

The Moderating Role of Political Ideology: Need for Cognition, Media Locus of Control, Misinformation Efficacy, and Misperceptions About COVID-19

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Along with the horrific impacts of the COVID-19 pandemic, there has been another attack alongside termed as the “infodemic.” The main purposes of the current study are to examine (1) the association between literacy variables and misperceptions about COVID-19 and (2) the moderating role of political ideology on these relationships. The findings from a survey conducted in the United States show that self-identified liberals, need for cognition, and misinformation efficacy were negatively related to misperceptions about COVID-19. Findings from Hayes’s PROCESS model 1 show meaningful moderating effects of need for cognition, media locus of control, and misinformation efficacy with political ideology. Implications are discussed.

Keywords: misinformation, COVID-19, need for cognition, media locus of control, misinformation efficacy, political ideology, survey

Along with the horrific impact of the COVID-19 pandemic, there has been another attack alongside termed as the “infodemic” (World Health Organization, 2020). Misinformation has proliferated on various social media platforms (Frenkel, Alba, & Zhong, 2020), even as some social media companies are attempting to halt the flow of misinformation regarding the COVID-19 crisis. Scientific uncertainties associated with COVID-19 and the novel nature of the pandemic fueled public anxiety and thus facilitated the spread of conspiracy theories (O’Sullivan, 2020). Multiple researchers have examined the spread of misinformation related to the COVID-19 pandemic (Bridgman et al., 2020; Ordun, Purushotham, & Raff, 2020; Schild et al., 2020). Other studies have explored factors that may facilitate or mitigate COVID-19 misperceptions including trust (Xiao, Borah, & Su, 2021), ideology (Ohme, Hameleers, Brosius, & Van der Meer, 2021; Van Stekelenburg, Schaap, Veling, & Buijzen, 2021), and media literacy (Guess et al., 2020).

Prior research has shown the importance of media literacy to fight misinformation (Craft, Ashley, & Maksl, 2013; Vraga, Bode, & Tully, 2020) including COVID-19 misperceptions (Guess et al., 2020; Xiao et al., 2021). However, multiple scholars have posited that the association between misinformation and media literacy variables is not consistent (Borah, Austin, & Su, 2022; Carlson, 2018; Waisbord, 2018a, 2018b). Moreover, studies have highlighted the role of political ideologies on misperceptions and the challenges involved in fighting misinformation (Thorson, 2016). It is possible that the inconsistency of the results is because variables related

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to media literacy may not always work similarly across ideologies, and one's confidence and understanding of the media environment may be contingent on their political ideology. Political ideology can impact how people process and understand information (Chan & Palmeira, 2021). For example, Garrett, Long, and Jeong (2019) show that "individuals' political biases color how they interpret events in the news" (p. 492).

The COVID-19 pandemic, which has been highly politicized (Green, Edgerton, Naftel, Shoub, & Cranmer, 2020; Rothgerber, Wilson, Whaley, Rosenfeld, & Humphrey, 2020), is an ideal opportunity to study the relationships between literacy variables and political ideology. To that end, a survey was conducted with participants from the United States to examine these relationships. Thus, the main purposes of the current study are to examine the association between literacy variables and misperceptions and the moderating role of political ideology on these relationships. The current study not only helps us to understand the associations among these variables but also indicates the complexity of these relationships. The results show a path to understand the mixed findings from past literature (Carlson, 2018; Waisbord, 2018a, 2018b).

Disinformation and Misinformation

Misinformation is not unique to social media platforms and has been present before the Internet. However, many social media affordances (Ridout, Fowler, Branstetter, & Borah, 2015), including the convenience of sharing information (Borah, Fowler, & Ridout, 2018) can facilitate the spread of misinformation. Freelon and Wells (2020), define misinformation as inaccurate information circulated without the "disseminators' knowledge" (p. 1). The authors define disinformation as "all forms of false, inaccurate, or misleading information designed, presented and promoted to intentionally cause public harm or for profit" (Freelon & Wells, 2020, p. 1). Moreover, misperceptions are defined as "cases in which people's beliefs about factual matters are not supported by clear evidence and expert opinion" (Nyhan & Reifler, 2010, p. 305). Scholars have examined the impact of misinformation on political outcomes (Weeks & Garrett, 2014), attitudes (Nyhan & Reifler, 2010; Thorson, 2016), and have studied the role of media literacy in fighting misperceptions (Chen, Wu, & Wang, 2011; Vraga, Bode, & Tully, 2020).

Role of Media Literacy in Fighting Misinformation

Media literacy is often considered as one of the primary means to combat misinformation (Craft et al., 2013; Guess et al., 2020). In terms of COVID-19 related misinformation, few scholars have called for literacy interventions to fight COVID-19 misinformation (Chong, Cheng, Chan, Chien, & Wong, 2020; Vraga, Tully, & Bode, 2020) while a few recent studies have examined the role of media literacy related to COVID-19 misperceptions (Austin, Austin, Willoughby, Amram, & Domgaard, 2021; Guess et al., 2020). Guess and colleagues (2020) conducted surveys across multiple countries and found that brief media literacy interventions were helpful to lower misperceptions about COVID-19. Similarly, Xiao and associates (2021) provided evidence that ability to identify misinformation lowered COVID-19 misperceptions. Moreover, Austin and colleagues (2021) demonstrated that media literacy was related to lower misinformation about COVID-19 in communities of color.

The theoretical framework for the current study is adapted from past research (Maksl, Ashley, & Craft, 2015; Potter, 2004). Media literacy has been defined and approached in manifold ways by scholars.

These approaches often tend to focus on critical thinking (Potter, 2004); conscious processing (Potter, 2004); knowledge structures (Maksl et al., 2015; Potter, 2004); analysis and evaluation (Hobbs, 2010); or the ability to produce media messages (Hobbs, 2010). Thus, there is "no single definition" of literacy (Maksl et al., 2015, p. 30), however, scholars tend to use one or a combination of the above approaches. The current study used three critical variables to tap people's literacy, need for cognition (NFC), media locus of control (MLOC), and misinformation efficacy. These three concepts to measure media literacy were adapted from past research (i.e., Maksl et al., 2015; Potter, 2004). In the current study, I adapted the media literacy variables from prior research, and included a new variable called misinformation efficacy.

