



Article

# News literacy, fake news recognition, and authentication behaviors after exposure to fake news on social media

new media & society

1–20

© The Author(s) 2022

Article reuse guidelines:

[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)

DOI: 10.1177/14614448221127675

[journals.sagepub.com/home/nms](https://journals.sagepub.com/home/nms)



Michael Chan 

The Chinese University of Hong Kong, Hong Kong

## Abstract

The global problem of online disinformation has led scholars, educators, and other stakeholders in societies to emphasize the utility of news literacy to engender more critical news audiences. Using a survey among a representative online sample of citizens in Hong Kong ( $N=1485$ ), this study examined how dispositional news literacy was related to individuals' ability to discern real and fake COVID-related news on social media and their news authentication behaviors. Results showed that higher news literacy was related to greater ability to discern the veracity of real and fake news headlines; greater likelihood of certain internal acts of authentication when exposed to fake news (e.g. assessing content characteristics of the message); and greater likelihood to search online to verify fake news. The findings demonstrated the normative benefits of high dispositional news literacy among the general populace that can attenuate the effects of online disinformation.

## Keywords

Disinformation, fake news, media literacy, news authentication, news literacy, social media

Online disinformation is a global problem, and citizens in many countries are concerned with the veracity of the information they come across online (Chan et al., 2022). Fake news is a specific type of disinformation that is false with the intent to deceive

---

## Corresponding author:

Michael Chan, School of Journalism and Communication, New Asia College, The Chinese University of Hong Kong, Humanities Building, Shatin, NT, Hong Kong.

Email: [mcmchan@cuhk.edu.hk](mailto:mcmchan@cuhk.edu.hk)

audiences while mimicking real news (Tandoc, 2019).<sup>1</sup> It is not by any means a new phenomenon. But, the ubiquity and interconnected nature of social media means that fake news can cascade exponentially in a short time, potentially showing political and social discord in societies that threaten their democratic functioning. Scholars and commentators often cite the UK Brexit campaign and 2016 US Presidential election as exemplars of the nefarious effects of fake news (e.g. Bennett and Livingston, 2018), but the problem is no less serious in other parts of the world, such as in Latin America (Siles et al., 2021), Asia (Kanozia and Arya, 2021), and Africa (Wasserman and Madrid-Morales, 2019). Thus, substantive research in past years has sought to understand the sources of fake news, how it spreads, what are its effects, and how to stop it (Weeks and Gil de Zúñiga, 2019).

Concerns about fake news have yielded different responses and research agendas to deal with the problem. These include government legislation to regulate misleading content (Rodrigues and Xu, 2020), message-based interventions before, during and after of fake news exposure (Brashier et al., 2021), and media literacy education with curricula focusing on the critical evaluation of news (Luhtala and Whiting, 2018). This study follows the audience-centered approach of the latter and focuses on news literacy (NL) that can engender more critical news consumers who have the capacity to judge the veracity of the news they encounter. This is important because greater aggregate NL means that societies are generally more able to collectively recognize fake news, which should stem its effects and spread. Of course, some people would still spread fake news even when they know the content is false for entertainment, relational maintenance, reputation building, and other reasons, but these are in the minority (Altay et al., 2020).

Previous studies have examined the antecedents of NL (Chan et al., 2021) while others focused on the normative benefits of high NL among individuals, including greater public affairs knowledge (Ashley et al., 2017), lower likelihood of conspiracy theory endorsement (Craft et al., 2017), and greater trust in news generally (Paisana et al., 2020). Experimental studies have also shown how specific NL-based interventions can lower the perceived accuracy of fake news (Hameleers, 2020).

There are still two gaps in the literature. First, beyond a few studies that have offered mixed findings (e.g. Amazeen and Bucy, 2019; Jones-Jang et al., 2019), it is still uncertain whether high levels of individuals' dispositional NL are related to their ability to recognize fake news. Second, no study has yet examined whether NL is related to individuals' authentication behaviors after exposure to fake news, which comprise an important set of NL behaviors (NLB). Without more concrete evidence, assumptions that NL improve fake news recognition *and* lead to more critical verification responses stand on shaky ground. This study fills these gaps by using a recently proposed holistic conceptualization of NL (Vraga et al., 2021) among a representative sample and compare it with individuals' ability to discern fake and real COVID-related news headlines. Moreover, it integrates insights from the acts of authentication framework (Tandoc et al., 2018) to explore how NL engenders different verification strategies and behaviors following fake news exposure on social media. The study is conducted in Hong Kong, which is a society where social media platforms such as Facebook and WhatsApp have more than 75% penetration and 60% of

online citizens have come across some form of fake news while online (Newman et al., 2021). Therefore, it provides a suitable context to examine the normative role of NL to attenuate the effects of fake news.

## **NL as a Bulwark against fake news**

### *From media literacy to NL*

There has been much debate and contestation over the decades on what exactly constitutes “media literacy” although there is a general agreement that it is “the ability to access, analyze, evaluate and create messages across a variety of contexts” (Livingstone, 2004: 1). The main contexts for early media literacy research and education initiatives emphasized newspapers and television, but the diffusion of digital communication technologies engendered by the Internet led to the development of more specific literacies, such as “digital literacy” to address and reduce the digital divide locally and globally (Hargittai and Hinnant, 2008) and “social media literacy” to protect children from harmful content while using social media (Livingstone, 2014). There are thus different facets of media literacy with each emphasizing different normative outcomes.

