model

We modeled reading features and information features as second-order constructs. Since PLS does not directly support second-order factors, we generated factor scores for each of the first-order dimensions, which we then used as reflective indicators of the second-order constructs (Chin et al., 2003). We first ran the full research model in SmartPLS with the dimensions for each construct disaggregated. We then used the resulting factor scores of the dimensions as the measures of the aggregate construct (i.e., reading features and information features). In accordance with Wong et al. (2016), we used a two-stage procedure to evaluate the measurement quality of each second-order construct (i.e., reading features and information features). First, we evaluated the factor loadings and significance of the indicators of the first-order constructs. As Table 7 in Appendix shows, all items exhibited a loading higher than 0.7. Second, we also evaluated the factor loadings and significance of the dimensions of the second-order constructs. As Figure 2 shows, all factor loadings of the first-order constructs are higher than 0.6.

We evaluated the adequacy of the measurement model in terms of reliability, convergent validity, and discriminant validity. Reliability was examined by using the composite reliability values. Table 3 shows that all values were above 0.7, the commonly accepted threshold. The convergent validity of the scales was assessed by two criteria (Fornell & Larcker, 1981): (1) all indicator loadings should be significant and exceed 0.7, and (2) the average variance extracted (AVE) of each construct should exceed 0.5. As Table 7 in Appendix shows, all items exhibited a loading higher than 0.7 on their respective constructs, and Table 3 shows that all AVEs ranged from 0.69 to 0.94, thus satisfying both conditions for convergent validity.

Discriminant validity is assessed via two criteria. First, the square root of the AVE of each construct should be greater than the correlations between that construct and all other constructs in the model (Fornell & Larcker, 1981). As Table 4 shows, all the values for the square root of the AVE were larger than the interconstruct correlations. Second, we employed the heterotrait-monotrait

Table 3. Descriptive statistics of constructs

Constructs	AVE	Composite Reliability	Mean	STD	Cronbach's Alpha
Attitude Toward Panic Vaccination (ATT)	0.84	0.96	4.74	1.41	0.95
Expected Benefit (BNF)	0.77	0.91	5.17	1.22	0.85
Fact-Checking Experience (CHE)	0.74	0.93	5.44	1.04	0.91
Media Credibility (CRE)	0.83	0.96	2.97	1.17	0.95
Descriptive Norm (DNO)	0.80	0.94	2.97	1.16	0.93
Emotional Contagion (EMO)	0.74	0.94	4.68	1.32	0.93
Injunctive Norm (INO)	0.90	0.96	2.93	1.29	0.95
Panic Vaccination Intention (INT)	0.94	0.98	4.38	1.68	0.98
Issue-Involvement (INV)	0.79	0.96	4.73	1.14	0.95
Personal Norm (PNO)	0.70	0.88	3.90	1.24	0.79
Argument Quality (QUA)	0.70	0.92	5.15	1.09	0.89
Self-Efficacy (SEF)	0.69	0.87	5.21	0.99	0.78
Subjective Norm (SNO)	0.89	0.97	3.93	1.50	0.96
Social Undesirability (SOC)	0.85	0.96	5.44	1.22	0.94
Third-Person Effect of Fake News (THI)	0.83	0.95	5.82	0.97	0.93

Table 4. Correlations among constructs and the square root of AVE

	ATT	BNF	CHE	CRE	DNO	EMO	INO	INT	INV	PNO	QUA	SEF	SNO	SOC	THI
ATT	0.92														
BNF	0.62	0.88													
CHE	-0.01	0.02	0.86												
CRE	0.20	0.14	-0.24	0.91											
DNO	-0.35	-0.35	-0.21	0.00	0.89										
EMO	0.48	0.39	-0.07	0.20	-0.22	0.86									
INO	-0.01	-0.06	-0.19	0.41	0.18	0.08	0.95								
INT	0.74	0.50	0.03	0.22	-0.35	0.41	0.02	0.97							
INV	0.30	0.27	0.17	0.24	-0.26	0.24	0.01	0.30	0.89						
PNO	-0.31	-0.23	0.01	0.10	0.11	-0.09	0.52	-0.31	-0.03	0.84					
QUA	-0.25	-0.22	0.30	-0.28	0.07	-0.27	-0.01	-0.30	-0.10	0.19	0.83				
SEF	0.04	0.04	0.56	-0.14	-0.26	-0.14	-0.18	-0.01	0.20	0.00	0.32	0.83			
SNO	-0.68	-0.47	0.02	-0.26	0.36	-0.39	-0.14	-0.69	-0.23	0.19	0.28	0.02	0.94		
SOC	-0.26	-0.22	0.22	-0.36	0.06	-0.27	-0.10	-0.33	-0.14	0.13	0.80	0.24	0.36	0.92	
THI	-0.13	0.00	0.36	-0.32	-0.16	-0.12	-0.21	-0.18	0.05	0.01	0.54	0.38	0.19	0.59	0.91

Note: The square root of the AVE is shown in **boldface**.

(HTMT) ratio of correlations, recently suggested by Henseler et al. (2015), to further check the degree to which the latent variables (constructs) are distinctly different. The HTMT should be well below 0.9 (Henseler et al., 2015). As Table 5 shows, HTMT values ranged from 0.02 to 0.87. This demonstrates sufficient discriminant validity.

Table 5. Heterotrait-Monotrait ratio of correlations (HTMT)

	ATT	BNF	CHE	CRE	DNO	EMO	INO	INT	INV	PNO	QUA	SEF	SNO	SOC	THI
ATT															
BNF	0.69														
CHE	0.05	0.06													
CRE	0.21	0.15	0.26												
DNO	0.40	0.40	0.22	0.07											
EMO	0.49	0.42	0.12	0.19	0.24										
INO	0.06	0.07	0.21	0.44	0.16	0.08									
INT	0.77	0.55	0.03	0.23	0.39	0.41	0.03								
INV	0.31	0.30	0.18	0.25	0.29	0.24	0.06	0.31							
PNO	0.36	0.28	0.13	0.14	0.11	0.12	0.58	0.36	0.05						
QUA	0.27	0.25	0.33	0.31	0.11	0.28	0.13	0.33	0.12	0.25					
SEF	0.06	0.07	0.66	0.17	0.28	0.16	0.20	0.02	0.24	0.07	0.38				
SNO	0.71	0.52	0.07	0.27	0.42	0.39	0.15	0.71	0.24	0.22	0.30	0.05			
SOC	0.28	0.25	0.23	0.39	0.10	0.28	0.12	0.35	0.15	0.17	0.87	0.28	0.37		
THI	0.14	0.06	0.38	0.35	0.15	0.12	0.22	0.19	0.07	0.12	0.58	0.43	0.20	0.63	

We used three approaches to check for common method bias (CMB). First, we performed a Harman's one-factor test. We entered all the variables into an exploratory analysis using unrotated principal components factor analysis and forcing one factor to be extracted. The merged factor accounted for less than 50% of the variance (24.64%), implying that CMB is not substantial. Second, while CMB is evidenced by extremely high correlation ($r > 0.90$) (Bagozzi et al., 1991), the matrix for our model (Table 4) shows that all correlations were below 0.75. Third, to further assess the possibility of CMB, we used a PLS approach documented in the IS literature (Saraf et al., 2007), which involves including a latent method factor in the structural model. Each indicator in the structural model is specified to be determined by its substantive (theoretical) construct, the method factor, and measurement error. We converted each indicator into a single indicator construct as suggested by Saraf et al. (2007). The results show that all research constructs and the method factor became second-order constructs, except for self-efficacy, issue-involvement, fact-checking experience, social undesirability, and argument quality (a third-order construct).

