Research Article

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Credibility in the time of COVID-19: Cues that audiences look for when assessing information on social media and building confidence in identifying 'fake news' about the virus

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Abstract: Navigating the COVID-19 pandemic has included parsing an overwhelming amount of information—much of it online. Many Americans have seen information on social media that they find confusing (Mitchell, Oliphant & Shearer, 2020) and recent research has found that social media use may contribute to greater likelihoods of believing misinformation about the virus and sharing 'fake news' about it (Su, 2021; Pennycook et al., 2020). Using a survey of U.S. adults, this research determined which social media platforms Americans rely on most when they search for information about COVID-19: Facebook, YouTube and Twitter. The present study also identified the credibility cues that people look to as they are trying to ascertain the veracity of COVID-19 information they come across on social media and that are predictors of helping them feel more confident in their own ability to identify credible information. Those significant cues—believability, authenticity, trustworthiness, reliability and objectivity—confirm previous research by Appelman and Sundar (2016) and Tandoc et al. (2018b). Educators, public health officials, and journalists are among the professionals who can use these findings to create more effective messages designed to assist people in making better health decisions.

Keywords: credibility; misinformation; confidence; COVID-19; social media.

1 Introduction

The COVID-19 pandemic has generated widespread crises, fueling anxiety as the public navigates a barrage of information on social media. Most Americans report they have seen made-up news and information that causes confusion about COVID-19 (Mitchell, Oliphant & Shearer, 2020), which is especially problematic as the U.S. accounted for the highest cumulative totals of confirmed COVID-19 cases and deaths as of March 2022 (WHO, 2022).

Americans get information about the pandemic from a variety of sources, with social media playing a significant role as they seek to learn more about the deadly virus and protect themselves (Jurkowitz & Mitchell, 2020). Of notable concern is recent research that indicates links between social media use and believing misinformation about COVID-19 (Su, 2021; Baum et al., 2020) as well as sharing 'fake news' about the virus on social media platforms (Pennycook et al., 2020). It is clear that people are struggling to determine what is credible information, and what is not.

This study examines the characteristics of message credibility developed by Appelman and Sundar (2016), as well as other credibility cues theorized by Tandoc and colleagues (2018b), to discern which elements people rely upon as

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signals of valid data—and how those perceptions affect individuals' confidence in their own ability to identify credible information about COVID-19 on social media.

Understanding the credibility factors that influence assessments of COVID-19 information on social media platforms helps professionals in education, public health, journalism and other fields to more effectively educate citizens as they struggle to make sense of the world during this pandemic and potentially during future public health threats. Additionally, people who can effectively judge the credibility of COVID-19 information will feel more confident in their subsequent assessments, which can in turn lead to making better decisions about health behaviors.

The present study found that two of the three strongest indicators of message credibility identified by Appelman and Sundar (2016)—believability and authenticity—were significant predictors of having confidence in one's ability to recognize credible information about COVID-19 on social media. Additionally, two of the source credibility measures—trustworthiness and reliability—were similarly predictive, as was the credibility cue of objectivity. The findings also confirmed the three social media sites used most often when people search for information about the virus: Facebook, YouTube and Twitter.

With social media platforms among the top ways that people get information about COVID-19, being able to accurately assess the credibility of messages on those sites and feeling confident in your ability to make those judgments is crucial to the wellbeing of yourself and others in your life. The creators of COVID-19 information must understand how to effectively communicate credibility through the framing of their messages, and this research helps to move knowledge forward in that regard.

2 Acknowledging social media's role in spreading COVID-19 information

Nearly 80 percent of Americans have social media accounts, with Facebook and YouTube as their most heavily used platforms (Tankovska, 2021). More than half of U.S. adults (53%) get news from social media on a fairly regular basis across a variety of sites (Shearer & Mitchell, 2021). Prior to the start of the pandemic, Americans were, on the whole, confident in their ability to find information they needed and to identify information they classified as 'fake news' (Basol, Roozenbeek, & van der Linden, 2020; Nielsen & Graves, 2017; Sharma et al., 2019).

During the COVID-19 outbreak, they continued to rely on the internet as a steady source of data. A majority of Americans (70%) said they had searched online for information about the pandemic in the first few weeks of its spread in the U.S., and more than half that number (37%) had shared posts about it on social media (Anderson & Vogels, 2020). Social media users were particularly likely to report following news and information about the pandemic: In one Pew Research Center survey, four-fifths (80%) of social media users were seeking out details about COVID-19 (Jurkowitz & Mitchell, 2020).