Need for Cognition

Cacioppo and Petty (1982) defined NFC as "the tendency for an individual to engage in and enjoy thinking" (p. 116). Prior research (Chen & Chaiken, 1999) suggested that NFC determines individuals' reception of media messages, which can, therefore, be associated with media literacy (Cacioppo & Petty, 1982; Epstein, Pacini, Denes-Raj, & Heier, 1996). Individuals who are oriented toward NFC have the proclivity to engage in analytical processing of media messages; this cognitive process is thoughtful, conscious, intentional, systematic, and comprehensive (Epstein et al., 1996; Rozendaal, Buijzen, & Valkenburg, 2012). The systematic cognitive processes that NFC-oriented individuals often engage in would bring elaborative and contemplative critical-thinking processes, leading to stronger skepticism about news and information (e.g., Haugtvedt, Petty, & Cacioppo, 1992; Petty & Cacioppo, 1986).

Since NFC-oriented individuals are inclined toward engaging in logical and critical processing of messages, it is possible they have a stronger tendency to practice critical thinking (Cacioppo & Petty, 1982; Priester & Petty, 1995). Furthermore, NFC-oriented people process arguments by considering their strengths and engaging in more systematic processing of information (Sloman, 1996; Smith & DeCoster, 2000). In a recent experimental study, Leding and Antonio (2019) found that participants who scored high on NFC were "less susceptible to misinformation" (p. 409). These results make sense because high-NFC individuals engage in systematic processing of information. High-NFC individuals would monitor information more carefully, which would make them less vulnerable to mis- and disinformation. Based on this literature, the first hypothesis is proposed.

H1: Individuals who score high on NFC will show lower COVID-19 misperceptions.

Media Locus of Control

Besides the view that individuals have the ability to critically think about the information they consume, the perception that individuals are in control of media influence could predict misperceptions as well. MLOC is defined as "the extent to which an individual believes they control media influences" (Maksl et al., 2015, p. 33). MLOC has been developed from a general measurement of the extent to which individuals think they might be in control of their environment, called locus of control (LOC), which "refers to mastery of one's environment" (Rubin, 1993, p. 162). LOC is associated with people's perception that their behavior is under their control (Broos & Roe, 2006). LOC has been studied in many contexts. For example, researchers have found LOC is associated with people's Web activities (Hoffman et al., 2003), and

individuals who score higher on LOC actively avoided online advertisements (Walsh, 2010). The basic concept of LOC has been studied in health (Wallston, Wallston, & DeVellis, 1978) and media use (e.g., Ku et al., 2019; Maksl et al., 2015).

MLOC is an important concept in media literacy studies. Individuals would score high on MLOC when they perceived themselves as being aware of the impact of media and information they used (Maksl et al., 2015; Wallston et al., 1978). Media literacy requires understanding influence of news media, elaboration, and engagement with information, which should facilitate the lowering of misperceptions. Craft, Ashley, and Maksl (2017) demonstrated the impact of media literacy on conspiracy theory endorsement. Findings from their survey showed that greater knowledge about news media was associated with lower likelihood of endorsing conspiracy theories (Craft et al., 2017). The perceptions of having control over a situation often increases individuals' interest in a situation (Bandura, 1984). One's control over influence of media could lead individuals to pay more attention to the content and be more engaged with the information. As a result, individuals with higher MLOC might be less susceptible to misinformation. Thus, the second hypothesis is:

H2: Individuals who score high on MLOC will show lower COVID-19 misperceptions.

Misinformation Efficacy

Bandura (1984) defined self-efficacy as individuals' "beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 71). This perception of self-efficacy can determine peoples' feeling, motivation, and behavior. Abundant research has examined the antecedents and effects of self-efficacy (Bandura, 1977, 1984; Wu, 2017). Furthermore, scholars have examined political efficacy (Blais, 2010; Kenski & Stroud, 2006). Often, researchers have demonstrated that political efficacy is an antecedent of political engagement and participation (Blais, 2010; Campbell, Gurin, & Miller, 1954; Kenski & Stroud, 2006; Verba, Schlozman, & Brady, 1995). Research has shown the many positive effects of self-perceived efficacy (Abramson, 1983; Bandura, 1984; Bennett, 1986; Craig, Niemi, & Silver, 1990; Kenski & Stroud, 2006; Verba, Schlozman, & Brady, 1995).

To capture the perceptions of efficacy about misinformation, I use a new variable called misinformation efficacy in this study. Misinformation efficacy is the perception that individuals can decipher false information from real news. The variable is adapted from a wide range of research on self-efficacy (Bandura, 1984), political efficacy (Verba, Schlozman, & Brady, 1995), as well as misinformation (Schmeichel et al., 2018). The basic concept is that those individuals who are confident about their ability to determine whether a piece of information is false or true, will be less susceptible to COVID-19 related misinformation. Thus, the next hypothesis proposed is:

H3: Individuals who score high on misinformation efficacy will show lower COVID-19 misperceptions.

Political Ideology as a Moderator

The COVID-19 pandemic has become a deeply politicized issue in the United States (Green et al., 2020; Rothgerber et al., 2020). In a recent study, Green and colleagues (2020) examined message cues from

members of the U.S. House and Senate. They found that liberals emphasized public health threats and COVID-19 while their conservative counterparts primarily talked about China and the economy (Green et al., 2020). Conservatives are skeptical about the pandemic and are more likely to believe that the COVID-19 situation has been exaggerated (Ritter, 2020). Given the political nature of the COVID-19 pandemic, political ideology of participants could be an important moderator for understanding predictors of misperceptions of the pandemic.