We then constructed a SmartPLS model with the method factor linking to all the single indicator constructs converted from the observed indicators. For each single indicator construct, we examined the coefficients of the incoming paths from its substantive construct and the method factor. These two path coefficients are equivalent to an observed indicator's loadings on the single indicator construct's substantive construct and the method factor and can be used to assess CMB (Saraf et al., 2007). According to Saraf et al. (2007), the squared values of the method factor loadings are interpreted as the percentage of the indicator variance caused by the method, whereas the squared loadings of the substantive constructs are interpreted as the percentage of the indicator variances caused by the substantive constructs. As Table 8 in Appendix shows, 39 of 64 method factor loadings were insignificant, and all the indicator's substantive variances were substantially greater than their method variance. These findings indicate that common method bias should not be a serious problem with our study.

We used variance inflation factors (VIF) to assess the degree of multicollinearity. We conducted regression analysis by modeling panic vaccination intention as the dependent variable and the other fourteen variables as the independent variables. All VIF values ranged from 1.407 to 2.713, all below the suggested threshold of 3.3 (Diamantopoulos & Siguaw, 2000). Therefore, no significant multicollinearity problem exists in regard to our data.

Structural Model

In PLS analysis, the structural paths and the R^2 scores of endogenous variables are examined to assess the explanatory power of the structural model. Figure 2 shows the structural path analysis results. Most paths exhibited a p-value of less than 0.05. The significance of all paths was assessed with 5,000 bootstrapping runs (Hair et al., 2012). With the exception of H7, which turned out to be the opposite of our presumption, the remaining hypotheses proposed in this study are all supported. Though the research model accounted for 55.8% of the variance of panic vaccination intention overall, we still showed its path coefficient ($\beta = 0.743$) (see Figure 2).

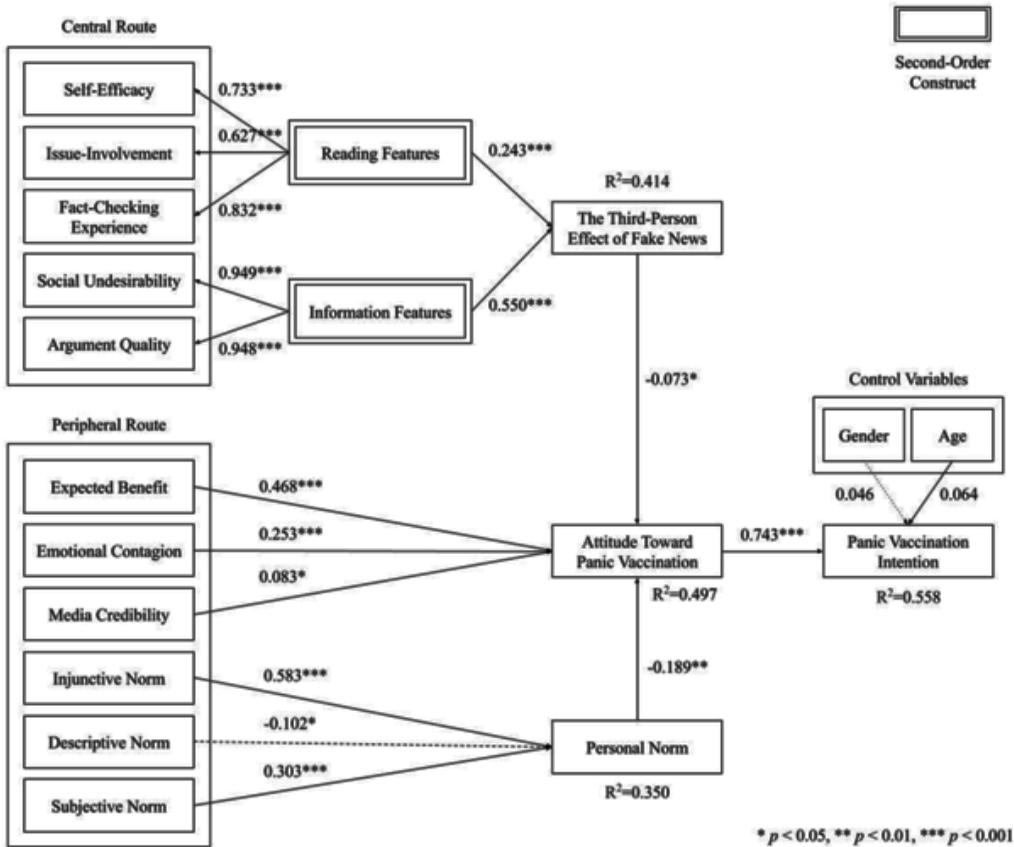
DISCUSSION AND IMPLICATIONS

Summary of Results

As predicted, attitude toward panic vaccination has a strong effect on panic vaccination intention ($\beta = 0.743$, $p < 0.001$), supporting H11. The results indicate that the stronger the mental state created and caused by fear of COVID-19 infection, the greater the panic vaccination intention.

For the antecedents of attitude toward panic vaccination, the results indicate that expected benefit ($\beta = 0.468$, $p < 0.001$), emotional contagion ($\beta = 0.253$, $p < 0.001$), and media credibility ($\beta = 0.083$, $p < 0.05$) all positively affect attitude toward panic vaccination (supporting H3, H4, and

Figure 2. SEM analysis of the research model



H5, respectively). Interestingly, the research data reveals that the mean score for media credibility are below 3. This possible explanation is that individuals have some reservations about fully trusting media advice. Nevertheless, given the severity of COVID-19 and its potential for fatal consequences, people still lean toward vaccination despite these reservations. However, expected benefit has the greatest influence on individuals' attitudes toward panic vaccination, in comparison to the other antecedents. This means that reducing medical costs or avoiding the risk of serious side effects in the future have a critical influence on individuals' attitudes regarding vaccination.