However, the information Americans and others around the world were finding about COVID-19 wasn't always reliable. Many adults in the U.S. believe they have come across information about the virus that was not accurate and felt confused about what to believe (Mitchell, Oliphant & Shearer, 2020). Social media has been a particularly intense arena for misinformation to spread. In March 2020 alone, Facebook reported it had put misinformation warnings on 40 million posts (Rosen, 2020). In April 2020, the platform flagged 50 million posts and began notifying people who had interacted with those posts by liking or commenting on the posts before they were removed by Facebook for violating its policy on misinformation. Like Facebook, YouTube (2021) removes content that violates its misinformation policies and allows users to flag questionable content. Since February 2020, YouTube has removed more than 500,000 videos with misleading content about COVID-19 (Nieva, 2021).

During the early months of the pandemic's spread in the U.S., Twitter addressed posts that contained potential misinformation by adding a label with links to help people get facts about COVID-19 (Roth & Pickles, 2020). In some cases, warnings were placed on top of tweets before people could view them to notify the users that the message conflicts with data from public health officials. Since March 2020, Twitter has removed about 8,500 tweets with misleading messages and challenged 11.5 million accounts. Still, Twitter has struggled with how to handle users like then-U.S. President Donald Trump who posted tweets touting COVID-19 treatments that were ineffective and contributed to the mistrust of public health advice (Rosenberg, Syed & Rezaie, 2020). In early 2022, Twitter suspended the personal account of U.S. Rep. Marjorie Taylor Greene (R-Georgia) because she had repeatedly violated its COVID-19 misinformation policies

(Alba, 2022). The proliferation of misinformation about COVID-19 led scholars like Young et al. (2020) to declare that it had exacerbated the crisis and become a "misinfomedic" (p. 514). To begin to ameliorate this situation, an important first step is to consider where people go online when they are looking for pandemic information.

3 Looking to credibility cues in COVID-19 information

Correctly assessing the credibility of information about COVID-19 can be an arduous and daunting task, given the overwhelming spread of the virus, the proliferation of data and opinions about it, and reports that seem to contradict each other at times. Unlike other forms of 'fake news,' misinformation about the pandemic may "literally be a matter of life and death" as people attempt to parse legitimate data from material that may be misleading, miscontextualized, or outright fabricated (Pennycook et al., 2020, p. 777).

Scholars Appelman and Sundar (2016) defined message credibility as "an individual's judgment of the veracity of the content of communication" (p. 63), and they identified characteristics of credible messages through experiments that were grounded in the findings of previous research across the social sciences. Through their research on perceptions of credibility, Appelman and Sundar (2016) determined there are two distinct paths whose features converge to constitute message credibility. In one path, determining credibility is focused on the content of the message itself. They tested formative indicators of content credibility that center on judgments about the quality and fairness of the information, specifically whether the information appears complete, concise, consistent, well-presented, objective, representative, believable, authentic, accurate, and professional, as well uses expert sources and no 'spin,' and has an impact for the people affected. Appelman and Sundar (2016) concluded that the strongest measures of content credibility are accuracy, authenticity and believability. Additionally, other research suggests that confirmation bias should be considered in examinations of information credibility because individuals tend to gravitate toward content that reinforces what they already believe to be true and they will place greater weight on messages they see as representing the 'truth' (Westerwick, Johnson, & Knobloch-Westerwick, 2017; Winter, Metzger, & Flanagin, 2017). In particular, Brumette et al. (2018) warned that social media platforms can become online echo chambers because users, through their choices of whom to follow, are repeatedly exposed to messages that label opposing views as 'fake news' regardless of whether they contain actual misinformation. Previous research (e.g. Mourao & Robertson, 2019; Tong, Gill, Li, Valenzuela & Rojas, 2020; Van Duyn & Collier, 2019) has identified political ideology as strongly tied to confirmation bias at either end of the liberal-conservative spectrum. Kaye & Johnson (2016) found that news consumers with strong political beliefs spend more time with media sources that support—and thus reinforce—their views.

The second path that Appelman and Sundar (2016) identified as helping people determine a message's credibility is to consider the producer of the information (also called the source). Appelman and Sundar (2016) described source characteristics as reflective indicators that help people assess how well sources of information present themselves as being authoritative, reliable, reputable, and trustworthy—all of which ultimately influence credibility judgements about the information. One additional characteristic of source credibility—perceived competence—was identified in research by Jahng & Littau (2016) as a potential separate construct in evaluations of overall message credibility.