Prior research has indeed shown that political ideology can play an important role (e.g., Reedy et al., 2014). Reedy and associates (2014) found that voters' political orientations were related to distorted beliefs, and these beliefs influenced individuals' voting decisions. Past research shows that several psychological variables can predict political orientations (Federico & Goren, 2009; Jost, Glaser, Kruglanski, & Sulloway, 2003). On one hand, need for closure and intolerance of ambiguity are positively associated with conservatism. On the other, openness to experience and tolerance of uncertainty are negatively associated with conservatism (Jost et al., 2003). Moreover, liberals show higher tolerance to complexity, and they show more openness to new experiences (Amodio, Jost, Master, & Yee, 2007). Research has also shown the difference between conservatives and liberals in terms of spreading misinformation. Conservatives are found to spread misinformation at a higher level than liberals (e.g., Benkler, Faris, Roberts, & Zuckerman, 2017; Marwick & Lewis, 2017). Past research has also shown that political ideology can impact individuals' information processing (Chan & Palmeira, 2021; Jost et al., 2003). People may construct a reality, based on where they situate themselves in the ideological spectrum (Federico & Goren, 2009). As a result, political ideology can affect information processing as well as impact perceptions (Amodio et al., 2007; Federico & Goren, 2009).

Motivated reasoning is often used as a theoretical framework to understand the influence of political ideology on individuals' opinion formation (Bolsen, Druckman, & Cook, 2014; Leeper & Slothuus, 2014). Motivated reasoning is defined as a person's "goal in the context of forming an attitude" (Bolsen et al., 2014, p. 236). In general, there are two primary motivations in information processing and opinion formation: Directional and accuracy goals (Taber & Lodge, 2006). A directional goal refers to an individual's motivation to arrive at a specific conclusion. For example, Taber and Lodge (2006) explains how people can be motivated to arrive at a conclusion consistent with their political ideology and partisan identity. Due to directionally motivated reasoning, people seek information that is congruent with their views, as well as dismiss information that is not aligned with their preexisting attitudes. They consider information consistent with their views as accurate and credible (i.e., Druckman, Peterson, & Slothuus, 2013; Kunda, 1990; Lodge & Taber, 2005; Taber & Lodge, 2006). This politically motivated reasoning could be quite potent in misperceptions formation.

Thus, political ideology can moderate the relationships between the predictor variables and COVID-19 misperceptions. For example, in case of MLOC, motivated reasoning may play a pivotal role. People may think they have control over the news media they consume. However, if they trust news outlets that spread misinformation, being literate about the media may not be enough. Based on this literature and theoretical concepts a research question is proposed to examine the relationships among the literacy variables and political ideology.

RQ1: Will political ideology moderate the relationship between media literacy variables and COVID-19 misperceptions?

The Conceptual Model

The conceptual model is presented in Figure 1. As discussed earlier, prior research has shown the importance of media literacy in combating misinformation (Craft et al., 2013; Guess et al., 2020). Individuals with higher NFC, who are more likely to engage in thoughtful processing of information, are less susceptible to misinformation (e.g., Leding & Antonio, 2019). Moreover, efficacy or the perception of having control over a situation helps individuals to be deeply interested and engrossed in a situation (Bandura, 1984); this in turn could mean individuals with higher perceptions of control and efficacy may also be less susceptible to misinformation. Adapted from past research (i.e., Maksl et al., 2015; Potter, 2004) three literacy related variables NFC, MLOC, and misinformation efficacy were considered important predictors for examining misperceptions about COVID-19.

However, many scholars highlight that literacy might not always be enough or successful in fighting misinformation (Bennett & Livingston, 2018; Carlson, 2018; Waisbord, 2018a, 2018b; Wenzel, 2020) as there are systemic cultural and political issues. Bennett and Livingston (2018) state that fighting misinformation “requires more than just fact-checking . . . goes to deeper issues of repairing political institutions” (p. 124). Similarly, scholars (Nyhan & Reifler, 2010; Thorson, 2016) provide evidence about the importance of political attitudes and how these ideologies could challenge efforts to address misinformation. Thus, using theoretical concepts from literacy and motivated reasoning the current study examines not only the role of media literacy variables but also the moderating role of political ideology to examine the nuances and complexities of these relationships.

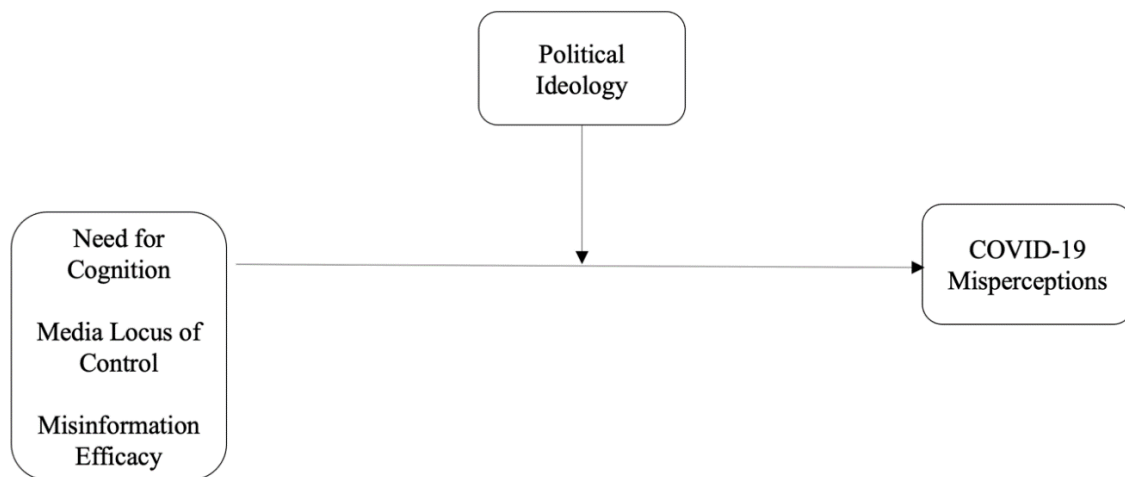


Figure 1. Conceptual figure showing the relationship between the literacy variables and the moderating role of political ideology.