The results also indicate that the third-person effect of fake news ($\beta = -0.073$, $p < 0.05$) and personal norm ($\beta = -0.189$, $p < 0.01$) have negative effects on attitude toward panic vaccination, supporting H9 and H10. This indicates the important roles of personal norm and the third-person effect in people's ability to resist the influence of fake news on social media. This means that people who are exposed to fake news tend to believe that they will not be as manipulated by fake news as are others, thus giving them a less positive attitude toward panic vaccination (H9). People also keep calm and deal with COVID-19 disease news rationally when other people feel panic, which also gives them less positive attitudes toward panic vaccination (H10).

In regard to the impact of the central route on the third-person effect of fake news, the construct of information features ($\beta = 0.550$, $p < 0.001$), which is comprised of two first-order constructs (social undesirability and argument quality), is more important than reading features ($\beta = 0.243$, $p < 0.001$), which consists of three first-order constructs (self-efficacy, issue-involvement, and fact-checking

experience). Based on self-enhancement, when individuals perceive that fake news is socially undesirable, or consider the argument quality to be poor, they are more confident in their ability to discern fake news; thus, H2 is supported. H1 is supported as well because the results also suggest that reading features have a positive impact on the third-person effect.

The results show discerned that the peripheral route plays a more significant role in prompting panic vaccination than the central route. The peripheral route is more effective than the central route because it leads the message recipient to draw immediate conclusions based on their intuitive understanding of a collection of facts. Considering the inference that COVID-19 has caused many deaths and the fear associated with matters of life and death, people are generally afraid of succumbing to COVID-19. Vaccinating with internationally approved vaccines will help individuals/families reduce future medical costs, risk of future infection, and risk of severe side effects. This fear and the benefits of vaccinating with internationally approved vaccines are intimately and directly connected to one's attitude toward panic vaccination.

As hypothesized, both injunctive norm ($\beta=0.583$, $p<0.001$) and subjective norm ($\beta=0.303$, $p<0.001$) have a positive effect on personal norm (supporting H6 and H8, respectively). For personal norm, the results suggest that individuals pay more attention to meeting social expectations than to the agreement of important others. Notably, the research data reveal that both injunctive norm and descriptive norm mean scores below 3, suggesting that people didn't consider panic for vaccinations embarrassing or guilt-inducing. They also believed that everyone would opt for internationally recognized vaccines other than AZ vaccine. Contrary to H7, descriptive norm is found to have a negative effect on personal norm. The possible explanation is that COVID-19's high fatality rate induced widespread panic, weakening general moral standards in Taiwan. Fearing for their lives, people prioritized self-preservation over non-life-threatening moral codes. The seriousness of COVID-19 led individuals and their families to advocate panic for vaccinations internationally recognized other than AZ vaccine. This weakened the norm against not to panic for vaccination.

Theoretical Implications

In this study, we made reference to the ELM to explain the effects of fake news on attitude toward panic vaccination and panic vaccination intention. According to Zhang and Watts (2003), the ELM posits that individuals use two information-processing routes (i.e., central and peripheral) to process persuasive information. Below, we list several academic implications based on our findings.

First, when people receive messages that are intended to be persuasive, they may be involved in a reading activity and judge whether the message is worth reading. Our insight into how the strategy used to process persuasive messages affects attitudes and intentions regarding panic vaccination suggests that the elements of the central route are best conceptualized at a more abstract level to suit the individual's information processing strategy. Therefore, we set the elements of the central route (reading features and information features) as two second-order constructs. By modeling the central route as a pair of second-order constructs, we achieved a higher level of abstraction and built a parsimonious model for examining the over-arching effects of the first-order variables (i.e., self-efficacy, issue-involvement, fact-checking experience, social undesirability, and argument quality) on the third-person effect of fake news.

Second, social norms were interpreted as belonging to the peripheral route. According to Cheung et al. (2009), the peripheral route uses the message's environmental clues to determine whether or not the message should be accepted. Individuals who receive persuasive messages may try to behave according to other people's beliefs and perceived group norms in order to gain approval from other people or to avoid giving a negative impression (Yazdanmehr & Wang, 2016). However, past studies have regarded social norms as an independent theory, and few studies have examined social norms as a strategy with which individuals process persuasive information. In this study, social norms are treated as an environmental clue that individuals use to judge persuasive messages (i.e., fake news) and further influence personal norm and the individual's attitude and intention regarding panic vaccination.

Third, we contribute to the theory regarding panic vaccination intention and attitude toward panic vaccination by examining the facilitators and inhibitors at the same time. In our study, the third-person effect of fake news and personal norm were seen as inhibitors, which have a negative effect on individuals' panic vaccination attitude and intention. Expected benefit, emotional contagion, and media credibility were treated as facilitators of individuals' panic vaccination attitude and intention. Few studies have explored the facilitators and inhibitors of panic vaccination attitude and intention simultaneously. By examining both positive and negative elements, we can gain a deeper understanding of individuals' attitudes and intentions regarding panic vaccination.

Finally, we found that the elements of the peripheral route (expected benefit, emotional contagion, media credibility) and personal norm are more influential than that of the central route (third-person effect) in the COVID-19 context in terms of the relationship between fake news and the individuals' panic vaccination attitude and intention. This results in a more advanced and sophisticated theoretical model for investigating fake news, which also creates a new path for IS and communication literature to explore.

While our selected theoretical framework aligns well with our research objectives, alternative theoretical perspectives might yield deeper insights into the ramifications of attitude toward panic vaccination and intention. Moral disengagement, grounded in Bandura's theory of moral agency (Bandura, 1986), sheds light on the motivations behind individuals' immoral or unethical actions (D'Errico & Paciello, 2018). This construct elucidates the propensities that lead individuals to transgress established norms and rationalize unethical decisions. Bandura delineated eight intertwined cognitive mechanisms that underpin such behaviors: moral justification, euphemistic labeling, advantageous comparison, displacement of responsibility, diffusion of responsibility, disregarding or distorting the consequences, dehumanization, and attribution of blame. Past studies have contextualized this theory within various COVID-19 scenarios, including workplace safety climates (Bazzoli & Probst, 2022), organizational citizenship behaviors (Yildiz et al., 2022), face mask wearing (Chávez-Ventura et al., 2022), and the psychological effect of the COVID-19 pandemic in Italy (Gori & Topino, 2021). Future research could delve into the potential impact of moral disengagement on panic vaccination attitudes and intentions. Such studies are crucial for understanding the broader public's stance and acceptance of COVID-19 vaccines.