Other research that centered on examining credibility cues in online spaces (e.g. Chung, Nam, & Stefanone, 2012; Graefe, Haim, Haarmann, & Brosius, 2018; Metzger, Flanagin, & Medders, 2010) supports the content and source features that Appelman and Sundar (2016) validated.

Further research has hypothesized additional content features that people may look to when determining the credibility of information. Tandoc et al. (2018b), for example, found in qualitative analysis that when people were assessing potential 'fake news' they looked to a variety of signals within the information such as whether it was from a recognized news organization or other well-known institution, as well as if its tone was objective and well-written, and if it was shareable on social media. In a series of experiments, Jun et al. (2017) used headlines for fact-checking. Further studies (e.g. Go, Jung & Wu, 2014; Sundar, Knobloch-Westerwick & Hastall, 2007) and media literacy resources (e.g. Meriam Library, 2010) have reiterated the importance of these cues—source, headline, objectivity, and shareability—as well several other features that can be used in credibility assessments, including publication date, author, and links to original information, as well as conducting your own research to verify the information in question.

While these varied cues have been validated in academic research that is broadly centered on identifying the distinguishing characteristics of credible information, they have not been tested for their applicability in specific scenarios—such as the COVID-19 pandemic—to determine if the public relies on the cues to the same extent in times of great uncertainty. An additional question arises about the mental heuristics that occur after people weigh the various credibility cues to determine whether what they've seen contains misinformation: Do they then feel more confident in their ability to identify credible information about COVID-19 going forward?

4 Developing confidence in identifying credible information

An individual's confidence arises from a complex system of information processing (Chaxel, 2016) that is dependent on their ability to analyze an issue or problem and gain knowledge until they feel secure in handling it (Wan & Rucker, 2013). Developing confidence is a fragile progression that is easily undermined by incongruous information (Burke, 2010)—particularly when a person is unsure about the validity of the material they are considering and its relevance to their life (Wan & Rucker, 2013). If the person feels the information may have a significant impact on their life—such their ability to navigate the COVID-19 pandemic—they are more likely to engage in deeper cognitive processing, but they might not have acquired the information literacy skills necessary to help them feel secure in their assessments of the messages. Thus, incorporating explicit details about credibility cues into information literacy programs could be crucial in boosting confidence in identifying credible messaging about COVID-19 and ultimately helping to suppress the spread of misinformation about the disease.

Previous studies have shown confidence is shaped by the situation and social comparison: Depending on the circumstances, individuals may over- or underestimate confidence in their abilities when they are being compared against others (Tirso & Geraci, 2020; Matz & Hinsz, 2000), and people with lower self-confidence believed they were not as skilled at differentiating between 'fake news' and objective reporting as were higher-confidence individuals (Schwarzenegger, 2020). Similarly, Paisana, Pinto-Martinho & Cardoso (2020) found a correlation between higher confidence in one's news literacy and greater suspicion of misinformation they encountered online. Lacking here, though, is a nuanced understanding about the basic foundation of information confidence. By examining the importance people place on particular information credibility cues, it can aid in developing greater knowledge about how those cues drive confidence in being able to identify credible messages related to COVID-19 on social media. In addition, our interest lies in the potentially incremental explanatory power of the conceptual model in which the credibility assessment cues are additively included in the hierarchical model to examine the relative and unique contribution of each category (e.g., content, source, and other credibility cues) to the variance explained in confidence.

The following research questions were posed:

RQ1: Which social media platforms do people rely upon to get information about COVID-19?

RQ2: How do

a) content credibility cues (accurate, objective, up-to-date, believable, comprehensive, authentic, and confirms what you already believe)
b) source credibility cues (authoritative, reliable, reputable, trustworthy, and competent)
c) other credibility cues (location, appearance, date published, headline, photos/other visuals, author, sources cited within the information, links within the information to other sources, objectivity, shareability, and personal research) affect individuals' confidence in identifying credible information about COVID-19 on social media?