NL is defined as the “knowledge of the personal and social processes by which news is produced, distributed, and consumed, and skills that allow users some control over these processes” (Vraga et al., 2021: 5). Distinct from other media literacies, NL is closely tied to individuals’ competence as engaged citizens because normative theories of democracies predispose a well-informed citizenry who have the necessary knowledge and motivation to participate in political and civic life (Delli Carpini, 2004). This is predicated on a news information environment that gives citizens the “facts” that affect their everyday lives, which has become increasingly difficult to sustain for three reasons. First, the shift from a “mass media logic” to a “network media logic” facilitated by social media has completely altered the dynamics of news production, distribution, and consumption (Klinger and Svensson, 2015). Not only have individuals as intermediaries supplanted the traditional gatekeeping roles of professional media organizations and journalists; they can also produce and share content more cheaply, quickly, and with less regard to journalistic norms, values, and ethics. Second, the sheer amount of information disseminated through social media means it has become more challenging for citizens to discern the relative quality and veracity of the news they encounter. Third, the above-mentioned conditions provide actors with nefarious agendas several channels to disseminate misleading or false information to sow political and social discord (Bennett and Livingston, 2018; Tandoc, 2019).

A news literate society is thus normatively desirable because people are “aware of how news is produced and by whom; and possesses the critical awareness and capacity to judge the relative veracity of the news that one encounters” (Chan et al., 2021: 573). Recognizing the importance of NL, schools and universities have implemented formal NL education programs and initiatives in the past decade so as to engender a more news literate generation (Fleming, 2014; Luhtala and Whiting, 2018). But many adults today may not have such exposure and so overall NL within the population may vary widely.

## NL and NL behaviors

Recent theorizing of NL posits five domains (“the 5 Cs”): the environment in which news is produced (context); the process of producing news (creation); the features of news that distinguishes it from other media (content); the ways in which news is disseminated (circulation); and factors affecting news selection and exposure (consumption; Vraga et al., 2021). NL like other forms of knowledge can be formally and informally learned through education and the process of media socialization, and it can be called upon from long-term memory at the moment of news exposure (Amazeen and Bucy, 2019). Available cross-national data however suggests that citizens’ dispositional NL is fairly low. Using Reuters Digital News Report survey data across 18 countries that included the United States and Europe (N=36,911), Fletcher (2018) found that 32% of respondents were unable to correctly answer questions on which outlets in their country received public funding, who was usually responsible for writing a press release, and what determined which news stories appeared on peoples’ Facebook feeds. Only 10% of respondents answered all three questions correctly.

While NL refers to ones’ *capability* to engage with news, NL behaviors (NLBs) refer to its *application*, that is “behaviors that occur when people engage with news content in a critical and mindful manner” (Vraga et al., 2021: 8). Perhaps the most relevant NLB in the context of disinformation is fake news recognition because any normative response to fake news depends first on its identification. Amazeen and Bucy (2019) tested this relationship with their 10-item measure of “procedural news knowledge” that encompassed several of the NL domains specified above and found that increased levels were indeed negatively related to the perceived accuracy of fabricated political news headlines. Jones-Jang et al. (2019) measured four kinds of literacy (media, information, news, and digital) and found that only information literacy positively predicted respondents’ ability to recognize fake political headlines on social media. The results appeared to downplay the role of NL. However, their operationalization of NL was based on perceived rather than actual knowledge measures (i.e. level of agreement to the question: “The owner of a media company influences the media content”), which may not have accurately reflected respondents’ NL levels. Using actual knowledge measures, this study thus seeks to provide much-needed additional evidence of the theoretical relationship between NL and fake news recognition as a NLB, and the following hypotheses are proposed:

*H1.* People with higher NL are (a) more likely to perceive real news headlines as accurate, and (b) less likely to perceive fake news headlines as accurate.

*H2.* People with higher NL can better discern that (a) real news headlines are real and (b) fake news headlines are fake.

## NL and acts of authentication

In addition to recognition, another pertinent NLB related to fake news is “verification of content” (Vraga et al., 2021: 15). How this NLB is related to NL has received very little

attention, yet willingness to verify news suspected to be misleading represents an important normative outcome derived from critical and mindful news engagement. Understanding the relevance and need for verification of news content and applying it to news encounters are central to university NL curricula (Fleming, 2014), and it is considered a “normative ideal” for general news audiences because collective efforts to verify news can reduce the threat of fake news (Edgerly et al., 2020). News verification however is not one single NLB, but it represents a broad range of authentication behaviors. Focus group interviews have mentioned some participants’ use of interpersonal and institutional resources to authenticate news, such as using search engines like Google to triangulate information they were unsure about (Wenzel, 2019), while others simply just relied on their “gut feelings” (Swart, 2021). The prevalence of authentication behaviors may also vary across societies. In the United States, for example, more than a third of online citizens have engaged in at least two authentication behaviors, such as checking different sources to see whether the same news was reported in the same way and discussing the news story with trusted others. In the Netherlands, only 10% of respondents engaged in such behaviors (Chan et al., 2022).

A relevant and useful conceptual framework for organizing these diverse verification behaviors is the *audiences’ acts of authentication* model (Tandoc et al., 2018), which was conceived inductively through focus group interviews of Singaporean citizens. According to the model an initial encounter with suspected fake news on social media can lead first to “internal acts of authentication” to judge its credibility and authenticity. These include the use of one’s personal judgment and experience (self), consideration of where the news came from and the credibility of the source (source), and the tone and characteristics of the news content (message). The latter two acts in particular overlap conceptually with several of the NL domains. Consideration of the “source” aligns with *context* and process of news *creation* whereas “message” is related to *content* characteristics of news. Therefore, it is reasonable to assume a positive relationship between individuals’ dispositional NL and how they would generally determine the veracity of the news they encounter. To test this assumption, the following hypothesis is proposed:

*H3.* NL is positively related to internal acts of authentication, including (a) personal experience, (b) credibility cues, and (c) content characteristics.