Methods

Data for the study were collected through an online survey after a certificate of exemption was granted by the Institutional Review Board in a large research university in the United States. The participants were recruited from Amazon's MTurk in April 2020. A total of 797 participants were recruited. Participants completed the survey via the Qualtrics software. The average age of participants was 38.40 years (41.2% female; 30.8% Republican). The participants were compensated with \$1.50. There were attention-check questions built into the survey, to avoid people who did not pay attention to the questions. Participants who failed those tests were automatically excluded by the Qualtrics software.

Researchers are increasingly using MTurk data (Berinsky, Huber, & Lenz, 2012; Dworkin, Hessel, Gliske, & Rudi, 2016). Dworkin and associates (2016) state that, among the many advantages of using MTurk, one is that the platform produces a "demographically diverse sample, in a short period of time, with little cost" (p. 1). However, there are other scholars (i.e., Shaw & Hargittai, 2021) who have highlighted problems with MTurk data. Shaw and Hargittai (2021) showed that MTurk participants are heavier users of social media compared with a national U.S. sample. Since the current article included the participants' social media news use as a variable, it was important to compare the current data with a national sample. Pew data from 2020 (Shearer & Mitchell, 2021) show that 53% of U.S. adults get their news from social media "often" or "sometimes." In the current study, 51.4% of participants reported getting news from social media. These are participants who "somewhat agree," "agree," and "strongly agree" to the statement "I get most of my news and information through social media sites." This comparison shows that in the current study, the use of social media for news variable was highly comparable with national U.S. data.

Measures

COVID-19 Misperceptions

Misperceptions (e.g., Vraga & Bode, 2017) were captured by asking participants to respond to five items on a 7-point Likert scale (from 0 = strongly disagree to 6 = strongly agree). The five items used were "It was Bill Gates who created the Coronavirus, he financed a lab that created the virus in the first place"; "The Pope has coronavirus"; "Hair weaves (artificial hair) from China are contaminated with the virus"; "Air purifiers can protect people from spreading the virus"; and "The origin of the virus is from a bat soup that was consumed in China." These items were used to create an index ($\alpha = .88$, $M = 2.67$, $SD = 1.35$). The M and SD of each of the five items can be viewed in Appendix 1: <https://www.dropbox.com/scl/fo/r9qui1i8u85t9sziftrhb/h?dl=0&rlkey=dsa6ddezui1v8tsin95jluuzy>. Higher number means higher misperceptions. These items were chosen because they were commonly covered during the time of data collection in the news media and were circulated on social media (Funke, 2020; Gilbert, 2020; Lytvynenko, 2020; Palmer, 2020; Putterman, 2020).

Need for Cognition¹

NFC (e.g., Cacioppo & Petty, 1982; Leding & Antonio, 2019) was measured using six items on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). Participants were asked to respond to "I prefer complex to simple problems"; "I really enjoy a task that involves coming up with new solutions to problems"; "I enjoy thinking about an issue even when it will not affect the outcome"; "I don't like to have to do a lot of thinking"; "I try to avoid situations that require thinking in depth about something"; and "Thinking hard and for a long time about something gives me little satisfaction." The six items were used to create an index ($\alpha = .88$, $M = 4.74$, $SD = 1.35$). The last three items were reverse coded.

Media Locus of Control

MLOC (e.g., Ku et al., 2019; Maksl et al., 2015) was measured using four items on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). Participants were asked to respond to "I am in control of the information I get from the news media"; "If I pay attention to different sources of news, I can avoid being misinformed"; "If I am misinformed by the news media, it is my own behavior that determines how soon I will learn credible information"; and "When I am misinformed by the news media, I am to blame." These five items were used to create an index ($\alpha = .74$, $M = 4.79$, $SD = 1.03$).

Misinformation Efficacy

Misinformation efficacy was measured with three items on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). These items were adapted from research on made-up news (Mitchell et al., 2019), news media literacy (Schmeichel et al., 2018), and misinformation literacy (Xiao et al., 2021). Participants were asked to respond to "Generally, I am able to discern misinformation from real news"; "Most of the times, when I see misinformation, I am able to detect them easily"; and "It is very unlikely that a piece of misinformation can mislead me." The three items were used to create an index ($\alpha = .75$, $M = 4.36$, $SD = 1.03$).

Political Ideology

Political ideology was measured by asking participants where they considered themselves on a 7-point scale, from (1) very conservative to (7) very liberal ($M = 4.34$, $SD = 1.94$).

Controls

Three common variables were included as controls. They were gender, age, and political interest. Gender was measured with a single item asking participants to identify their gender (41.2% female). Age was measured by asking participants to write down their age. The average age of the participants was 38.40

¹ A factor analysis was conducted with all the items for NFC, MLOC, and misinformation efficacy. The results showed that there were three distinct components.

years. Political interest was measured with a single item on a 4-point scale (from 1 = very interested to 4 = not at all interested), by asking participants how interested they were in politics ($M = 1.79$, $SD = .76$).

Besides the demographic variables, two variables related to information gathering were also added as controls. News and information consumption play a crucial role in political and social life (Gans, 2004; Luhmann, 2000). The traditional media of the latter half of the twentieth century was represented by television, radio, and print media, which were then advanced toward 24/7 cable television as well as websites in the mid-1990s (Luhmann, 2000). In the current media ecology, social media has already surpassed traditional media as sources of news consumption in the United States (Shearer, 2018). Mainstream media sources such as newspapers and television are no longer the only sources of information. Different from traditional news media, on social media everyone can share information, resulting in a large amount of news offered every second (Rajendran & Thesinghraj, 2014). As such, the proportion of people who have higher preference to seek news using social media has been growing continuously. For this current study, two variables were added to examine participants' information-gathering habits.

Mainstream Media Use

Mainstream media use was tapped using one item. Participants were asked to respond to the item: "I get most of my news and information through mainstream media sites" ($M = 4.93$, $SD = 1.59$). Participants were asked to respond on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree).