5 Methods

This research used a cross-sectional survey design, with U.S. residents age 18 and older recruited through online panels with Qualtrics and Cloud Research MTurk Toolkit, both of which contract with researchers to provide survey participants who are reflective of U.S. demographics. The survey received IRB approval and was conducted in spring 2020, garnering a total of 912 completed surveys from participants. To help identify valid responses, participants had

to pass a series of attention test questions. In the survey, participants were asked about their perceptions of credible material related to COVID-19 on social media and their confidence in identifying misinformation, as detailed below. In addition, they provided information about their age, gender, race/ethnicity, marital status, employment status, number of residents in the household, education, family income level, health insurance, prescription drug insurance, current health care provider, self-reported health status, and comorbidity. That demographic and socioeconomic information is listed in the Appendix and is generally representative of U.S. adults.

Dependent variable: Confidence in identifying credible information about COVID-19. The dependent variable is the participants' confidence in their own ability to recognize valid information about COVID-19 when they encounter it on social media. Confidence is used here as the dependent variable because message credibility perceptions can affect the way people make subsequent judgements (Appelman and Sundar, 2016), such as perceptions of their confidence in identifying misinformation about COVID-19. Because previous research (e.g. Fletcher and Nielsen, 2018) has found that the public has a broad understanding of 'fake news' but rarely delves into categorical distinctions, this research did not prime participants with specific examples of credible messages or misinformation and instead used a confidence scale drawn from Loibl et al.'s (2009) measures for confidence in information acquisition.

Responses to three questions about confidence in recognizing credible information were summed together to create a single score. The questions included: "I am confident in my ability to recognize credible sources of information on social media about COVID-19 (coronavirus); I can tell which sources of information on social media about COVID-19 (coronavirus) meet my expectations for credibility; and I trust my own judgment when deciding which source of information on social media about COVID-19 (coronavirus) is credible enough to consider." Response options were: 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither disagree nor agree; 5 = somewhat agree; 6 = agree; 7 = strongly agree.

Independent variable: Social media use. Participants were asked how often they sign in to a variety of social media platforms to specifically seek information about COVID-19. The platforms included Facebook, Twitter, YouTube, Instagram, Reddit, Snapchat and TikTok. The response scale items were: 1 = never; 2 = once a month or less; 3 = more than once a month but less than once a week; 4 = once a week; 5 = a few times a week; 6 = once a day; 7 = several times a day.

Independent variable: Content credibility cues. Participants were asked about how important they considered certain content cues to be when trying to determine whether information on social media about COVID-19 was credible. The measures were drawn from Metzger et al. (2003) and Appelman and Sundar (2016), and included accurate, objective, up-to-date, believable, comprehensive and authentic. The measure of "confirms what you already believe" was added due to other studies that have found individuals prefer information does not challenge already-established notions of "truth" (Westerwick, Johnson, & Knobloch-Westerwick, 2017; Winter, Metzger, & Flanagin, 2017). Participants used a seven-point semantic differential scale (1 = not important to 7 = very important) to indicate their responses about the importance of the content elements.

Independent variable: Source credibility cues. Source credibility measures were drawn from Appelman and Sundar (2016) and included questions about which elements had the greatest importance when participants were trying to determine whether the source (the producer) of information on social media about COVID-19 was credible. The questions asked about the source being authoritative, reliable, reputable and trustworthy. One more factor—competent—was added from additional research by Jahng & Littau (2016). Participants used a seven-point semantic differential scale (1 = not important to 7 = very important) to indicate their responses.

Independent variable: Other credibility cues. The final set of independent variables drew from features that were theorized in other studies (Tandoc et al., 2018a; Tandoc et al., 2018b; Jun et al., 2017) as cues that people look to when trying to identify fake news. To test whether these elements might be relevant for misinformation specifically about COVID-19 on social media, this research examined 11 additional credibility cues to determine how frequently participants rely on them, with 1 = never, 2 = rarely (about 10% of the time or less), 3 = occasionally (about 30% of the time), 4 = sometimes (about 50% of the time), 5 = frequently (about 70% of the time), 6 = usually (about 90% of the time), 7 = always. The credibility cues included scrutinizing the location (information URL), appearance (information looks like a news story), date published, headline, photos/other visuals, author, sources cited within the information, links within the information to other sources, objectivity, shareability, and personal research.

Statistical analysis: Descriptive statistics were performed for the characteristics of the respondents (see Appendix) and frequency of sign-in various social media platforms to search for COVID-19 information (see Table 1). Reliabilities

Table 1: Frequency of sign-in various social media platforms to search for COVID-19 information.