According to the model, if there are further doubts on the veracity of news, then individuals could proceed to “external acts of authentication” which are organized along two dimensions: incidental/intentional and interpersonal/institutional. Incidental strategies are passive in nature and rely on confirmation from family and friends (interpersonal) or corrections from media and journalists (institutional). The onus for determining the veracity of news is thus placed on others with the implication that the news is generally considered “real” until informed otherwise. Intentional strategies are proactive and require expenditure of time and resources. This includes checking the news with family and friends (interpersonal) or using search engines, alternative news websites, or fact-checking websites (institutional). Previous research suggests that people with higher NL are predisposed to be skeptical of the information they receive on social media (Vraga

and Tully, 2019). Moreover, they are likely to have the necessarily motivation, knowledge, and skill to take more proactive steps to verify suspected fake news at the point of encounter rather than “wait” for verification by others at a later point in time. From a normative perspective, these more proactive NLBs are consistent with what is considered to be an engaged and critical news consumer (Edgerly et al., 2020). Thus, the final hypothesis is raised as follows:

*H4.* NL is positively related to proactive forms of external authentication, including (a) checking with friends and (b) checking online when exposed to fake news, but not (c) passive forms of external authentication.

Although this study is primarily focused on examining the NL to NLB dynamic suggested by recent theorizing of the NL literature (Vraga et al., 2021), it is also important to consider other individual orientations that may motivate and explain acts of authentication in addition to NL. One variable is the need for cognition (NFC), which relates to individuals’ tendency to enjoy effortful ways of thinking (Cacioppo et al., 1984). Indeed, encounters with suspected fake news is the very scenario where those with high NFC are more likely to expend their cognitive efforts to evaluate the news content and engage in more proactive NLBs. Moreover, previous research has shown that experience and concern with fake news also predicted news authentication (Chan et al., 2022). Therefore, including these controls can provide a more robust examination of the NL to NLB relationship.

## Method

### *Sample and procedure*

A survey experiment was fielded among a sample of online citizens in Hong Kong (Final  $N=1485$ ) via Qualtrics in March 2022. Quota sampling was adopted so that the sample was representative of the gender and age characteristics of the online population in Hong Kong based on latest available census data. After providing informed consent respondents answered the frequency in which they used (a) Facebook and (b) WhatsApp or WeChat, which are the most popular social media platforms in Hong Kong. Those who answered “Never” to any of the platforms were excluded from the remainder of the survey. Respondents then answered a battery of questions related to COVID, media use habits, prior perceived exposure to fake news, and previous internal acts of authentication. Then, they were informed that they would be shown “some news headlines that have appeared on social media in the past year” and were randomly assigned to read three real news headlines and three fake news headlines related to COVID (see Appendix 1). The fake news headlines were sourced from real-life examples that were disseminated and spread through social media that had been subsequently debunked by external fact-checkers.<sup>2</sup> The real news headlines were selected from mainstream newspapers that also appeared on social media. After exposure to each of the six news headlines respondents indicated how accurate they believed the headline to be and their most likely

response to it (i.e. external acts of authentication). They were also asked whether they had seen any of the headlines before and those who answered affirmatively were removed from subsequent analysis ( $N=9$ ). Finally, respondents completed a battery of NL questions and were then debriefed on the purposes of the study. Of the final sample, 52% were female with a mean age of 43.47 ( $SD=12.97$ ) and mode education at vocational/associate degree level (4,  $M=4.26$ ,  $SD=1.17$ ).

## Measures

### *Dependent variables*

*Perceived accuracy of news headline.* For each news headline they saw, respondents indicated its perceived veracity when asked on the subsequent page “How accurate do you think was the information you saw in the previous page?” (1=“I am sure it is inaccurate,” 2=“I think it could be inaccurate,” 3=“I am not sure if it is accurate or inaccurate,” 4=“I think it could be accurate,” and 5=“I am sure it is accurate”). The answers for each set of three fake ( $M=2.69$ ,  $SD=.81$ ,  $\alpha=.70$ ) and real news headlines ( $M=3.25$ ,  $SD=.70$ ,  $\alpha=.68$ ) were combined and averaged. Correct recognition of fake news as fake was operationalized by combining answers with values of 1 and 2 while correct recognition of real news as real was operationalized by combining answers with values of 4 and 5.

*Internal acts to authenticate fake news.* Respondents answered whether they had come across false or misleading information about COVID on social network sites or messaging apps (Yes=69%). For those who answered affirmatively, they were then asked on what basis they usually judged the news to be misleading, including reliance on personal experience (Yes=55%, “Based on my knowledge and personal experience”), reliance on source cues (Yes=37%, “The person or organization who shared the post did not appear to be credible”), and reliance on content characteristics (Yes=38%, “The headline or content in the post seemed too exaggerated”). Respondents could select more than one answer choice.

*External acts to authenticate fake news.* After exposure to each news headline, respondents indicated their most likely response from five choices: (a) “No response. I will ignore the headline”; (b) “No response. If the information is not accurate, my friends will say something about it later”; (c) “No response. If the information is not accurate, the news media or an official organization will clarify it later”; (d) “I will ask people I know whether the information in the headline is accurate”; and (e) “I will go online and find out whether the information is accurate.” Answers (d) and (e) were considered more proactive external acts of authentication. A composite measure for each of the five acts was created by adding affirmative answers for each response.

### *Independent variables and controls*

*News literacy.* Respondents answered 10 multiple-choice questions that encompass the five dimensions of NL proposed by Vraga et al. (2021). Seven questions were drawn

from the 15-item news media knowledge structures scale (Maksl et al., 2015), one from the 2018 Reuters Digital News Report (Fletcher and Nielsen, 2018), and two were created for this study (See Appendix 2). Ease of translation and adaptability to local context were prioritized in question selection, such as word by word translation of the original English question but with localized answer choices (e.g. Q2). Correct answers were summed to create a composite measure of NL ( $M=3.57$ ,  $SD=1.80$ ,  $Min=0$ ,  $Max=9$ ,  $Mode=3$ ). No respondent answered all questions correctly and 15% answered six or more questions correctly.