Social Media News Use

Social media news use was captured with four items. Participants were asked to respond on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree) to "I get most of my news and information through social media sites"; "I get most of my news and information through Facebook"; "I get most of my news and information through Twitter"; and "I get most of my news and information through Reddit." These items were used to create an index ($\alpha = .79$, $M = 3.46$, $SD = 1.60$).

Results

Analysis Strategy

To test the hypotheses and answer the research question, a hierarchical multiple regression analysis was conducted. The regression model was conducted to test the overall associations among the variables of interest. Next, the moderation analysis was conducted using Hayes's PROCESS macro (model 1; Hayes, 2013). In each of the PROCESS models the five control variables were also added.

Regression Analysis

In the first block, the control variables and political ideology were added. Among the control variables, social media news use was positively related to misperceptions about COVID-19 ($B = .36$, $p < .001$). Moreover, political ideology ($B = -.26$, $p < .001$) was significant such that conservatives

showed higher misperceptions about COVID-19. The second block consisted of three variables. Among these, NFC was negatively ($B = -.16, p < .001$) related to misperceptions about COVID-19, supporting H1. MLOC was positively ($B = .10, p < .01$) associated with misperceptions about COVID-19. The relationship between MLOC and misperceptions about COVID-19 was in the opposite direction of what was hypothesized in H2. Next, misinformation efficacy was negatively ($B = -.08, p < .01$) related to misperceptions about COVID-19, supporting H3 (Table 1). The regression model shows that the variables explained 32.1% of the total variance.

Table 1. OLS Regression Model Predicting Misperceptions About COVID-19.

COVID-19 Misperceptions				
Variables	<i>b</i>	<i>SE</i>	β	<i>t Value</i>
<i>Step 1</i>				
Age	-.001	.004	-.012	-.358
Gender	-.072	.086	-.026	-.840
Political interest	.108	.056	.062	1.930
Mainstream media use	.012	.027	.014	.439
Social media news use	.341***	.029	.405***	11.732
Political ideology	-.199***	.022	-.287***	-9.044
ΔR^2	29.0%			
<i>F for R²</i>	50.993***			
<i>Step 2</i>				
Age	-.002	.004	-.017	-.488
Gender	-.103	.085	-.038	-1.216
Political ideology	-.183***	.022	-.263***	-8.365
Political interest	.040	.058	.023	.685
Mainstream media use	.010	.026	.011	.364
Social media news use	.305***	.029	.361***	10.389
NFC	-.158***	.033	-.159***	-4.800
MLOC	.133**	.046	.101**	2.910
Misinformation efficacy	-.101**	.044	-.078**	-2.270
ΔR^2	3.1%			
<i>F for R²</i>	39.117***			
<i>Total R²</i>	32.1%			
<i>N</i>	797			

* $p < .05$; ** $p < .01$; *** $p < .001$.

Moderation Analysis

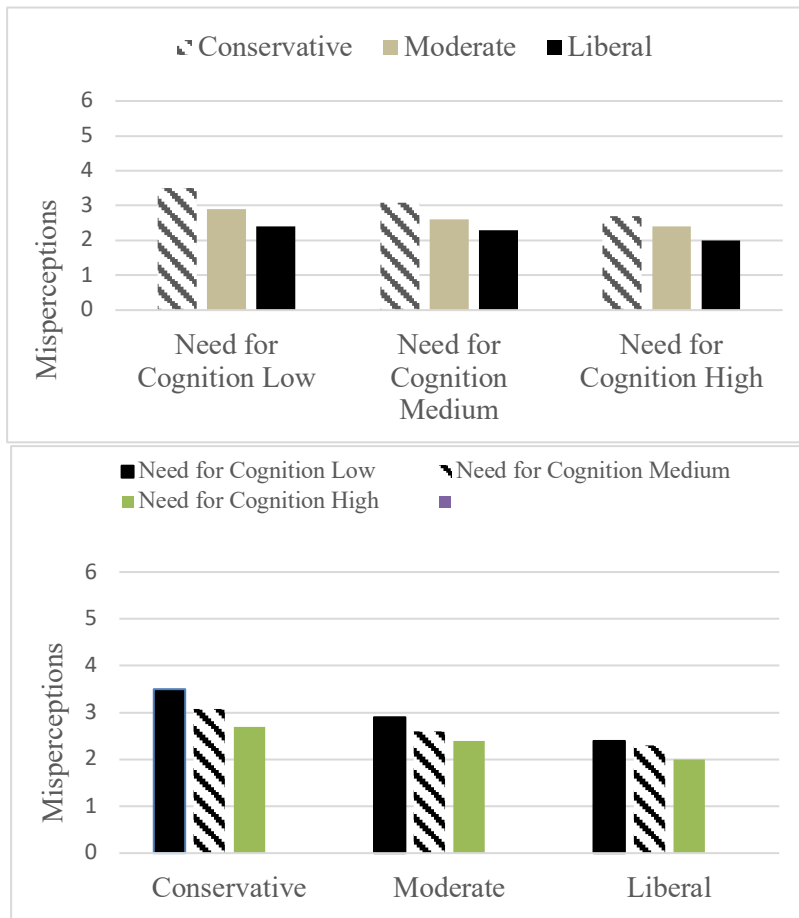
Three separate PROCESS moderation models (Table 2) were tested to examine the relationship between (1) NFC and political ideology, (2) MLOC and political ideology, and (3) misinformation efficacy and political ideology on misperceptions about COVID-19. In the NFC model, the only control variable

that was significant was social media news use [$b = .33, t(756) = 11.29, p < .001$]. The overall model for NFC was significant [$F(3, 756) = 40.79, p < .001, R^2 = .30$], as well as the interaction between NFC and political ideology [$b = .03, t(756) = 2.06, p < .01$]. The conditional effects of political ideology on NFC for individuals' misperceptions about COVID-19 were stronger for participants' political ideology by 1 SD above the M [$b = -.10, t(756) = -2.22, p < .001$] compared with those at the M [$b = -.16, t(756) = -4.80, p < .001$] and below the M [$b = -.22, t(756) = -4.83, p < .001$]. Specifically, the interaction pattern showed that conservatives held the highest misinformation perception about COVID-19, followed by centrists and liberals. For all three groups, misperceptions about COVID-19 were lowest when NFC was high (Figures 2a and 2b).