	N	Mean ± SD (range) [a]	Once a week or more frequency (%)
Facebook	912	4.16 ± 2.33 (1-7)	62.3
YouTube	912	3.75 ± 2.39 (1-7)	54.8
Twitter	912	3.56 ± 2.41 (1-7)	50.5
Instagram	912	3.44 ± 2.42 (1-7)	47.7
Reddit	912	2.85 ± 2.23 (1-7)	37.9
Snapchat	912	2.77 ± 2.23 (1-7)	36.2
TikTok	912	2.56 ± 2.21 (1-7)	31.6

Wilks' Lamda = .652, F (6, 906) = 80.483, p < 0.001

Scale: 1 = never; 2 = once a month or less; 3 = more than once a month but less than once a week; 4 = once a week; 5 = a few times a week; 6 = once a day; 7 = several times a day

for each scale were evaluated using Cronbach's alpha (see Table 2). A composite scale score was generated by averaging scores of all items for each of the scales. We employed multivariate linear hierarchical regression analyses, which was considered reasonable to test our hypotheses. The regression models included a number of covariates to control for the individual and structural factors in a hierarchical manner. More specifically, we entered sociodemographic factors in the first block, content credibility in the second block, source credibility cues in the third block, and other credibility cues in the fourth block. Selection of the covariates was guided by Andersen's (1995) model. Underlying statistical assumptions were validated to ensure the appropriateness of data for the analyses. The level of significance for all statistical tests was $p < .05$. All analyses were preplanned and conducted using the SPSS version 28.

6 Results

The first research question asked about which social media platforms people rely upon to get information about COVID-19. A within-subjects general linear model (GLM) was used to test the relative use frequency of social media platforms. Table 1 illustrates the frequency with which participants reported signing in to various social media sites to specifically look for information about COVID-19.

There were significant differences of social media platform use to search for COVID-19 information, Wilks' Lambda = .652, F (6, 906) = 80.483, p < .001. The contrast tests for all possible pairs among the platforms showed that all of the comparing pairs have significant differences of use frequency from one another at 0.05 (α) level. Participants reported that they used Facebook the most frequently, followed by YouTube and Twitter.

The second research question was broken down into three parts (source credibility, content credibility, and other credibility) to more fully explore the credibility cues that individuals turn to when assessing information about COVID-19 on social media. Table 2 presents descriptive details about the independent and dependent variables.

Each credibility cue was sequentially entered into a regression model in a hierarchical fashion. The respondents' socio-demographic variables were first entered into the regression model as the first block. Next, variables in the source credibility cues were added to the model as the second block to identify the significant source credibility cues that individuals turn to when assessing COVID-19-related information, after controlling for their socio-demographics. Variables in the content credibility cues were added as the third block to determine the significant content credibility cues, after controlling for respondents' socio-demographics and source content credibility evaluations. Finally, variables in the other credibility cues were added as the fourth block to examine the significant other credibility cues, after adjusting for respondents' socio-demographics, source content credibility, and content credibility assessments.

Table 2: Descriptive statistics for major measures.

Measures	Number of items	*N*	Mean ± standard deviation (range)	Reliability
Source credibility cues [a]	5	912	5.80 ± 1.07 (1-7)	0.86
Content credibility cues [a]	7	912	5.62 ± 1.03 (1-7)	0.86
Others credibility cues [b]	11	912	4.72 ± 1.30 (1-7)	0.93
Confidence [c]	3	912	5.40 ± 1.07 (1-7)	0.82

[a] Scale: 1 = not important at all, … , 4 = neutral, … , 7 = extremely important
[b] Scale: 1 = never, 2 = rarely (about 10% of the time or less), 3 = occasionally (about 30% of the time), 4 = sometimes (about 50% of the time), 5 = frequently (about 70% of the time), 6 = usually (about 90% of the time), 7 = always
[c] Scale: 1 = strongly disagree, … , 4 = neither disagree nor agree, … , 7 = strongly agree

Table 3: Hierarchical regression results.