*Concern with fake news.* Respondents answered their level of agreement (1 = “Strongly disagree” to 5 = “Strongly agree”) to the following question based on Newman et al. (2021): “Thinking about information on social media, to what extent are you concerned about whether information is accurate or misleading on social media?” ( $M=2.12$ ,  $SD=0.56$ ).

*Exposure to fake news.* Respondents answered their frequency of being exposed to fake news on Facebook and WhatsApp (1 = “Never” to 5 = “Always”): “How often did you come across posts containing false or misleading information about COVID when you used Facebook (WhatsApp or WeChat?).” The two questions were combined and averaged ( $M=2.78$ ,  $SD=0.79$ ,  $r=.70$ ,  $p<.001$ ).

*Need for cognition.* Respondents answered their level of agreement (1 = “Strongly disagree” to 5 = “Strongly agree”) to questions based on the short version of the need for cognitions scale (NCS-6; Lins de Holanda Coelho et al., 2020): (1) “I would prefer complex to simple problems,” (2) “I like to have the responsibility of handling a situation that requires a lot of thinking,” (3) “Thinking is not my idea of fun (reverse),” (4) “I would rather do something that requires little thought than something that is sure to challenge my thinking abilities (reverse),” (5) “I really enjoy a task that involves coming up with new solutions to problems,” and (6) “I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought” ( $M=3.27$ ,  $SD=0.59$ ,  $\alpha=.70$ ).

*COVID-related media use and communications.* Various general COVID-related measures were asked, including the frequency (1 = “Never” to 5 = “Always”) of overall news attention ( $M=3.17$ ,  $SD=0.65$ ); following COVID-related news from the news media ( $M=3.61$ ,  $SD=0.86$ ); searching for COVID-related information online ( $M=3.19$ ,  $SD=0.89$ ); receiving COVID information from family and close friends through social media ( $M=3.62$ ,  $SD=0.79$ ); posting or sharing COVID information with family and close friends through social media ( $M=3.19$ ,  $SD=1.00$ ); and talking about COVID in everyday face-to-face conversations with family and close friends ( $M=3.58$ ,  $SD=0.76$ ). Moreover, respondents answered their level of agreement (1 = “Strongly disagree” to 5 = “Strongly agree”) to the statements: “I think the news media in Hong Kong is generally trustworthy” ( $M=3.21$ ,  $SD=1.05$ ) and “At this moment I am very concerned about COVID” ( $M=3.08$ ,  $SD=0.74$ ). Finally, respondents indicated whether they have taken at least one dose of the COVID vaccine (Yes = 93%).



## Results

### *NL and fake news recognition*

Linear regression analyses with study and control variables as predictors were conducted to examine whether NL was related to perceived accuracy of real (H1a) and fake news (H1b), and discernment of real (H2a) and fake news (H2b). The results are summarized in Table 1. Models 1 and 2 show that NL was negatively related to perceived accuracy of fake news ( $b = -.06, p < .001$ ) and positively related to perceived accuracy of real news ( $b = .03, p < .01$ ). H1a and H1b were supported. Regarding respondents' discernment of real and fake news 14% correctly recognized all three fake news items as fake (24% recognized two, 28% one, and 34% none) and 13% correctly recognized real news a real (25% recognized two, 29% recognized one, and 33% none). Models 3 and 4 showed that NL was positively related to correct assumptions of fake ( $b = .10, p < .001$ ) and real news ( $b = .07, p < .001$ ) so H2a and H2b were supported. Only 1% of respondents correctly discerned the veracity of all six news headlines (three real and three fake) while 6% discerned the veracity of five news headlines (i.e. at least two real or fake headlines recognized while the other three were correctly recognized). To examine which variables predicted recognition of five headlines an additional logistic regression analysis (correctly identified at least five of six versus those who could not) was conducted and showed that only two variables were significant: lower media trust ( $b = -.30, p < .01$ ) and higher NL ( $b = .20, p < .01$ ) (Model 5).

### *NL and internal acts of authentication*

Logistic regression analyses were conducted to examine the relationship between NL and acts of internal authentication among respondents who said that they had been exposed to fake news on social media. The results summarized in Table 2 showed that NL predicted the use of personal experience ( $b = .16, p < .001$ ) and content characteristics ( $b = .15, p < .001$ ) but not credibility cues. H3a and H3c were supported while H3b was not supported.

### *NL and external acts of authentication*

Figure 1 summarized the distributions of respondent behaviors to each fake news headline. For example, 17% of respondents indicated that they would ignore all three headlines while 8% indicated that they would go online to check the veracity of all headlines they saw. As a whole, 56% of respondents would ignore at least one news headline and take no further action. The figure was 20% for reliance on friends to verify if the news is false, 46% for reliance on media correction, 21% for checking with friends, and 38% for searching online.

Because the summed responses were based on count outcomes and had skewed distributions and majority of the values were zero, Poisson regression analyses were conducted and summarized in Table 3. It showed that NL was negatively related to checking with friends ( $b = -.16, p < .001$ ), which was opposite to what was proposed by H4 and

**Table 1.** Regression models predicting accuracy of presumed COVID fake and real news.

	Model 1	Model 2	Model 3	Model 4	Model 5
(Intercept)	2.20***	2.18***	.63	-.58	-3.35*
Gender	.02	.03	-.04	.01	-.03
Age (Female)	-.00**	-.00**	.00	-.01***	-.01
Household size	-.02	-.03	.01	-.00	-.17
Education	-.03*	.00	.02	.00	.10
Concern with COVID	-.02	.00	.00	-.00	.05
Vaccinated (Yes)	-.22**	-.13	.31**	-.21*	-.35
News attention	-.05	.02	.05	-.01	.04
Media trust	.12***	.07***	-.08**	.11***	-.30**
Get COVID info SM	.04	.06	-.03	.05	-.29
Share COVID info SM	.03	-.00	-.03	.02	-.04
COVID news exposure	-.00	-.00	.03	.02	.31
Search COVID news	.11***	.07**	-.08	.10**	-.10
Discuss COVID	.01	.05	.02	.09*	.36
$\Delta R^2$	.12	.08	.04	.09	.07
Expose fake news	.23***	.12***	-.12**	.20***	-.17
Concern fake News	.05	.10**	-.06	.14**	-.07
Need for cognition	.04	-.01	-.01	.02	.22
News literacy	-.06***	.03**	.10***	.07***	.20**
$\Delta R^2$	.05	.03	.04	.04	.03
Personal experience	-.15***	-.00	.26***	.05	.42
Credibility cues	-.08	-.03	.09	-.02	-.04
Content characteristics	-.16***	.03	.21***	.12*	.34
$\Delta R^2$	.02	.00	.02	.01	.00
Total R <sup>2</sup>	.19	.11	.10	.14	.10
N	1485	1485	1485	1485	1485