Table 2. Conditional Effects of Political Ideology and the Literacy Variables on Misperceptions About COVID-19.

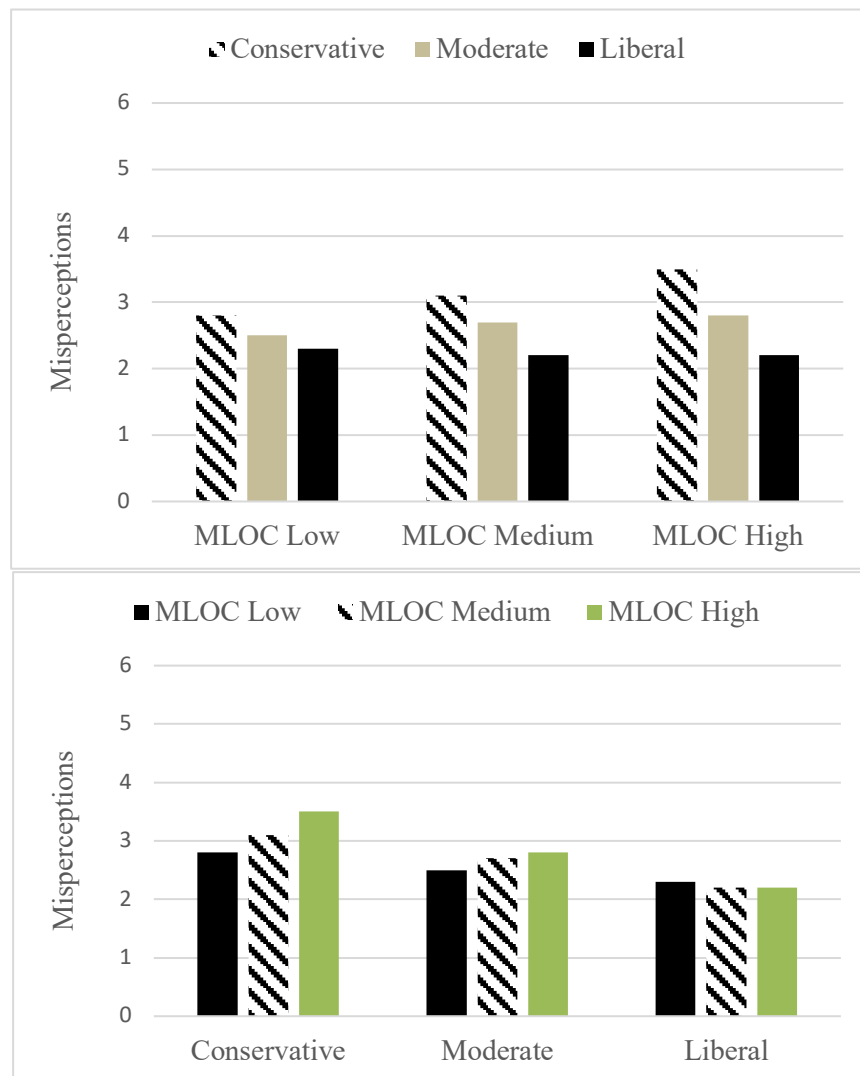
	Political Ideology	<i>t Value</i>	LLCI	ULCI
NFC	-1 SD	-5.71***	-.3699	-.1807
	<i>M</i>	-6.31***	-.2784	-.1464
	+ 1 SD	-3.34***	-.2374	-.0615
MLOC	- 1 SD	5.10***	.1984	.4464
	<i>M</i>	-3.37***	.0620	.2351
	+1 SD	-.44	-.1366	.0862
Misinformation efficacy	-1 SD	-.49	-.1534	.0926
	<i>M</i>	-2.60**	-.2003	-.0277
	+1 SD	-3.35***	-.3136	-.0817

* $p < .05$; ** $p < .01$; *** $p < .001$.



Figures 2a and 2b. Interaction effects between need for cognition and political ideology on misperceptions about COVID-19.