Managerial Implications

The COVID-19 pandemic has highlighted the significant challenges brought about by misinformation and the ensuing insufficient policy reactions during a global health emergency. In the current digital age, the rapid spread of misinformation, facilitated by digital technology, has intensified the repercussions of fake news. As we move toward a post-pandemic era, it's imperative for governments and relevant agencies to implement strategies that strengthen public health policies. Our findings have several important implications for governments and practitioners.

First, the results show that the third-person effect of fake news can have a beneficial effect on individuals' panic vaccination attitude and intention. This means that the greater the third-person effect of fake news, the less likely an individual will be to consider participating in panic vaccination. Throughout the epidemic, the CDC consistently broadcasted television news updates and set up a LINE group to disseminate epidemic-related information and debunk falsehoods daily. However, despite the CDC's proactive measures, our survey indicates an average "the third-person effect of fake news" score of 5.8, signaling that these initiatives might not be fully achieving their desired outcome. Misinformation on social media continues to mislead many, leading to apprehensions about vaccination. To combat this, governments should not only continue their current strategies but also foster collaborations with social media platforms to amplify their impact. Such partnerships could involve creating engaging content, like games or quizzes centered on COVID-19, designed to enhance public understanding and critical thinking. Additionally, social media platforms should intensify their efforts in implementing robust filtering and fact-checking mechanisms to curb the spread of false

content. Such measures can not only strengthen the third-person effect of fake news but also decrease the chances of panic vaccination.

Second, strengthening personal norm can also help decrease the likelihood that individuals will consider and participate in panic vaccination. Social media platforms can bolster these norms by offering profile frames supporting mainstream vaccine views and hosting forums and polls on vaccination opinions. Objective polls can guide individuals' vaccination decisions. Additionally, platforms can run free online campaigns on COVID-19 vaccination, where participants discuss and form consensus, further influencing personal norm. Based on the findings related to injunctive norm and descriptive norm, it's evident that people aren't embarrassed about their vaccination concerns but prioritize their safety. Despite the CDC's efforts in broadcasting news and countering misinformation via LINE groups, these strategies haven't effectively shifted social norms. In future scenarios, governments should consider alternative approaches to reinforce social norms. Collaborating with key opinion leaders (KOLs) emerges as a promising approach. By regularly updating KOLs with accurate information and leveraging their media influence, governments can foster responsible communication and reshape public perceptions of norms.

Third, while some factors reduce the likelihood of panic vaccination, there are some facilitators that may increase the likelihood that individuals will participate in panic vaccination. Our results indicate that increases in the expected benefit, emotional contagion, and media credibility can increase the likelihood that individuals will engage in panic vaccination. To address this, social media platforms should prioritize showcasing verified articles and data from trusted sources, emphasizing WHO-endorsed vaccines. Making intricate COVID-19 information more accessible through clear visuals is beneficial. In vaccine discussions, a focus on the broader efficacy rather than isolated side effects can temper emotional contagion. It's crucial to report impartially on all vaccines, not just select brands, to ensure a balanced perspective and curb panic-induced choices. Merely clarifying facts isn't sufficient. A key solution lies in diversifying vaccine sources and ensuring adequate preparation. Governments should proactively forecast to guarantee ample vaccine supply. For instance, in Taiwan's early days, the government underestimated the epidemic's potential impact, neglecting the global context, which led to a lack of preparation for international vaccines. Future strategies should address these oversights to better equip for potential outbreaks.

LIMITATIONS

Although our study is novel and insightful, it has some possible limitations. First, this study mainly explores various factors that affect an individual's cognition during the outbreak. However, we have yet to determine whether these factors will still influence individual attitudes and intentions toward panic vaccination in the post-pandemic era. Future studies could examine why government public health policies didn't yield the anticipated outcomes and were unsuccessful in enhancing public norms to mitigate attitudes toward panic vaccination and intention.

Second, this empirical study adopted the third-person effect for evaluating our theoretical model, and the results show that the third-person effect of fake news is influenced by reading features and information features. However, we did not further analyze the data by age group (e.g., youth, adults, middle-aged, and the elderly) and/or gender (male vs. female) to determine which group or groups are influenced more. We call for investigations that can provide further academic evidence.

Third, our study adopted the ELM, and the results show that the path coefficient of the peripheral route ($= -.189$) outperforms that of central route ($-.073$). Further, this study found that factors in the peripheral route both positively and negatively influence individuals' attitude toward panic vaccination. Future research may hold qualitative research (i.e. focus group) to explore why the peripheral route is better than the central route and to determine why and how these factors influence the formation of individuals' attitude toward panic vaccination.

Lastly, though not included in our model, traditional media (such as television news, newspapers, and news radio) are also powerfully influential. Future studies can further compare the attributes of old and new media in terms of their influence on fake news. Further, we believe that it is important to continue the investigation into such things as the characteristics of those who spread fake news (i.e., personality or trait), how the fake news spreads from the beginning to end (i.e., pre-post-exposure study design), and—after clarifying the falsity of the fake news—whether or not fake news still continues to cause panic in regard vaccination.

CONCLUSION

Social media, as a primary source of information, underscores the urgency of comprehending the mechanisms through which fake news impacts individuals, potentially leading to psychological distress. This study comprehensively investigates the impact of fake news on attitudes and intentions regarding panic vaccination during the COVID-19 pandemic, utilizing the ELM and integrating concepts such as the third-person effect and norms. By redefining the central route into second-order constructs (i.e., reading features and information features), a more streamlined model was yielded. Furthermore, this study breaks new ground by incorporating social norms into the peripheral route, considering them as environmental cues that shape judgments of persuasive messages and, consequently, attitudes toward panic vaccination. The contribution of this study is its concurrent investigation of both facilitators and inhibitors influencing panic vaccination attitudes and intentions, which results in a comprehensive understanding. Furthermore, it paves the way for advanced research in the field of fake news investigation and opens novel avenues for exploration within Information Systems and communication literature. Future research can delve deeper by integrating additional media-related factors and antecedents of individual beliefs to enrich and extend this theoretical model. Consequently, our work provides a foundational platform for examining the effects of fake news and other social models/theories, offering valuable insights for future studies exploring the dissemination of fake news.

COMPETING INTERESTS

The authors of this publication declare there are no competing interests.