Variables	Confidence in identifying credible COVID-19 information			
	Regression coefficients (standard error)	Regression coefficients (standard error)	Regression coefficients (standard error)	Regression coefficients (standard error)
Block 1. Socio demographic factors				
Age	0.030 (0.027)	-0.004 (0.025)	-0.003 (0.025)	0.022 (0.024)
Female Gender	-0.138 (0.075)	-0.192 (0.068)**	-0.196 (0.068)*	-0.147 (0.066)*
Race/ethnicity	0.009 (0.033)	0.006 (0.030)	0.012 (0.030)	-0.011 (0.029)
Marital status	0.043 (0.082)	0.097 (0.074)	0.088 (0.073)	0.034 (0.072)
Employment	0.148 (0.091)	0.224 (0.082)**	0.255 (0.082)**	0.178 (0.080)*
Number of residents	-0.014 (0.028)	-0.016 (0.025)	-0.010 (0.025)	-0.016 (0.025)
Education	0.075 (0.064)	0.037 (0.058)	0.027 (0.057)	0.002 (0.056)
Family income	0.017 (0.026)	-0.015 (0.024)	-0.015 (0.023)	-0.017 (0.023)
Health insurance	-0.137 (0.121)	-0.079 (0.109)	-0.073 (0.107)	-0.067 (0.104)
Prescription drug insurance	0.127 (0.087)	0.110 (0.078)	0.097 (0.077)	0.069 (0.075)
Current health care provider	0.267 (0.095)**	0.080 (0.086)	0.070 (0.086)	0.083 (0.083)
Self-reported health status	0.170 (0.041)***	0.134 (0.037)***	0.135 (0.037)***	0.119 (0.036)**
Number of conditions	0.001 (0.012)	-0.007 (0.011)	-0.009 (0.011)	-0.011 (0.011)
Block 2. Content credibility cues				
Accurate		0.093 (0.039)*	0.013 (0.041)	0.004 (0.040)
Objective		0.024 (0.032)	0.011 (0.032)	-0.016 (0.031)
Up-to-date		0.027 (0.038)	-0.017 (0.039)	-0.018 (0.038)
Believable		0.076 (0.032)*	0.060 (0.032)†	0.056 (0.031)†
Comprehensive		0.115 (0.034)**	0.083 (0.034)*	0.050 (0.034)
Authentic		0.103 (0.036)**	0.073 (0.036)*	0.066 (0.036)†
Confirms what I already believe		0.009 (0.020)	0.019 (0.022)	0.006 (0.023)
Block 3. Source credibility cues				
Authoritative			-0.011 (0.025)	-0.024 (0.024)
Reliable			0.077 (0.043)†	0.079 (0.042)†
Reputable			0.012 (0.040)	-0.006 (0.882)
Trustworthy			0.120 (0.042)**	0.106 (0.041)*
Competent			0.051 (0.039)	0.026 (0.038)

Continued **Table 3:** Hierarchical regression results.

Variables	Confidence in identifying credible COVID-19 information			
	Regression coefficients (standard error)	Regression coefficients (standard error)	Regression coefficients (standard error)	Regression coefficients (standard error)
Block 4. Other credibility cues				
Location				0.007 (0.026)
Appearance				-0.010 (0.028)
Date published				0.024 (0.028)
Headline				-0.004 (0.026)
Photos/other visuals				0.012 (0.026)
Author				0.038 (0.024)
Sources cited within the info				0.017 (0.030)
Links within the info to other sources				0.034 (0.029)
Objectivity				0.075 (0.031)*
Shareability				0.006 (0.024)
Personal research				0.033 (0.027)
ΔF	4.429	9.801***	-1.200***	-1.272***
R^2	0.069	0.260	0.285	0.339
ΔR^2	0.069	0.191	0.024	0.054

† significant at the $p < 0.10$ level; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note: A 0.1 significance level was used to account for the sample size and theory-driven (Andersen Health Service Model, 1995) covariates in the full regression model.

The improvement of the model at each stage was assessed with the changes in (adjusted) R^2 and the significance of the change. Table 3 shows results from the full hierarchical regression model.

RQ2a sought to better understand how content cues affect individuals' confidence in identifying credible information about COVID-19 on social media. Of the content credibility measurement items, "authentic" and "believable" were the significant predictors of having higher confidence in one's own ability to recognize credible information. These two items were consistently significant predictors of having higher confidence in all regression models (at the $p < 0.1$ level).

RQ2b asked about the effect of source (producer) cues on confidence in identifying credible information about COVID-19 on social media. "Trustworthy" and "reliable" were consistently significant (at the $p < 0.1$ level) predictors in all regression models of feeling more confident in one's ability to recognize credible information. In particular, "trustworthy" was always significant at the $p < 0.05$ level.

Finally, RQ2c examined the extent to which other cues might predict confidence in identifying credible information about COVID-19 on social media. Of these other credibility cues, only "objectivity" was a significant predictor of confidence.