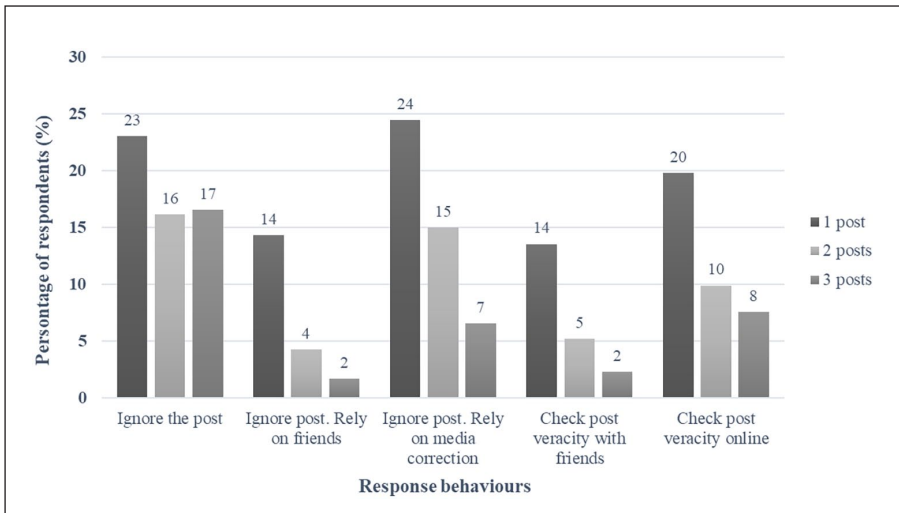
Unstandardized beta coefficients are shown. First four models are linear regression models while the fifth is a logistic regression model. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

**Table 2.** Regression models predicting internal acts of authentication among respondents who have come across fake news.

	Personal experience	Credibility cues	Content characteristics
(Intercept)	-.61	-.98	-1.80*
Gender (female)	-.09	-.38**	.23
Age	-.00	-.01	-.02***
Household	-.03	.07	.06
Education	-.01	.08	.02
General news exposure	.09	-.29**	.47***
Media trust	-.06	.04	-.25***
Fake news exposure	.17	.35***	-.06
Concern with fake news	-.13	.18	.10
Need for cognition	.13	.10	.10
News literacy	.16***	-.01	.15***
NR <sup>2</sup>	.04	.06	.11
N	1022	1022	1022

Unstandardized beta coefficients are shown.

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .



**Figure 1.** Percentage of respondent responses to three fake news headlines.

**Table 3.** Poisson regression models predicting external acts of authentication of fake news.

	Ignore headline	Ignore headline. Rely on friends	Ignore headline. Rely on media	Check with friends	Search online
(Intercept)	1.90***	.23	-.45	-4.01***	-2.93***
Gender	-.01	.05	.12	-.28**	.01
Age (Female)	.00	.00	-.00	.01	-.01*
Household size	.03	.02	-.03	-.03	-.01
Education	.05**	.04	.00	.04	-.10***
Concern with COVID	.01	-.18*	-.10	.06	.10
Vaccinated (Yes)	.05	-.22	.23	-.16	-.12
News attention	.06	-.15	.04	-.22*	.08
Media trust	-.17***	.11*	.05	.26***	-.01
Get COVID info SM	-.03	-.02	-.12*	.12	.17**
Share COVID info SM	-.09**	.22**	-.02	.22**	-.01
COVID news exposure	-.04	-.17*	.11*	.08	.05
Search COVID news	-.15***	.01	-.03	.20**	.14**
Discuss COVID	-.06	-.05	.09	-.13	.03
$\Delta R^2$	.16	.07	.02	.21	.13
Expose fake news	-.17***	.14*	-.05	.22***	.04
Concern fake News	-.24***	-.20*	.02	.30***	.28***
Need for cognition	-.07	-.04	-.07	.14*	.10*
News literacy	.01	-.07*	.02	-.15***	.07***
$\Delta R^2$	.03	.02	.01	.04	.03
Personal experience	.38***	-.60***	-.29***	-.25*	.13
Credibility cues	-.06	.25*	.05	.01	-.11
Content characteristics	.09	-.39**	-.09	-.36**	.32***
$\Delta R^2$	.03	.04	.01	.01	.02
Pseudo R <sup>2</sup>	.22	.13	.04	.26	.18
N	1485	1485	1485	1485	1485

Unstandardized beta coefficients are shown.

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

therefore the hypothesis was not supported. However, NL predicted searching online ( $b = .07, p < .001$ ) so H4b was supported. NL was not positively related to the more passive forms of external authentication although there was a negative relationship with reliance on friends. H4c was supported. Examination of the other orientations showed that while concern with fake news and NFC did not predict internal acts of authentication, they both predicted proactive forms of external authentication. Implications of the findings will be discussed next.