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APPENDIX

Figure 3. COVID-19 status in Taiwan



Figure 4. Details regarding vaccines in Taiwan



Figure 5. AZ discussions (on social media)

社群聲量
台灣民眾怎麼看AZ疫苗

先存70萬血檢醫務費，再打AZ疫苗

政府玩數字遊戲 掩蓋AZ高死亡率

台灣威脅人民只能打國外不要的AZ疫苗

Figure 6. Screenshot of compiled fake news sent to a line group

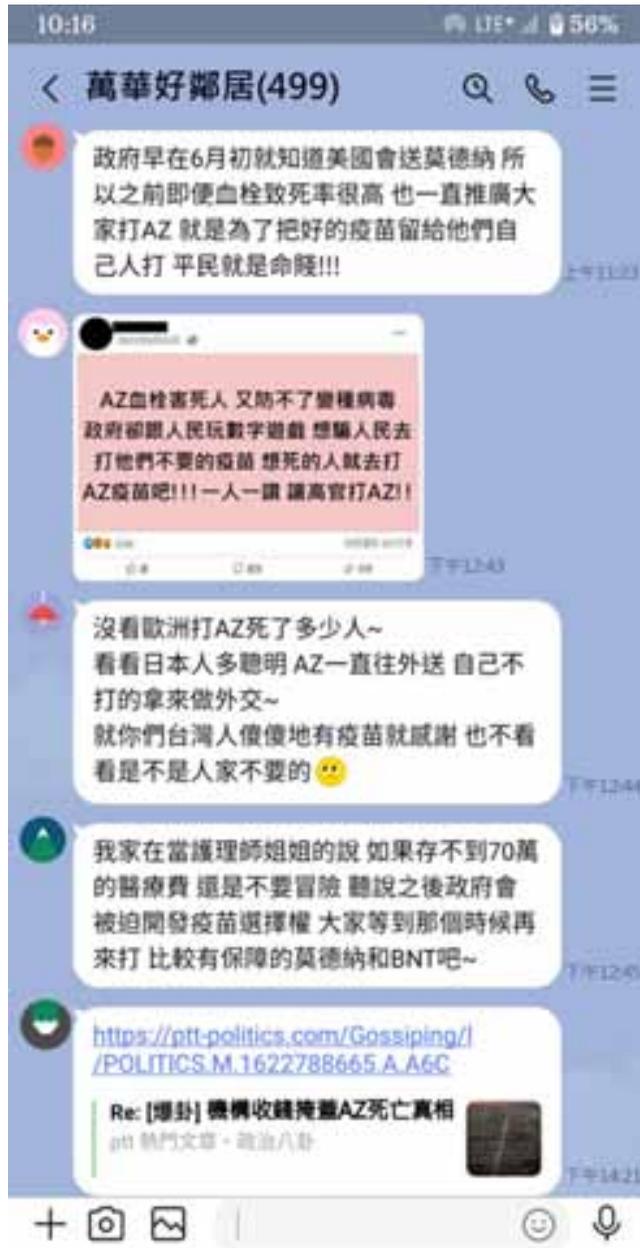


Figure 7. Vaccine-related clarification



疫苗資訊澄清
此資訊係社群爭論討論內容
經過編譯轉傳文不實謠言！

1. 施打完兩劑AZ疫苗後，對於Delta變種病毒有**80%的保護效力**。
2. 台灣人接種AZ疫苗而引發凝血系統事件僅**40萬分之一**。
3. 目前台灣接種疫苗後死亡案例之原因尚待查證中，**尚未有確切證據證明死因與AZ疫苗直接相關**。
4. 慢性病患者與老年人士接種後容易引發重症，因此政府建議接種疫苗。
5. 部分縣市官長已在四月中旬帶領施打AZ疫苗，如：台北市長柯文哲、新北市長侯友宜、桃園市長鄭文燦、台中市長盧秀燕等。
6. 疫苗選擇權尚待政府規劃，目前僅開放孕婦自由選擇疫苗接種中，其餘一般成年人士則可預約各醫療院所之疫苗進行接種。

~詳細資訊請上衛福部官網進行查詢~

本問卷到此結束
非常感謝您的填寫~



Table 6. Questionnaire Items

Attitude Toward Panic Vaccination (ATT) - Zhao & Cai (2008)	
ATT1	I think it is correct to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
ATT2	I think it is beneficial for me to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
ATT3	I think it is wise to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
ATT4	I think it is a good thing for me to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
ATT5	I think it is necessary to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
Expected Benefit (BNF) - This Current Study	
BNF1	I think vaccinating with internationally approved vaccines other than AstraZeneca will help individuals/families reduce future medical costs.
BNF2	I think vaccinating with internationally approved vaccines other than AstraZeneca will help individuals/families reduce the risk of future infection.
BNF3	I think vaccinating with internationally approved vaccines other than AstraZeneca will help individuals/families reduce the risk of severe side effects.
Fact-Checking Experience (CHE) - Ștefăniță et al. (2018)	
CHE1	When I have question about the content of articles on social media, I will think of ways to check (such as Googling related information).
CHE2	When I see content that appears to be fake news on social media, I will think of ways to check (such as Googling related information).
CHE3	When I see a sensational article title on social media, I will think of ways to check (such as Googling related information).
CHE4	When I have questions about an article I read, and its source is not clearly indicated, I will be willing to trace the source of the article.
CHE5	I verify other people's (special or extreme) comments on the article on social media.
Media Credibility (CRE) – Turcotte et al. (2015)	
CRE1	I think the information provided on social media is trustworthy.
CRE2	I think the information provided on social media is accurate.
CRE3	I think the information provided on social media is fair.
CRE4	I think the information provided on social media is complete.
CRE5	I think the information provided on social media is unbiased.
Descriptive Norm (DNO) - Yazdanmehr & Wang (2016)	
*DNO1	I believe that other people will preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*DNO2	I think most people will preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*DNO3	I am convinced other people will preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*DNO4	I think it is likely that most people will preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
Emotional Contagion (EMO) - Doherty (1997)	
EMO1	I feel the same feelings when watching the fearful faces of the public on the news about passing away from having received the AstraZeneca vaccine.
EMO2	I feel tense when watching the fearful faces of the public on the news about passing away from having received the AstraZeneca vaccine.
EMO3	I feel nervous when watching the worried faces of the public on the news about passing away from having received the AstraZeneca vaccine.
EMO4	I feel sad if someone cries because their loved ones passed away after being vaccinated with AstraZeneca.
EMO5	I get filled with sorrow when people talk about the death of their loved ones who were vaccinated with AstraZeneca.
EMO6	I feel sad when people pass away because they were vaccinated with AstraZeneca.
Injunctive Norm (INO) - Yazdanmehr & Wang (2016)	
INO1	I believe other people will feel embarrassed if they preemptively vaccinate an internationally approved vaccine other than AstraZeneca.
INO2	I believe other people will feel ashamed if they preemptively vaccinate an internationally approved vaccine other than AstraZeneca.
INO3	I believe other people will feel guilty if they preemptively vaccinate an internationally approved vaccine other than AstraZeneca.

