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Trust in doctors, social support, and belief in COVID-19 misinformation

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Abstract

Background Misinformation has emerged as a major concern for public health during the COVID-19 pandemic. Our study conceptualizes trust in doctors and social support through the lens of social capital theory and investigates their role in public endorsement of COVID-19-related misinformation.

Methods Using data from a nationally representative survey ($N = 6,515$), a series of logistic regression models were used to estimate relationships between misinformation endorsement and trust in doctors and social support from interpersonal and communal sources. Moderation analyses explored differences in these relationships among non-Hispanic White, non-Hispanic Black, and Hispanic respondents.

Results In the full sample analysis, trust in doctors and social support from both sources were negatively associated with misinformation endorsement. This pattern did not consistently hold across the three subgroups in moderation analyses. Trust in doctors was negatively associated with misinformation endorsement in most cases, whereas social support exhibited varied associations depending on its source and respondents' race and ethnicity.

Conclusions These findings confirm that trust in doctors is an important protective factor against COVID-19 misinformation. The role of social support, however, is more nuanced and warrants continued research that considers both support sources and the racial and ethnic background of the communities involved.

Keywords Misinformation, COVID-19, Trust, Social support, Social capital, Health disparities, Health equity

Background

Since the outbreak of the COVID-19 pandemic, the public has been confronted with a barrage of health information—some of it accurate, some misleading, some blatantly false. During this "infodemic" [1], millions of people have been exposed to false or misleading claims regarding the origins of the virus, the causes of its spread, self-protection methods, available treatments, and the vaccine rollout [2]. This oversaturation of the information sphere has made it challenging for the public to find trustworthy and reliable health guidance and has challenged the public health community's capacities to engage diverse communities across cultural and political lines [3].

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An extensive body of research has examined the mechanisms responsible for the spread and negative effects of misinformation amongst the public [4–6] and analyzed how complex and intersecting variables, including racial and ethnic minoritized status and socioeconomics, can shape health resources access [7], affect the distribution of social support across communities [8–10], weaken trust in medical institutions and providers, and impact individuals' and groups' ability to resist health misinformation [4, 11, 12].

Relatively less attention has been devoted to the social relationships within which misinformation and accurate health information are shared. The present study seeks to address this gap. It conceptualizes trust in doctors and social support through the lens of social capital theory and suggests that these relationship-based mechanisms might play an important role in individuals' resistance or susceptibility to misinformation. It also investigates how the role of social capital might vary across racial and ethnic groups, with particular attention to minoritized communities facing complex vulnerability to health misinformation.

Social capital

Putnam defines social capital broadly as "social networks and the associated norms of reciprocity and trustworthiness" [13]. Scholars have further differentiated among *bonding*, *bridging*, and *linking* social capital to clarify how individuals and communities are connected—vertically and horizontally—with one another and with social institutions, authorities, and experts [14]. Within this typology, bonding social capital refers to relationships among members of a social network who see themselves as sharing important similarities in some respect [14, 15]. Bridging social capital describes connections that cross boundaries of heterogeneous groups; such ties increase social inclusion but are less stable than those in close-knit, homogenous groups [16, 17]. Finally, linking social capital refers to relationships between people interacting across explicit, formal power gradients and taps into vertical trust connecting individuals and communities with representatives of institutional entities, including public health officials and members of the medical profession [14, 18, 19].

Social capital has been found to yield health benefits for individuals and communities by facilitating the exchange of psychosocial resources and enhancing emotional and material support among members of social networks [20–22]. Linking social capital, in particular, can increase access to health services and accurate health information, both critical pathways through which social capital affects health [16, 23]. In the context of COVID-19, different forms of social capital have been linked to increased vaccine acceptance, higher intentions to follow health protective behaviors, and lower toll of COVID-19 on communities [24–26]. Yet, these beneficial effects depend on norms and beliefs encouraged by and shared within social networks. In some situations, social ties might constrain rather than facilitate the flow of health information, encourage unhealthy behaviors, and produce rumors and echo chambers, a phenomenon well-documented in both online and offline spaces [21, 27, 28]. Overall, social relationships both within and outside of one's immediate network appear to play an important and complex role in health promotion and health (mis) information dissemination and acquisition.

Trust in Doctors

Trust, defined as a relationship where involved parties assume the best interest and competence of one another, is a key dimension of social capital [29, 30]. In health communication contexts, it pertains to both the validity of health information delivered and the credibility of those delivering it [31, 32]. Trust in general, and trust in health professionals in particular—as a dimension of linking social capital—emerge as important mechanisms through which social capital affects health [33–35]. A trusting relationship with one's own doctor seems to play an especially key role when it comes to misinformation protection, with research showing that even individuals expressing a generalized mistrust of expert health guidance tend to embrace health advice when delivered clearly and encouragingly by their own doctor [36–38]. The COVID-19 pandemic did place these relationships under strain, however. 29% of self-identified Republican respondents surveyed by del Ponte and colleagues indicated that the COVID-19 experience decreased their trust in their personal doctors [3].