## Discussion

This study follows an audience-centered perspective and logical arguments put forward by media and NL scholars that dispositional knowledge and skills related to how the news operates, is created, disseminated, and its effects, should effectively attenuate the effects of fake news (Vraga et al., 2021). Yet while this is a reasonable and logical assumption, actual evidence on whether dispositional NL is related to fake news recognition and authentication on social media is thin. Addressing this empirical gap, this study provides supportive evidence for the normative role of dispositional NL on fake news recognition as it was the only variable that consistently discriminated against the accurate discernment of fake and real news headlines presented in this study. Moreover, individuals with higher NL were also more likely to draw from personal experiences and consider the content characteristics of the news to judge its veracity as well as search online to verify fake news.

These findings are indicative of the important knowledge and skills integral to dispositional NL that can engender more critical *and* proactive news consumers. There were some unexpected findings. Higher NL reduced the likelihood of checking the veracity of fake news with friends, which was opposite to what was hypothesized. One possible reason is the interpersonal and small group dynamics of sharing suspected fake news on social media that can harm social relationships (Duffy et al., 2020) such that sharing fake news to others on a WhatsApp group even for the purposes of verification could provoke negative reactions and harm one's reputation. The efficacy of this external act is also reliant on the relative knowledge levels of ones' friends, whereas searching online can provide more definitive answers on the veracity of the news. NL also did not predict the use of credibility cues to judge whether the news was fake, which could be attributed to the multifaceted and nuanced nature of source credibility (e.g. credibility of the news source vis-à-vis credibility of the sender, etc.) that the measure used in this study did not capture. Some findings for other variables are also worth noting. Need for cognition had no role in predicting fake news recognition nor internal acts of authentication, but positively predicted checking with friends and searching online, which suggests that it is a relevant variable to account for individuals' motivation and willingness to expend cognitive resources to verify news. Similarly, concern with fake news was positively related to the proactive external behaviors and negatively related to the more passive ones. These two variables thus complement NL to engender more proactive search-based behaviors and should be included in future studies examining NLBs.

While the findings provide an optimistic picture linking NL with various NLBs, they are tempered to some degree by the relatively low levels of NL among the study

sample. Only 15% of respondents answered more than half of the NL questions correctly, which is along the lines of previous data from other advanced societies (Fletcher, 2018). Thus, in addition to formal NL education in schools and universities (Fleming, 2014; Luhtala and Whiting, 2018), greater efforts and initiatives are required to raise NL among the general population to engender more NLBs (Lee, 2018). In this regard, there have been some efforts in Hong Kong in the form of public service announcements encouraging citizens to “check the facts to keep fake news in check.” However, these and other similar announcements focused on NLB (i.e. verify news) rather than NL. Future programs and initiatives aimed at the general population should therefore reorientate the focus toward specific skills and knowledge along the five dimensions of NL and away from NLBs since encouraging citizens to do something is rather redundant and not a good investment of resources if they do not have the ability to do it.

Several limitations of the current study and avenues for future research are worth noting. First, the audiences’ act of authentication model was conceived as a two-step process whereby individuals engage in external acts *after* internal acts were not adequate to determine the veracity of news. This study did not formally test this process as internal acts were measured as a dispositional response to fake news and only external acts were explicitly measured following exposure to real and fake news. Future studies would therefore need to adopt more sophisticated research designs to capture this two-step process. In fact, the very notion that authentication is a two-step process requires greater scrutiny because different motivations may lead individuals to proactively verify news even when they are reasonably confident that it is real or fake (Walter et al., 2021). Future studies should therefore also attempt to tap into people’s motivations for engaging in authentication behaviors. Second, while the survey items for NL were designed along the five dimensions proposed by Vraga et al. (2021), the low number of items for each dimension meant it was not possible to thoroughly assess the factor structure of the concept and to ascertain which dimensions played a more prominent role in predicting the NLBs. Third, the experimental design of the study intentionally avoided the use of any contextual cues to avoid spurious effects. Yet, the media credibility literature has long acknowledged the importance of source and message cues that affects how people perceive and respond to media content (see Metzger et al., 2016). Future studies can consider the implementation of such cues as additional factors or moderators in future experiments, such as the role of trust (Paisana et al., 2020). Fourth, this study focused on dispositional NL and not on NL interventions (e.g. Hameleers, 2020), which is equally important for the attenuation of fake news effects. Indeed, future research can develop theories and models that integrate both strands of research to answer some pertinent empirical questions. For example, whether those with higher dispositional NL are more receptive to NL interventions. And whether NL interventions in turn increase dispositional NL. Finally, the study was conducted within the context of Hong Kong during the COVID pandemic, so it was likely that the overall media system was saturated with COVID-related news and communications. While this study included a battery of COVID-related questions it did not directly measure COVID knowledge, which could play a role in recognizing misleading COVID news. And since COVID was a serious

matter of life and death, it was understandable that some people would be more proactive to search for information online to verify COVID-related news. Future studies should build on these findings in others social contexts by using the same five dimensions of dispositional NL to predict NLB for other issues and topics.

Despite these limitations, this study makes an important contribution to the NL literature by specifying and demonstrating the theoretical relationship between NL and fake news recognition and authentication. Exposure to formal and informal NL education may take time, effort, and resources. But the skills and knowledge learned by citizens about the production, distribution, and consumption of news can help better protect them from future encounters with fake news on social media.

### Authors' Note

The author agrees with this submission and the manuscript is not currently being considered for publication by any other print or electronic journal.

### Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Faculty of Social Science (Direct Grant), Chinese University of Hong Kong, under Grant #4052251.

### ORCID iD

Michael Chan  <https://orcid.org/0000-0001-9911-593X>

### Notes

1. Some scholars have recommended against the use of the term “fake news” because of its limited conceptual scope, political connotations, and appropriation by populist actors (Wardle and Derakhshan, 2017). This study uses the term in line with Tandoc’s (2019) academic definition, which was also used in previous studies of news literacy and disinformation (Jones-Jang et al., 2019). However, the meaning of “fake news” can vary widely among individuals. Therefore, the fielded survey questions in this study used the term “false or misleading information” rather than “fake news,” which is the same approach adopted by the Reuters Digital News Report (Newman et al., 2021).
2. HKBU Fact Check: <https://factcheck.hkbu.edu.hk/home/en/>.