continued on following page

Table 6. Continued

Panic Vaccination Intention (INT) – Lada et al. (2009) and Venkatesh et al. (2008)	
INT1	I intend to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
INT2	I predict I will preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
INT3	I plan to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
INT4	I am likely to preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
Issue-Involvement (INV) - McQuarrie & Munson (1992) and Zaichkowsky (1986)	
INV1	Vaccine-related topics on social media are important to me.
INV2	Vaccine-related topics on social media will interest me.
INV3	Vaccine-related topics on social media are valuable to me.
INV4	Vaccine-related topics on social media mean a lot to me.
INV5	Vaccine-related topics on social media are useful to me.
INV6	Vaccine-related topics on social media are a concern to me.
Personal Norm (PNO) - Yazdanmehr & Wang (2016)	
PNO1	Based on being morally obligated, I feel that I should not preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
PNO2	I feel guilty if I preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
PNO3	I am willing to bear the low protection and high risk of death that the AstraZeneca vaccine may have and leave internationally approved vaccines to those who need it more.
Argument Quality (QUA) - Chung et al. (2015)	
QUA1	I think the content in this article is ambiguous.
QUA2	I think the content in this article is incomplete.
QUA3	I think the content in this article is inaccurate.
QUA4	I think the content in this article is inconsistent.
QUA5	I think the content in this article is untimely.
Self-Efficacy (SEF) - Cheng & Chen (2020)	
SEF1	I believe that I can identify misinformation on social media by myself.
SEF2	I believe that I can post/share facts instead of misinformation.
SEF3	I believe that I can reduce the likelihood of receiving/sharing misinformation.
Subjective Norm (SNO) - Hsu & Chiu (2004)	
*SNO1	My family think I should preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*SNO2	My friends think I should preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*SNO3	My colleagues think I should preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
*SNO4	People who are important to me think I should preemptively vaccinate with an internationally approved vaccine other than AstraZeneca.
Social Undesirability (SOC) - Cheng & Chen (2020)	
SOC1	I think this article will have a bad impact on society.
SOC2	I think this article will give society the wrong perception.
SOC3	I think this article is undesirable for society.
SOC4	I think this article is harmful to society.
The Third-Person Effect of Fake News (THI) - Cheng & Chen (2020)	
THI1	I think other people will pay attention to fake news they receive on social media.
THI2	I think other people will pay attention to unconfirmed news that they are sharing on social media.
THI3	I think fake news on social media will mislead others.
THI4	I think fake news on social media will affect others.

Note: * Reverse Items

Table 7. PLS confirmatory factor analysis and cross-loadings

	ATT	BNF	CHE	CRE	DNO	EMO	INO	INT	INV	PNO	QUA	SEF	SNO	SOC	THI
ATT1	0.90	0.56	-0.02	0.21	-0.29	0.46	0.04	0.68	0.23	-0.29	-0.23	0.00	-0.65	-0.29	-0.17
ATT2	0.92	0.56	0.03	0.14	-0.36	0.44	-0.07	0.68	0.31	-0.28	-0.21	0.08	-0.58	-0.20	-0.06
ATT3	0.95	0.60	-0.01	0.20	-0.33	0.44	-0.01	0.68	0.27	-0.28	-0.23	0.03	-0.61	-0.24	-0.12
ATT4	0.93	0.60	0.02	0.14	-0.34	0.40	-0.08	0.70	0.28	-0.33	-0.21	0.08	-0.58	-0.18	-0.05
ATT5	0.89	0.54	-0.05	0.25	-0.30	0.45	0.08	0.68	0.27	-0.25	-0.27	-0.03	-0.69	-0.31	-0.21
BNF1	0.52	0.90	0.04	0.11	-0.29	0.30	-0.05	0.38	0.20	-0.20	-0.17	0.05	-0.39	-0.17	0.03
BNF2	0.55	0.89	0.06	0.07	-0.30	0.30	-0.07	0.44	0.20	-0.22	-0.14	0.06	-0.40	-0.14	0.04
BNF3	0.57	0.84	-0.04	0.18	-0.32	0.42	-0.04	0.49	0.32	-0.18	-0.26	-0.01	-0.45	-0.27	-0.05
CHE1	0.00	0.03	0.89	-0.29	-0.21	-0.14	-0.26	0.02	0.14	-0.06	0.30	0.54	0.07	0.26	0.38
CHE2	0.00	0.02	0.91	-0.28	-0.19	-0.07	-0.22	0.02	0.17	-0.03	0.30	0.54	0.05	0.27	0.40
CHE3	-0.06	0.00	0.88	-0.26	-0.15	-0.13	-0.26	0.01	0.10	-0.03	0.24	0.47	0.06	0.19	0.35
CHE4	0.04	0.01	0.83	-0.06	-0.17	0.02	0.01	0.06	0.17	0.12	0.25	0.43	-0.05	0.11	0.20
CHE5	-0.01	0.02	0.79	-0.13	-0.18	0.02	-0.07	0.00	0.17	0.06	0.22	0.44	-0.04	0.10	0.21
CRE1	0.22	0.15	-0.20	0.90	-0.04	0.19	0.34	0.20	0.25	0.08	-0.21	-0.08	-0.21	-0.28	-0.21
CRE2	0.21	0.18	-0.22	0.95	-0.02	0.20	0.35	0.25	0.25	0.04	-0.29	-0.14	-0.27	-0.36	-0.28
CRE3	0.16	0.12	-0.21	0.94	0.00	0.15	0.37	0.20	0.22	0.10	-0.27	-0.12	-0.24	-0.36	-0.30
CRE4	0.17	0.12	-0.23	0.92	0.01	0.19	0.39	0.19	0.23	0.10	-0.26	-0.12	-0.20	-0.33	-0.30
CRE5	0.15	0.04	-0.25	0.83	0.09	0.17	0.43	0.16	0.12	0.15	-0.25	-0.18	-0.25	-0.32	-0.37
DNO1	-0.32	-0.33	-0.22	0.01	0.91	-0.20	0.15	-0.31	-0.27	0.09	0.03	-0.27	0.31	0.04	-0.18
DNO2	-0.35	-0.34	-0.19	-0.01	0.96	-0.22	0.15	-0.35	-0.25	0.11	0.06	-0.24	0.36	0.04	-0.14
DNO3	-0.36	-0.31	-0.13	-0.13	0.76	-0.25	-0.02	-0.37	-0.25	0.00	0.09	-0.13	0.43	0.16	0.04
DNO4	-0.31	-0.31	-0.19	0.02	0.93	-0.20	0.19	-0.32	-0.23	0.12	0.09	-0.23	0.34	0.09	-0.15
EMO1	0.47	0.39	-0.06	0.19	-0.29	0.88	0.02	0.40	0.23	-0.09	-0.26	-0.09	-0.38	-0.23	-0.11
EMO2	0.47	0.38	-0.16	0.25	-0.21	0.89	0.10	0.44	0.23	-0.12	-0.27	-0.18	-0.38	-0.25	-0.15
EMO3	0.47	0.39	-0.13	0.27	-0.24	0.91	0.12	0.44	0.26	-0.11	-0.27	-0.16	-0.41	-0.26	-0.16
EMO4	0.30	0.25	0.03	0.06	-0.12	0.81	0.06	0.23	0.15	0.00	-0.14	-0.05	-0.24	-0.18	-0.04
EMO5	0.30	0.25	0.02	0.05	-0.11	0.82	0.02	0.22	0.13	-0.04	-0.18	-0.10	-0.22	-0.20	-0.05
EMO6	0.36	0.29	-0.01	0.11	-0.11	0.85	0.07	0.29	0.17	-0.06	-0.22	-0.11	-0.30	-0.24	-0.09
INO1	-0.01	-0.07	-0.14	0.34	0.14	0.07	0.93	0.00	0.03	0.51	0.03	-0.13	-0.11	-0.06	-0.14
INO2	0.00	-0.06	-0.19	0.41	0.17	0.08	0.97	0.03	0.00	0.50	-0.02	-0.18	-0.15	-0.12	-0.24
INO3	-0.01	-0.04	-0.21	0.41	0.20	0.07	0.96	0.03	0.00	0.47	-0.04	-0.20	-0.14	-0.12	-0.23
INT1	0.70	0.48	0.02	0.24	-0.34	0.40	0.04	0.96	0.28	-0.26	-0.30	-0.04	-0.68	-0.34	-0.20
INT2	0.72	0.49	0.03	0.23	-0.32	0.40	0.02	0.98	0.29	-0.29	-0.31	0.00	-0.68	-0.33	-0.17
INT3	0.72	0.49	0.03	0.21	-0.36	0.39	0.04	0.97	0.29	-0.31	-0.27	0.01	-0.67	-0.31	-0.16
INT4	0.73	0.49	0.03	0.18	-0.34	0.40	-0.02	0.96	0.31	-0.33	-0.29	0.00	-0.66	-0.32	-0.16
INV1	0.23	0.20	0.14	0.22	-0.23	0.20	0.02	0.26	0.86	-0.01	-0.07	0.13	-0.19	-0.11	0.07
INV2	0.29	0.28	0.24	0.15	-0.26	0.26	-0.04	0.31	0.89	-0.04	-0.05	0.22	-0.24	-0.09	0.07
INV3	0.27	0.23	0.10	0.28	-0.22	0.18	0.07	0.28	0.90	0.02	-0.14	0.14	-0.22	-0.17	0.01
INV4	0.24	0.23	0.13	0.24	-0.23	0.16	0.04	0.23	0.91	-0.01	-0.12	0.18	-0.18	-0.15	0.01
INV5	0.29	0.28	0.11	0.27	-0.24	0.21	0.06	0.28	0.90	-0.01	-0.09	0.18	-0.21	-0.13	0.03
INV6	0.26	0.25	0.20	0.14	-0.23	0.23	-0.07	0.25	0.89	-0.08	-0.08	0.22	-0.18	-0.12	0.07