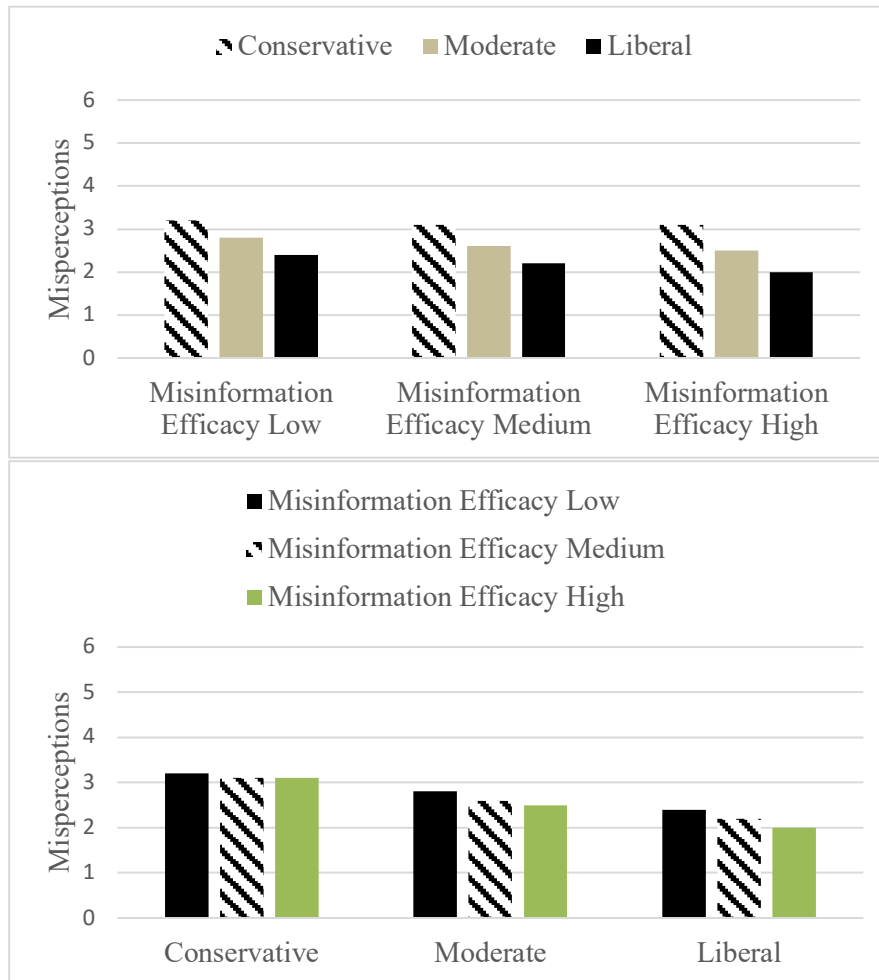
Next, the findings from a second PROCESS moderation model showed significant interaction between MLOC and political ideology. Among the control variables, social media news use [$b = .34, t(756) = 11.37, p < .001$] and political interest [$b = .12, t(756) = 2.04, p < .05$] were significant. Both the overall model [$F(3, 756) = 39.12, p < .001, R^2 = .30$] and the interaction between MLOC and political ideology [$b = -.06, t(756) = -3.43, p < .001$] were significant. The conditional effects of political ideology on MLOC for individuals' misperceptions about COVID-19 were lower for participants' political ideology 1 SD above the M [$b = -.02, t(756) = -.35, p = .72$] compared with those at the M [$b = -.11, t(756) = 2.62, p < .002$] and below the M [$b = .24, t(756) = 4.02, p < .001$]. Specifically, the interaction showed that for self-identified liberals, MLOC did not matter much; their misperceptions about COVID-19 were lower irrespective of MLOC levels. However, self-identified conservatives' misinformation perception about COVID-19 increased when individuals' MLOC scores were higher (Figures 3a and 3b).



Figures 3a and 3b. Interaction effects between media locus of control and political ideology on misperceptions about COVID-19.

Finally, the findings from a third PROCESS moderation model showed significant interaction between misinformation efficacy and political ideology. Among the control variables, social media news use [$b = .35, t(756) = 11.69, p < .001$] was significant. The overall model [$F(3, 756) = 53.40, p < .001, R^2 = .29$] and the interaction between misinformation efficacy and political ideology [$b = -.03, t(756) = -1.63, p < .01$]. The conditional effects of political ideology on misinformation efficacy for individuals' misperceptions about COVID-19 were higher for participants' political ideology 1 SD above the M [$b = -.20, t(760) = -3.35, p < .001$] compared with those at the M [$b = -.11, t(760) = -2.60, p < .01$] and below the M [$b = -.03, t(760) = -.49, p = .63$]. Specifically, the interaction shows that for self-identified liberals,

higher misinformation efficacy was related to lower misperceptions about COVID-19. However, for self-identified conservatives, the difference was not significant (Figures 4a and 4b).



Figures 4a and 4b. Interaction effects between misinformation efficacy and political ideology on misperceptions about COVID-19.

Discussion

The current study used survey data to understand the role of literacy related variables to predict misperceptions about COVID-19. The findings show that self-identified liberals, NFC, and misinformation efficacy were negatively related to misperceptions about COVID-19. On the other hand, social media use and MLOC were positively related to misperceptions about the pandemic. The finding that conservatives showed higher misperceptions about COVID-19 is in line with recent studies (Van Stekelenburg et al., 2021). Motivated reasoning could be a possible explanation for this finding. People often believe information that

aligns with their attitudinal predispositions (e.g., Kunda, 1990) and dismiss information that is not congruent with their attitudes and beliefs (Druckman et al., 2013; Kunda, 1990; Lodge & Taber, 2005; Taber & Lodge, 2006). In case of COVID-19 misperceptions, there is a clear partisan gap. In general, conservatives are skeptical and believe that the impact of the pandemic is exaggerated (Ritter, 2020). Multiple Republican politicians, including former president Trump, floated conspiracy theories, including some about the origin of the virus (Pengelly, 2020). Furthermore, social media news use was positively associated with misperceptions. This is in line with past research (i.e., Allington, Duffy, Wessely, Dhavan, & Rubin, 2020; Bridgman et al., 2020). Social media platforms lack an efficient fact-checking system, and these platforms do not have an adequate gatekeeping process (Westerman, Spence, & Van Der Heide, 2014). Social media affordances, such as sharing, also may often increase the spread of misinformation on these platforms.

As proposed in H1, findings show a negative NFC relationship with misperceptions. Individuals high on NFC engage in elaborative critical thinking (Petty & Cacioppo, 1986). It is not surprising that these individuals are less likely to believe false information. The additional interaction effects show that high-NFC individuals had lower misperceptions for both liberals and conservatives although conservatives continued to hold higher misperceptions than liberals did even when they scored high on NFC. Conservatives in general hold higher misperceptions (e.g., Benkler et al., 2017; Garrett & Bond, 2021; Marwick & Lewis, 2017), which is also evident in the current study. As a result, conservatives with low, moderate, and high NFC yielded higher COVID-19 misperceptions than liberals in general. But it is important to note that within conservatives, those who scored high on NFC showed less misperceptions. These results also demonstrate that the difference in misperceptions among high-NFC and low-NFC participants was most pronounced among the conservatives. The level of misperceptions among liberals was generally low, and so the difference in misperceptions among low-NFC and high-NFC liberal participants was not very prominent. While NFC helped to decrease misinformation across conservatives and liberals, it made a bigger difference among conservatives.