### References

- Altay S, Hacquin A-S and Mercier H (2020) Why do so few people share fake news? It hurts their reputation. *New Media & Society*. Epub ahead of print 24 November. DOI: 10.1177/1461444820969893.
- Amazeen MA and Bucy EP (2019) Conferring resistance to digital disinformation: the inoculating influence of procedural news knowledge. *Journal of Broadcasting & Electronic Media* 63(3): 415–432.
- Ashley S, Maksl A and Craft S (2017) News media literacy and political engagement: what’s the connection? *Journal of Media Literacy Education* 9(1): 79–98.
- Bennett WL and Livingston S (2018) The disinformation order: disruptive communication and the decline of democratic institutions. *European Journal of Communication* 33(2): 122–139.

- Brashier NM, Pennycook G, Berinsky AJ, et al. (2021) Timing matters when correcting fake news. *Proceedings of the National Academy of Sciences of the United States of America* 118(5): e2020043118.
- Cacioppo JT, Petty RE and Kao CF (1984) The efficient assessment of need for cognition. *Journal of Personality Assessment* 48(3): 306–307.
- Chan M, Lee FLF and Chen H-T (2021) Examining the roles of multi-platform social media news use, engagement, and connections with news organizations and journalists on news literacy: a comparison of seven democracies. *Digital Journalism* 9(5): 571–588.
- Chan M, Lee FLF and Chen H-T (2022) Avoid or authenticate? A multilevel cross-country analysis of the roles of fake news concern and news fatigue on news avoidance and authentication. *Digital Journalism*. Epub ahead of print March. DOI: 10.1080/21670811.2021.2016060.
- Craft S, Ashley S and Maksl A (2017) News media literacy and conspiracy theory endorsement. *Communication and the Public* 2(4): 388–401.
- Delli Carpini MX (2004) Mediating democratic engagement: the impact of communications on citizens' involvement in political and civic life. In: Kaid LL (ed.) *Handbook of Political Communication Research*. Mahwah, NJ: Lawrence Erlbaum Associates, pp. 395–434.
- Duffy A, Tandoc E and Ling R (2020) Too good to be true, too good not to share: the social utility of fake news. *Information, Communication & Society* 23(13): 1965–1979.
- Edgerly S, Mourão RR, Thorson E, et al. (2020) When do audiences verify? How perceptions about message and source influence audience verification of news headlines. *Journalism & Mass Communication Quarterly* 97(1): 52–71.
- Fleming J (2014) Media literacy, news literacy, or news appreciation? A case study of the news literacy program at Stony Brook University. *Journalism & Mass Communication Educator* 69(2): 146–165.
- Fletcher R (2018) The impact of greater news literacy. Available at: <http://www.digitalnewsreport.org/survey/2018/the-impact-of-greater-news-literacy/>
- Fletcher R and Nielsen RK (2018) Are people incidentally exposed to news on social media? A comparative analysis. *New Media & Society* 20(7): 2450–2468.
- Hameleers M (2020) Separating truth from lies: comparing the effects of news media literacy interventions and fact-checkers in response to political misinformation in the US and Netherlands. *Information, Communication & Society* 25: 110–126.
- Hargittai E and Hinnant A (2008) Digital inequality. *Communication Research* 35(5): 602–621.
- Jones-Jang SM, Mortensen T and Liu J (2019) Does media literacy help identification of fake news? Information literacy helps, but other literacies don't. *American Behavioral Scientist* 65(2): 371–388.
- Kanozia R and Arya R (2021) “Fake news,” religion, and COVID-19 vaccine hesitancy in India, Pakistan, and Bangladesh. *Media Asia* 48(4): 313–321.
- Klinger U and Svensson J (2015) The emergence of network media logic in political communication: a theoretical approach. *New Media & Society* 17(8): 1241–1257.
- Lee NM (2018) Fake news, phishing, and fraud: a call for research on digital media literacy education beyond the classroom. *Communication Education* 67(4): 460–466.
- Lins de Holanda Coelho G, Hanel PHP and Wolf LJ (2020) The very efficient assessment of need for cognition: developing a six-item version. *Assessment* 27(8): 1870–1885.
- Livingstone S (2004) Media literacy and the challenge of new information and communication technologies. *The Communication Review* 7(1): 3–14.
- Livingstone S (2014) Developing social media literacy: how children learn to interpret risky opportunities on social network sites. *Communications* 39(3): 283–303.