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Table 7. Continued

	ATT	BNF	CHE	CRE	DNO	EMO	INO	INT	INV	PNO	QUA	SEF	SNO	SOC	THI
PNO1	-0.31	-0.23	-0.02	0.08	0.10	-0.08	0.41	-0.32	-0.05	0.88	0.20	0.01	0.21	0.16	0.05
PNO2	-0.23	-0.17	-0.04	0.16	0.10	0.00	0.59	-0.21	0.00	0.90	0.13	-0.05	0.09	0.04	-0.10
PNO3	-0.25	-0.17	0.12	-0.04	0.08	-0.18	0.27	-0.26	-0.01	0.73	0.16	0.06	0.18	0.16	0.12
QUA1	-0.16	-0.18	0.26	-0.22	0.04	-0.19	-0.03	-0.20	-0.01	0.16	0.83	0.27	0.23	0.60	0.42
QUA2	-0.18	-0.11	0.34	-0.34	-0.05	-0.19	-0.19	-0.23	-0.05	0.05	0.82	0.35	0.28	0.72	0.65
QUA3	-0.18	-0.15	0.27	-0.24	0.02	-0.26	-0.04	-0.23	-0.10	0.14	0.89	0.31	0.19	0.73	0.43
QUA4	-0.26	-0.27	0.17	-0.14	0.14	-0.22	0.16	-0.29	-0.12	0.25	0.79	0.15	0.21	0.57	0.33
QUA5	-0.28	-0.21	0.22	-0.23	0.14	-0.26	0.07	-0.32	-0.15	0.22	0.83	0.24	0.26	0.69	0.40
SEF1	0.02	0.00	0.51	-0.10	-0.19	-0.19	-0.10	-0.01	0.11	0.04	0.29	0.84	-0.04	0.20	0.26
SEF2	0.03	0.02	0.34	0.00	-0.17	-0.10	-0.09	0.01	0.22	-0.03	0.20	0.79	0.03	0.11	0.22
SEF3	0.04	0.07	0.54	-0.23	-0.29	-0.06	-0.24	-0.01	0.19	-0.02	0.31	0.87	0.04	0.28	0.45
SNO1	-0.64	-0.46	0.02	-0.23	0.32	-0.36	-0.09	-0.64	-0.21	0.18	0.28	0.02	0.94	0.36	0.19
SNO2	-0.63	-0.45	0.01	-0.26	0.33	-0.35	-0.15	-0.63	-0.21	0.17	0.26	0.02	0.95	0.32	0.17
SNO3	-0.62	-0.40	0.01	-0.27	0.34	-0.37	-0.18	-0.63	-0.22	0.13	0.24	-0.01	0.93	0.32	0.16
SNO4	-0.67	-0.47	0.04	-0.23	0.36	-0.38	-0.12	-0.71	-0.22	0.21	0.27	0.02	0.96	0.34	0.18
SOC1	-0.20	-0.17	0.24	-0.37	0.00	-0.19	-0.18	-0.26	-0.10	0.06	0.67	0.27	0.30	0.91	0.54
SOC2	-0.23	-0.19	0.21	-0.35	0.05	-0.22	-0.17	-0.32	-0.10	0.06	0.72	0.24	0.34	0.93	0.55
SOC3	-0.25	-0.22	0.18	-0.30	0.08	-0.27	0.00	-0.31	-0.15	0.18	0.77	0.21	0.33	0.94	0.56
SOC4	-0.29	-0.25	0.18	-0.34	0.09	-0.30	-0.05	-0.34	-0.17	0.17	0.79	0.19	0.35	0.92	0.54
THI1	-0.16	-0.04	0.26	-0.29	-0.08	-0.14	-0.17	-0.20	-0.01	0.03	0.49	0.31	0.18	0.55	0.90
THI2	-0.11	-0.02	0.30	-0.28	-0.13	-0.10	-0.17	-0.16	-0.01	0.03	0.41	0.31	0.13	0.48	0.88
THI3	-0.12	0.03	0.36	-0.31	-0.18	-0.11	-0.22	-0.17	0.06	-0.01	0.52	0.35	0.20	0.58	0.94
THI4	-0.09	0.05	0.39	-0.28	-0.21	-0.11	-0.20	-0.13	0.12	0.01	0.51	0.40	0.16	0.55	0.93