During COVID-19, trust in scientists and health professionals has been linked to lower susceptibility to COVID-19 misinformation [4, 12, 39, 40]. Trust associated with other forms of social capital (bonding and bridging) can also help to mobilize community health networks and resources to resist misinformation, facilitating compliance with public health guidance [41–43]. However, researchers have sometimes noted positive associations between trust in friends or family and trust in social media and susceptibility to health misinformation that may be spread through these sources and networks [44, 45]. These findings reveal a complex landscape of trust during the pandemic and underscore the critical role of trust in doctors in effective infodemic response.

Social support

While the close relationship between social support and social capital is widely recognized, its exact nature has been debated. Social support has been variably described as an outcome, benefit, substantiation

[46, 47], or a perspective on social capital, where social support is framed as a mechanism responsible for the health-enabling role of different types of social relationships—bonding, bridging and linking social capital [14]. Moreover, situating social support within the broader social capital framework helps tap into the emotional and cognitive aspects of social networks [48] and their function in protecting individuals and communities against misinformation.

In the health literature, social support is broadly defined as exchanges of informational, emotional, or instrumental/material resources among individuals [49]. Researchers have documented associations between social support and better mental and physical health [50], objective and subjective welfare [51, 52], increased patient satisfaction in patient-provider interactions [53, 54], lower infectious disease mortality [52], and social mobilization for improved population-level vaccination rates [48, 55].

Social support has also been found to affect individuals' response to health misinformation in complex ways. On the one hand, individuals seeking health information might benefit from available social support to find accurate information and relieve health-related anxieties [53, 56–58]. Support from medical professionals, in particular, has been found to curb the spread of health misinformation [59–61]. At the same time, some of the same mechanisms and sources of social support, particularly in community settings, might serve as vectors of misinformation, with accompanying individual and population health harms [6, 62, 63]. Empirically assessing the association between social support from diverse sources and acceptance of health misinformation is, therefore, an important undertaking.

Role of race and ethnicity

Types of social ties mobilized in the context of health vary across racial and ethnic groups [41, 64, 65]. Social distance between the self and sources of support appears to be an important factor. Overall, racial and ethnic minoritized groups have been found to rely on support from family members and friends more than Americans who identify as White, a pattern attributable, at least in part, to social barriers experienced by these communities in accessing more formalized and distant social connections [9]. For individuals who identify as Hispanic, social support from family, friends, and neighbors has been positively associated with self-rated physical and mental health [66]. For Americans who identify as Black, utilization of social support for health depends on age and socioeconomic status, among other factors, with family support being more significant for older individuals (over 45 years) than for younger respondents [67, 68].

Racial and ethnic minority status has also been linked to higher levels of medical mistrust and higher health misinformation exposure and endorsement [69–72]. As a social determinant of health, medical mistrust is associated with worse general physical and mental health outcomes [73], reduced use of preventive services, higher rates of rejection of vaccines, and lower vaccine trial participation [74, 75]. Scholars have highlighted complex social, structural, and historical factors that underlay these patterns, and have noted the relative absence of trusted sources of credible information in many minoritized communities [76].

Overall, race and ethnicity, particularly when intersecting with socioeconomic status, have been found to affect the distribution of health-pertinent social connections in complex ways [8, 9]. Minoritized groups often face additional barriers due to socioeconomic inequalities that deepen the disadvantages they experience in the access to and utilization of health-related social capital. These existing divides in American society may have been exacerbated by the pandemic, and may correspondingly have produced differential vulnerability to health misinformation across racial and ethnic communities. Trust and social support might also interact in complex ways to influence misinformation acceptance or rejection within specific racial and ethnic populations. These interactions are out of the scope of this initial investigation but should be an important item for future research addressing misinformation disparities.

COVID-19 misinformation

Existing literature on health misinformation has so far lacked a consensus on what the term entails, with researchers proposing multiple classifications based on content themes, emotional appeals of specific misinformation items [77–79], the relative ease with which misinformation items may be debunked or counteracted [80], or demographic and psychological factors contributing to gullibility to specific misinformation types [79, 81], among others.

Our study adopts a definition of misinformation by the U.S. Surgeon General: "information that is false, inaccurate, or misleading according to the best available evidence at the time" [82]. We focus on two especially prevalent misinformation beliefs during the COVID-19 pandemic: (1) COVID-19 as a scheme for the rich and powerful to make profits and (2) the lack of careful testing in the fast rollout of COVID-19 vaccines [83, 84].