Contrary to the H2, MLOC was positively related to misperceptions about COVID-19. This relationship became clear in the results revealed by the interaction effects. The findings show that the relationship was driven by conservatives. MLOC did not matter much for the liberals; however, for conservatives, individuals with higher MLOC held higher misperceptions about COVID-19. This is a very significant finding since prior research on MLOC (Craft et al., 2017) and on LOC (Walsh, 2010) seem to indicate that greater perception of control over the media would be associated with lower misperceptions. However, the current findings reveal the nuances of this relationship since individuals' perceptions of control over media content do not necessarily take into account the kind of media they consume. At least in terms of COVID-19, the partisan nature of the issue might be the reason for these results. Conservatives, who get their information from and trust conservative news sources (e.g., Breitbart News, Fox), might perceive that they are in control of media sources. But the information from some of these conservative sources have amplified false information about the pandemic (Diamond, 2020; Ingraham, 2020; Jamieson & Albarracin, 2020).

Moreover, politically motivated reasoning can also accelerate the process (Bolsen et al., 2014; Leeper & Slothuus, 2014). Individuals could be motivated to arrive at certain conclusions that are consistent with their predispositions (Taber & Lodge, 2006). Conservatives who hold misperceptions

about COVID-19 may consider themselves media literate, but they may still participate in motivated reasoning while processing information. In general, because of motivated reasoning, people will consider information that aligns with their views as accurate (Druckman et al., 2013; Kunda, 1990; Lodge & Taber, 2005; Taber & Lodge, 2006). As a result, the confidence that one is media literate may not always be helpful in combating misperceptions. This is specifically complicated in a situation such as the COVID-19 pandemic, which is highly political in the United States.

The interaction patterns also indicated that conservatives with low MLOC showed lower misperceptions compared with conservatives with moderate MLOC and high MLOC. It is possible that conservative individuals who follow conservative media channels and are confident about their control over media content are more susceptible to misinformation. Kuklinski, Quirk, Jerit, Schwieder, and Rich (2000) posit that misinformation occurs when "people hold inaccurate beliefs, and do so confidently" (p. 792). This sense of confidence and control may mean that these individuals may strongly believe in the misinformation, and will not change their minds easily. The findings from the current study reveal another important factor: MLOC may work well for some but not for those who already have high misperceptions, MLOC may not work for those who follow news media that may reinforce their misperceptions. As a result, we see that conservatives who score high on MLOC also score high on misperceptions.

With regard to misinformation efficacy, liberals and centrists who scored higher on misinformation efficacy held lower misperceptions about the pandemic. But higher misinformation efficacy was associated with lower COVID-19 misperceptions in the case of conservatives. For conservatives, even if they are confident that they can detect misinformation, it may not help as they hold higher misperceptions. To make it worse, these misperceptions may be reinforced if they follow certain news media channels (Marwick & Lewis, 2017). These findings are similar to findings on MLOC, and they indicate that fighting misinformation is complex, to say the least. The findings show that media literacy related variables can be important for fighting misinformation, however, it does not work for everyone. Political ideology plays an outsized role in these associations, which is in line with prior research (Thorson, 2016; Waisbord, 2018a, 2018b).

These findings reveal that different variables within media literacy may have specific impact on individuals. As explained earlier, NFC, MLOC, and misinformation efficacy tap into different characteristics of literacy adapted from past research (i.e., Maksl et al., 2015; Potter, 2004). Taking these three variables into consideration, we see that the findings do not necessarily complement each other. NFC is beneficial for both liberals and conservatives, and liberals with higher NFC had the lowest misperceptions. On the other hand, MLOC is mostly harmful for conservatives, such that conservatives with higher MLOC held higher misperceptions. Misinformation efficacy benefitted liberals and centrists but not conservatives. Thus, there are two main takeaways from these findings: First, media literacy may not impact everyone similarly, as seen in the difference between conservatives and liberals. Second, different factors within media literacy may not benefit everyone similarly. In other words, media literacy relates differently to misbeliefs about COVID-19, depending on where people stand politically.

The findings are not all bad news. The results show that cognitive elaboration and an understanding of misinformation will be helpful to decrease misinformation. Misinformation literacy needs attention from

educators at the middle school and high-school level. If misinformation literacy becomes part of the school curriculum, children will grow up more confident about the information ecology and the abundance of false information online. Also, literacy education at a younger age may be able to overcome some of the impact of political attitudes. Although the findings can only be associated with the political nature of the pandemic, the results show that educators, journalists, and organizations designing messages to combat misinformation need to keep in mind the political nature of many issues such as the current pandemic or climate change. Politicians may also find these findings useful, and can attempt to engage with voters more meaningfully.

This research comes with some caveats. Although participants from MTurk are more generally accepted now (Berinsky et al., 2012; Dworkin et al., 2016), conducting this research with a more generalizable population will be important for future studies. These findings are also from a cross-sectional survey. Therefore, the results from the current study should be interpreted with caution. Future research should test these research questions with methods such as panel surveys and experiments to examine the causality of these relationships. Moreover, the data for this study were collected during the beginning of the pandemic. The COVID-19 situation has been a dynamic one. Future research should take a longitudinal approach to better understand these relationships. The mainstream media variable is a single-item measure, which could be a reason for the nonsignificant findings. Future research should include better measures of mainstream media to understand differences within mainstream media organizations. The media literacy variables did not include any knowledge structure measures (Potter, 2004). Future research should add the measurement of participant's knowledge about the media, and also pay attention to different types of literacy and examine what features may help in the fight against fake information. The misperceptions questions used a Likert scale consistent with past research (e.g., Vraga & Bode, 2017). However, future research may benefit from using a True/False measurement with a "don't know" option for capturing misperceptions.

Despite some of these limitations, the current study reports findings that are not only critical for understanding the role of media literacy variables but also useful in revealing the challenges involved in fighting misinformation. These findings are a preliminary step to comprehend the different layers of how political ideology can condition the impact of media literacy variables. The findings reveal that perhaps the question for future research is not whether media literacy helps to alleviate misperceptions, but to probe under what conditions media literacy can help. Understanding those nuances will help educators and organizations to design effective literacy education curriculum and interventions.

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