ATT: Attitude Toward Panic Vaccination
 BNF: Expected Benefit
 CHE: Fact-Checking Experience
 CRE: Media Credibility
 DNO: Descriptive Norm
 EMO: Emotional Contagion
 INO: Injunctive Norm
 INT: Panic Vaccination Intention
 INV: Issue-Involvement
 PNO: Personal Norm
 QUA: Argument Quality
 SEF: Self-Efficacy
 SNO: Subjective Norm
 SOC: Social Undesirability
 THI: The Third-Person Effect of Fake News

Table 8. Common method bias analysis

	Items	Substantive Factor Loading (R_1)	Substantive Factor Loading (R_1^2)	T-Statistics	Method Factor Loading (R_2)	Method Variance (R_2^2)	T-Statistics
ATT	ATT1	0.846	0.716	25.74	0.072	0.005	2.10
	ATT2	0.988	0.976	38.99	-0.082	0.007	2.52
	ATT3	0.983	0.966	40.63	-0.041	0.002	1.39
	ATT4	1.017	1.034	42.74	-0.112	0.013	3.74
	ATT5	0.750	0.563	18.75	0.172	0.030	4.06
BNF	BNF1	0.967	0.935	49.69	-0.094	0.009	3.04
	BNF2	0.947	0.897	38.05	-0.078	0.006	2.42
	BNF3	0.713	0.508	15.35	0.184	0.034	3.81
CHE	CHE1	0.880	0.774	61.44	-0.050	0.003	2.14
	CHE2	0.903	0.815	74.08	-0.034	0.001	1.74
	CHE3	0.877	0.769	51.43	-0.050	0.003	2.01
	CHE4	0.842	0.709	43.46	0.092	0.008	2.69
	CHE5	0.798	0.637	32.96	0.057	0.003	1.80
CRE	CRE1	0.901	0.812	59.61	-0.004	0.000	0.18
	CRE2	0.915	0.837	73.79	0.047	0.002	2.51
	CRE3	0.946	0.895	73.75	-0.017	0.000	0.87
	CRE4	0.935	0.874	68.54	-0.015	0.000	0.69
	CRE5	0.845	0.714	28.75	-0.013	0.000	0.39
DNO	DNO1	0.933	0.870	60.53	0.051	0.003	2.19
	DNO2	0.961	0.924	83.81	0.025	0.001	1.38
	DNO3	0.809	0.654	33.47	-0.112	0.013	3.80
	DNO4	0.914	0.835	46.88	0.028	0.001	1.18
EMO	EMO1	0.778	0.605	26.15	0.122	0.015	3.52
	EMO2	0.749	0.561	26.58	0.167	0.028	4.58
	EMO3	0.776	0.602	29.79	0.170	0.029	5.13
	EMO4	0.971	0.943	40.46	-0.190	0.036	5.35
	EMO5	0.976	0.953	42.12	-0.194	0.038	5.52
	EMO6	0.929	0.863	37.76	-0.083	0.007	2.54
INO	INO1	0.925	0.856	71.97	-0.030	0.001	1.37
	INO2	0.966	0.933	192.12	0.016	0.000	1.03
	INO3	0.957	0.916	146.78	0.014	0.000	0.90
INT	INT1	0.935	0.874	37.37	0.029	0.001	1.00
	INT2	0.984	0.968	54.12	-0.007	0.000	0.30
	INT3	0.991	0.982	57.20	-0.021	0.000	0.92
	INT4	0.960	0.922	35.30	-0.001	0.000	0.02

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Table 8. Continued

	Items	Substantive Factor Loading (R ₁)	Substantive Factor Loading (R ₁ ²)	T-Statistics	Method Factor Loading (R ₂)	Method Variance (R ₂ ²)	T-Statistics
INV	INV1	0.867	0.752	42.04	-0.017	0.000	0.58
	INV2	0.880	0.774	42.03	0.014	0.000	0.45
	INV3	0.891	0.794	45.11	0.027	0.001	0.99
	INV4	0.926	0.857	53.82	-0.025	0.001	0.97
	INV5	0.890	0.792	52.41	0.027	0.001	0.96
	INV6	0.895	0.801	46.15	-0.026	0.001	0.91
PNO	PNO1	0.864	0.746	58.18	-0.047	0.002	1.70
	PNO2	0.916	0.839	62.21	0.113	0.013	4.49
	PNO3	0.729	0.531	21.41	-0.082	0.007	2.03
QUA	QUA1	0.876	0.767	27.74	0.077	0.006	1.94
	QUA2	0.802	0.643	23.14	-0.035	0.001	0.74
	QUA3	0.917	0.841	43.35	0.050	0.003	1.70
	QUA4	0.790	0.624	22.71	-0.010	0.000	0.22
	QUA5	0.781	0.610	25.71	-0.084	0.007	2.37
SEF	SEF1	0.837	0.701	39.34	-0.019	0.000	0.78
	SEF2	0.805	0.648	27.94	0.052	0.003	1.67
	SEF3	0.854	0.729	48.38	-0.029	0.001	1.11
SNO	SNO1	0.926	0.857	37.07	-0.012	0.000	0.42
	SNO2	0.983	0.966	53.13	0.040	0.002	1.61
	SNO3	0.961	0.924	40.03	0.029	0.001	0.89
	SNO4	0.909	0.826	34.67	-0.057	0.003	2.15
SOC	SOC1	0.960	0.922	54.24	0.077	0.006	3.36
	SOC2	0.939	0.882	57.73	0.019	0.000	0.84
	SOC3	0.928	0.861	58.70	-0.013	0.000	0.64
	SOC4	0.869	0.755	40.83	-0.082	0.007	3.53
THI	THI1	0.885	0.783	53.56	-0.049	0.002	2.28
	THI2	0.895	0.801	46.98	0.016	0.000	0.62
	THI3	0.928	0.861	86.63	-0.006	0.000	0.37
	THI4	0.938	0.880	83.63	0.039	0.002	2.01

Note: t-statistics in bold are significant (p-value < .05).

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