7 Discussion

This research sought to develop a better understanding of which social media platforms Americans use to find information about COVID-19, how they assess the credibility of that information, and how those evaluations influence individuals' confidence in their own ability to identify credible information. Specifically, this study examined how that confidence is impacted by three types of credibility cues. The current project confirms some of the credibility measures developed by Appelman and Sundar (2016) in the situation-specific context of an ongoing, worldwide public health crisis. Additionally, the study fills gaps in the growing body of literature related to the dissemination of COVID-19 information by providing insight about credibility features that are the strongest predictors of having

higher confidence in identifying valid messages about the virus. By focusing on the significant predictors—as well as enhancing education about the other credibility cues—information literacy campaigns can help people become better at knowing what to cues to look for in COVID-19-related material and develop greater confidence in their ability to recognize credible information, hopefully leading them to enact health behaviors that contribute to slowing the spread of the virus. Although the findings here are specific to COVID-19, it is likely they would be relevant in future crises with similar characteristics.

The first research question focused on discerning which social media platforms Americans use when they're looking for information about COVID-19. Their most frequent visits were to Facebook, YouTube and Twitter, which aligns with general use patterns in the U.S. (Tankovska, 2021). Though each of these platforms has enacted policies to limit the dissemination of misinformation about COVID-19 and removed millions of problematic posts, it is not clear if the efforts have changed users' beliefs or behavior (such as seeking out more credible sources). One recent study does lend hope that fact-checking labels and notifications from platforms like Facebook and Twitter are making a difference: Yaqub and colleagues (2020) found that intentions to share potential 'fake news' on social media declined when users in experiments saw a note on the post informing them that fact-checkers dispute the credibility of the information.

The present study affirms the popularity of Facebook, YouTube and Twitter as sites for seeking information about COVID-19 and underscores the continued importance of these platforms' endeavors to aggressively identify, flag and remove misinformation related to the virus. Americans' reliance on these social media sites for information about the pandemic also offers direction for professionals involved in producing credible information about COVID-19: These three sites should be the focus of their social media campaigns to share public health messages and promote effective health behaviors.

Additionally, it is crucial to understand the credibility cues that should be used in framing those messages in order to boost individuals' confidence in their ability to identify credible COVID-19 information on social media—with the goal of ultimately lessening the spread of misinformation about the virus. The second research question examined three avenues that factor into credibility assessments of information about COVID-19 on social media. We found that believable, authentic content from trustworthy, reliable sources who provide objective information are among the most important features that individuals look for when they're evaluating whether the message is credible and are the most likely to enhance their confidence in identifying credible information. That only five of the more than 20 predictor variables were significant indicators of having higher confidence in identifying credible information about COVID-19 on social media suggests a deeper dive may be necessary to understand how people conceptualize those characteristics, and the analysis suggests information literacy programs may need to spend more time helping people understand the importance of the other credibility factors so they can draw from a greater variety of cues in order to become more confident in recognizing valid information about the virus.

The content characteristics of authenticity and believability were among the top three measures of message credibility identified by Appelman and Sundar (2016), although they note the two features are at near opposite ends of the objectivity spectrum with authenticity "considered to be more objective" and believability "considered to be more subjective" (p. 74). Kang (2010), whose work informed Appelman and Sundar (2016)'s study, conceptualized authenticity as exclusive coverage of a particular topic and found it was closely linked to insightful and informative messaging. Believability, on the other hand, is a more malleable judgment that is drawn from personal perceptions about the quality of the content (Sundar, 2008).

Interestingly, when objectivity was placed alongside the content credibility characteristics—as was done in Appelman and Sundar (2016)'s research—the findings of this study did not indicate its importance was a significant predictor of having higher confidence in identifying credible COVID-19 information on social media. However, when objectivity was grouped with the other credibility cues like headlines and photos/visuals, it was the only significant predictor on that list. What this suggests is that, at least in the context of COVID-19 messaging, people may not view objectivity as a characteristic that is parallel to authenticity and believability but instead as an important feature among cues that function more like attributes of journalism. Future research should examine whether perceptions of believability and authenticity are based on complex judgments that take into account multiple assessments of a piece of information, whereas objectivity may be viewed through a different lens that is no less important when developing feelings of confidence in one's ability to identify credible COVID-19 information on social media.