The first of these qualifies as misinformation because it falsely characterizes COVID-19 as a planned, profit-motivated scheme. Viewed by some scholars as symptomatic of conspiracy thinking [85], it has been linked to the decreased likelihood of following recommendations such as handwashing or social distancing, the perceptions

of the pandemic as less threatening, and generalized distrust in science and biomedicine [86, 87]. The second item reflects either a misperception based on false information or mistrust rooted in unusually rapid approval and distribution of COVID-19 vaccines. Regardless of its genesis, this belief has likewise negatively affected the public's decisions to vaccinate during the COVID-19 pandemic [34, 88]. Together, these items provided a good representation and sampling of the kinds of misinformation that dominated the informational sphere during the pandemic.

Current study

This study investigates how social network-based resources, such as trust and social support, conceptualized within the bounds of social capital theory, may provide protection against health misinformation during the COVID-19 pandemic. Based on the literature review, we advance the following hypothesis regarding trust in doctors:

H1: Trust in doctors will be negatively associated with individuals' likelihood to endorse COVID-19 misinformation.

The role of social support might be more complex and depend on the source of social support (i.e., the people, groups, and organizations that provide emotional, informational, or instrumental assistance to individuals) and the nature of the social networks from which support originates. In particular, literature suggests that the social distance between the self and sources of social support matters, particularly for minoritized communities. We propose the following research question:

RQ1: How will social support from close vs. distant sources be associated with an individual's likelihood to endorse COVID-19 misinformation?

Finally, we suspect that the relationships between trust in doctors and social support on the one hand and belief in misinformation on the other may vary across racial and ethnic groups. Focusing on the major racial and ethnic groups in the U.S., we ask the following research questions:

RQ2: How does the association between trust in doctors and belief in COVID-19 misinformation vary among non-Hispanic White, non-Hispanic Black, and Hispanic individuals?
RQ3: How does the association between social support from close vs. distant sources and belief in COVID-19 misinformation vary among non-Hispanic White, non-Hispanic Black, and Hispanic individuals?

We test these hypotheses and research questions using a large nationally representative household survey. Past research has identified sociodemographic variables [4, 89], political ideology [4, 90], criminal legal involvement [84], as well as health and insurance status [89] as important correlates of susceptibility to misinformation. There is also evidence that foreign-born individuals have a different pattern of exposure and vulnerability to COVID-19 misinformation, suggesting that nativity might be another important predictor of misinformation endorsement [91–93]. We include these variables as covariates in this study.

Methods

This study was conducted as part of the AmeriSpeak Omnibus survey by NORC at the University of Chicago. The Omnibus survey draws its sample from the AmeriSpeak panel, which includes about 35,000 households recruited using area probability and address-based sampling, covering approximately 97% of the United States (U.S.) household population. Most surveys are completed online through either a conventional internet connection or smartphone access; those living in non-internet households can participate by telephone. The current study was fielded from October 1 to November 19, 2021 ($N = 6{,}515$). Panel members were invited by email and phone if needed. Those participating received an incentive worth $25. The survey was offered in both English and Spanish and took about 30 min to complete. The response rate for the survey was 14.8% (37% recruitment rate * 40% completion). Weights were constructed based on U.S. census benchmarks, accounting for selection probabilities and non-response [94, 95]. The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of NORC at the University of Chicago (IRB00000967) under its Federal-wide Assurance (FWA00000142). All participants indicated informed consent before completing the survey. Data from the survey were used in an earlier analysis focusing on openness to change after misinformation correction [83]. This previous analysis did not address trust or social support; nor did it investigate the specific misinformation items in the current study. The questionnaire for the current study is available in the Supplemental File.

Measures

Respondents were asked whether the following statements were true or false: "COVID-19 is a scheme for rich people and big companies to make money off of the testing and vaccine" (hereafter the COVID-19 scheme statement) and "The COVID-19 vaccines are coming out so

fast because they have not been carefully tested" (hereafter the COVID-19 vaccine statement). These misinformation beliefs were extracted from previous qualitative research that examined COVID-19-related misperceptions among the criminal legal involved (CLI) communities [84]. A subsequent nationally representative survey confirmed that they were also prevalent among the general U.S. population [83]. Responses to these items were coded dichotomously (1 = yes and 0 = no).

Trust in doctors was measured with four items adapted from previous research [96]: "I believe that I can freely ask my physicians any questions I want;" "My physician would not ask me to participate in medical research if he or she thought it would harm me;" "In deciding what treatment I will get, my physicians always tries to protect me from unnecessary risk;" "If my physician wanted me to participate in research, I trust that he or she would fully explain it to me." Responses were given on a 5-point Likert scale (strongly disagree to strongly agree). Exploratory factor analysis (EFA) with principal axis factoring (PAF) unveiled a single factor, explaining 74.1% of the variance in the data. The items were averaged into an overall score where a higher value indicated greater trust (Cronbach's $\alpha = 0.88$).