- Luhtala M and Whiting J (2018) *News Literacy: The Keys to Combating Fake News*. Santa Barbara, CA: ABC-CLIO.
- Maksl A, Ashley S and Craft S (2015) Measuring news media literacy. *Journal of Media Literacy Education* 6(3): 29–45.
- Metzger MJ, Flanagin AJ, Eyal K, et al. (2016) Credibility for the 21st century: integrating perspectives on source, message, and media credibility in the contemporary media environment. *Annals of the International Communication Association* 27(1): 293–335.
- Newman N, Fletcher R, Kalogeropoulos A, et al. (2018) Digital news report 2018. Available at: <https://reutersinstitute.politics.ox.ac.uk/sites/default/files/digital-news-report-2018.pdf>
- Newman N, Fletcher R, Schulz A, et al. (2021) Digital news report 2021. Available at: <https://reutersinstitute.politics.ox.ac.uk/digital-news-report/2021>
- Paisana M, Pinto-Martinho A and Cardoso G (2020) Trust and fake news: exploratory analysis of the impact of news literacy on the relationship with news content in Portugal. *Communication & Society* 33(2): 105–117.
- Rodrigues UM and Xu J (2020) Regulation of COVID-19 fake news infodemic in China and India. *Media International Australia* 177(1): 125–131.
- Siles I, Tristán L and Carazo C (2021) Populism, media, and misinformation in Latin America. In: Tumber H and Waisbord S (eds) *The Routledge Companion to Media Disinformation and Populism*. New York: Routledge, pp. 356–365.
- Swart J (2021) Tactics of news literacy: how young people access, evaluate, and engage with news on social media. *New Media & Society*. Epub ahead of print 2 May. DOI: 10.1177/14614448211011447.
- Tandoc EC (2019) The facts of fake news: a research review. *Sociology Compass* 13(9): e12724.
- Tandoc EC, Ling R, Westlund O, et al. (2018) Audiences' acts of authentication in the age of fake news: a conceptual framework. *New Media & Society* 20(8): 2745–2763.
- Vraga EK and Tully M (2019) News literacy, social media behaviors, and skepticism toward information on social media. *Information, Communication & Society* 24(2): 150–166.
- Vraga EK, Tully M, Maksl A, et al. (2021) Theorizing news literacy behaviors. *Communication Theory* 31(1): 1–21.
- Walter N, Edgerly S and Saucier CJ (2021) “Trust, then verify”: when and why people fact-check partisan information. *International Journal of Communication* 15: 4734–4754.
- Wardle C and Derakhshan H (2017) Information disorder: Toward an interdisciplinary framework for research and policymaking. Available at: <https://edoc.coe.int/en/media/7495-information-disorder-toward-an-interdisciplinary-framework-for-research-and-policy-making.html>
- Wasserman H and Madrid-Morales D (2019) An exploratory study of “fake news” and media trust in Kenya, Nigeria and South Africa. *African Journalism Studies* 40(1): 107–123.
- Weeks BE and Gil de Zúñiga H (2019) What's next? Six observations for the future of political misinformation research. *American Behavioral Scientist* 65: 277–289.
- Wenzel A (2019) To verify or to disengage: coping with “fake news” and ambiguity. *International Journal of Communication* 13: 1977–1995.

### Author biography

Michael Chan (PhD, CUHK) is an Associate Professor at the School of Journalism and Communication, Chinese University of Hong Kong. His research focuses on individuals' uses of digital technologies and subsequent political, social, and psychological outcomes.

## Appendix I

### *Fake/real news stimuli*

Each respondent was randomly assigned three real and three fake COVID-related headlines. Quotas were set so each headline was randomly shown equally across respondents.

Real COVID news headline	Fake COVID news headline
"Taiwan studies showed that Perilla tackles COVID-19 as effectively as Remdesivir."	"Drinking Japanese tea can protect against COVID."
"Airport Authority Hong Kong launched lucky draw to encourage vaccination."	"Seniors can receive HK\$200 supermarket gift voucher for COVID vaccination."
"Experts do not object to children over five years old receiving COVID-19 vaccination."	"Taiwan's epidemic commander Chen Shizhong is not allowed to build a 'square cabin hospital' because the Chinese mainland uses this name."
"Expert Committee on Covid-19 vaccination recommends booster vaccination at no later than nine months."	"A number of studies in various countries have found that the infection rate and severe rate of new coronary pneumonia are related to blood type."
"Leticia Lee was tested positive against COVID-19 after passing, suspected to have died of the disease."	"Wife of Pfizer's CEO dies after complications from the vaccine."
"The fifth wave in Japan brought adverse impacts to children's well-being."	"Covid-19 vaccinated people are more likely to contract Covid-19 than unvaccinated people."

## Appendix 2

### *News literacy items*

#### Context

1. Which of the following newspapers are considered the most pro-China?<sup>1</sup>
  - Ta Kung Pao (correct)
  - Ming Pao
  - Oriental Daily
  - Sing Tao Daily
  - Don't know
  
2. Which of the following media outlets does NOT depend primarily on advertising for financial support?<sup>1,2</sup>
  - TVB
  - RTHK (correct)

- NowTV
- CableTV
- Don't know

### Creation

3. Who has the most influence on what gets broadcasted on TV news?<sup>1</sup>

- Individual reporters
- The anchor, the person reading the news
- The cameraman
- The producer (correct)
- Don't know

4. Writing a press release is typically the job of:<sup>1,2</sup>

- A reporter for Oriental Daily
- A spokesperson for Maxims Group (correct)
- A lawyer for Toyota
- A producer for NowTV News
- Don't know

### Content

5. Coverage of election campaigns in the news media usually focuses on:<sup>1</sup>

- Which candidate winning (correct)
- In-depth analysis of where candidates stand on the issues
- The candidates' family backgrounds
- The candidates' political experience
- Don't know

6. A news anchor often invites experts to make comments on a news story in order to:<sup>3</sup>

- Get opinions that support the reporter's point of view.
- Fill in time during the news broadcast
- Help audiences understand the news story better (correct)
- All of the above
- Don't know

### Circulation

7. What usually determines what news posts appear on people's Facebook feeds?<sup>2</sup>

- It is randomly generated
- It is determined by employees who work for Facebook
- Based on the users' interests (correct)
- It is determined by the news media organizations
- Don't know

8. Many journalists use social media to:<sup>3</sup>

- Share important and timely news stories from their news organization
- Interact with readers and answer their questions
- Increase the number of followers and readers
- All of the above (correct)
- Don't know

### Consumption

9. People who watch a lot of television news often tend to think the world is:<sup>1</sup>

- More violent and dangerous than it actually is (correct)
- Less violent and dangerous than it actually is
- Just as violent and dangerous as it actually is
- Full of violence
- Don't know

10. Most people think the news has:<sup>1</sup>

- A greater effect on themselves than other people
- A greater effect on other people than themselves (correct)
- The same effect on themselves as others
- Does not have any effects on anyone
- Don't know

Sources:

<sup>1</sup>Maksl et al. (2015).

<sup>2</sup>Newman et al. (2018).

<sup>3</sup>Original measures.