Among the significant characteristics of source credibility that Appelman and Sundar (2016) found, trustworthiness and reliability were significant predictors in this research—meaning that participants who said they view those factors

as being important when they are considering the credibility of COVID-19 information on social media were also more likely to have higher confidence in their ability to identify credible information. Both trustworthiness and reliability speak to credibility perceptions about the information source's reputation (Sundar, 2008), with reliability being closely associated with authoritativeness (Kang, 2010).

Taken together, the findings about the importance of the four credibility characteristics—authenticity, believability, trustworthiness, and reliability—as well as the credibility cue of objectivity highlight their significant role as individuals attempt to determine the credibility of information about COVID-19 on social media and become more confident in their ability to recognize potential misinformation. Moving forward, the creators of COVID-19-related messages need to strategize ways to assure their materials are seen as highly authentic, believable, and objective and that they themselves as the producers of the information are viewed as trustworthy and reliable sources.

Future studies should explore what people believe constitutes these credibility characteristics to determine what, for example, "authentic" messaging about COVID-19 looks like. Experiments or qualitative interviews could aid in developing greater degrees of understanding how people conceptualize specific elements of credibility in pandemic information on social media. Additionally, future experiments could test not only participants' confidence in identifying credible information about COVID-19 but also their competence in doing so. Furthermore, the current study employed a cross-sectional survey research that does not provide causal evidence. The findings should be considered correlational attestation, not causality. Last but not least, we utilized seven points scales for measuring major constructs. Some research suggests using 11 points (e.g., 0-10) because it provides more information and lends itself to more continuous nature. Nevertheless, there is a practical merit to use fewer scale points such as a seven-point scale as it reduces participants' fatigue and avoids their random selection of responses as compared to more points. Future researchers can consider an optimal number of scale points for their research purpose and context.

8 Conclusion

This study examines the impact of three types of credibility cues on Americans' confidence in their own ability to identify misinformation on social media about the COVID-19 pandemic. The role of confidence in recognizing "fake news" about the pandemic is important to understand because previous research (e.g. Paisana, Pinto-Martinho & Cardoso, 2020; Schwarzenegger, 2020) has shown higher-confidence individuals tend to be more skilled at identifying misinformation and are more skeptical of misinformation online. By learning which credibility cues they look to when determining the veracity of COVID-19 information, we can focus on developing more effective messaging that will increase people's confidence in their ability to identify such misinformation on social media.

Through surveys of U.S. adults, the content credibility cues of believability and authenticity had the strongest links to possessing greater confidence in identifying valid messages about the virus. Meanwhile, trustworthiness and reliability were the strongest predictors among the source credibility cues. Finally, from a list of other credibility cues like headlines and photos, objectivity was the only element that was a significant predictor of confidence in being able to identify COVID-related misinformation.

For public health agencies and professional communicators who want to help their audiences develop greater confidence, the findings here suggest they should strategically craft COVID-19 messaging for social media platforms that are seen as authentic, conceptualized by Kang (2010) as informative and insightful, and believable, which Sundar (2008) noted is related to assessments about the quality of the message. These conclusions are further supported by the preference for objective information as it connected to greater confidence in evaluating COVID-related material. Additionally, the credibility of the source itself—such as public health agencies and other professionals—appears to rest largely on perceptions of trustworthiness and reliability, suggesting that people feel more confident in identifying COVID misinformation when they believe the source has a reputation (Sundar, 2008) for providing consistently clear and unbiased messages.

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Appendix

Characteristics of study respondents (N = 912)	
Variables	
Age, %	
18 – 24	12.1
25 – 44	52.3
45 – 64	27.5
65 and over	8.1
Female, %	44.3
Race/ethnicity, %	
White, non-Hispanic	70.5
Black, non-Hispanic	10.6
Hispanic	4.7
Asian	14.1
Married, %	55.9
Employment: full or part-time, %	69.0
Number of residents in the household, mean ± sd	3.1 ± 1.4
Education: college or post-graduate, %	78.4
Family income level, %	
< $15,000	9.8
$15,000 – $54,999	42.8
$55,000 – $74,999	16.0
$75,000 – $99,999	15.2
□ $100,000	16.1
Health insurance, %	86.2
Prescription drug insurance, %	57.7
Current health care provider, %	77.2
Self-reported health status, %	
Poor	2.0
Fair	13.4
Good	38.7
Very good	32.0
Excellent	13.9
Number of conditions, mean ± sd	1.4 ± 3.0