The measure of social support was also adapted from previous research [97]. It asked respondents, "How much financial, emotional, or other forms of support did you receive from the following sources during the COVID-19 pandemic, starting in March 2020?" Six different sources of support were listed: family, friends, small groups you belong to, your local community, local organizations, and society as a whole. Responses ranged from 1 (no support) to 5 (very high levels of support). An EFA-PAF revealed two factors, explaining 63.1% and 17.5% of the variance in the data, respectively. The first factor reflected support from interpersonal sources and relatively close social ties, including family, friends, and one's small group ties. The second factor indicated support from communal sources or relatively distant others, including the local community, local organizations, and society at large. A summary score was created for each factor through averaging across the pertinent items, with a higher value indicating greater support (Cronbach's $\alpha = 0.86$ and 0.89, respectively).

Respondents indicated their race or races by selecting one or more options from a list of 15 categories, including White, Black or African American, American Indian or Alaska Native, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, other Asian, Native Hawaiian, Guamanian or Chamorro, Samoan, other Pacific Islander, and some other race. They were also asked whether they were of Spanish, Hispanic, or Latino descent. The "Yes" categories specified the following origins: Mexican/Mexican-American/Chicano, Puerto Rican, Cuban, Central American, South American, Caribbean, and other Spanish/Hispanic/Latino. Based on responses to these questions, four race and ethnicity groups were identified: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic non-Black minority.

Respondents were asked whether they had COVID before (yes, no, and not sure). General health status was evaluated on a five-point scale from poor to excellent. Insurance status was indicated as a dichotomy (yes or no). Prior criminal-legal involvement (CLI) was assessed by asking whether the respondent had ever been "convicted of any misdemeanor or felony crime" or "been incarcerated in jail or prison [84]." A positive response to either indicated CLI.

Other demographic and background variables included biological sex, age, education, income, marital status, employment status, and political party identification. These variables, together with race and ethnicity, were regularly gathered by the AmeriSpeak panel and updated annually.

Analysis strategy

Descriptive analysis was conducted to assess sample characteristics and the distribution of key variables. Cross-tabulation and one-way ANOVA were used to assess the difference in key variables across racial and ethnic groups. To test the hypothesis and answer the research questions, a series of logistic regression analyses were conducted for each misinformation item. We first estimated a model without any interactions for the full sample (Model 1). The model included trust and social support as key predictors and sex, age, race and ethnicity, education, household income, marital status, employment status, political party, nativity, CLI, COVID-19 infection, general health status, and insurance availability as covariates.

We then added interactions between trust/social support and race/ethnicity to the model (Model 2) and estimated it with only non-Hispanic White, non-Hispanic Black, and Hispanic respondents. Non-Hispanic non-Black minority respondents were excluded from Model 2 because they were heterogeneous in membership. Preliminary analyses showed that adding the interaction terms separately did not produce qualitatively different results. We therefore report the final model with all interaction terms included at the same time. To facilitate interpretation, we constructed a figure that included both full-sample (Model 1) and group-specific (Model 2) odds ratios and the associated 95% confidence intervals for trust and social support. All analyses were performed in SPSS (IBM Inc.) with weights to align the sample with national benchmarks while adjusting for selection probabilities and non-response. Statistical significance was established a priori at alpha = 0.05.

Results

Sample characteristics are summarized in Table 1. Of the sample ($N = 6{,}515$), 17.6% indicated agreement with the COVID-19 scheme statement, and 34.3% indicated agreement with the COVID-19 vaccine statement. Trust in doctors was relatively high, averaging 4.12 ($SD = 0.87$) on a 1–5 scale. Levels of social support received were generally low, averaging 2.47 ($SD = 1.09$) and 1.78 ($SD = 0.90$) from close ties and more distant sources, respectively, also on a 1–5 scale. ANOVAs showed significant main effects of racial and ethnic groups on trust, $F(3, 6473) = 51.56$, $p < .001$; social support from close ties, $F(3, 6445) = 3.91$, $p = .021$; and social support from distant ties, $F(3, 6405) = 33.75$, $p < .001$. Group means as well as post-hoc comparisons with Sidak correction are reported in Table 2. Focusing on the three major racial and ethnic groups, non-Hispanic White respondents ($M = 4.21$, $SD = 0.83$) reported markedly greater trust in doctors than non-Hispanic Black ($M = 3.98$, $SD = 0.91$) and Hispanic respondents ($M = 3.87$, $SD = 0.93$). Non-Hispanic Black respondents ($M = 1.99$, $SD = 1.02$) reported highest levels of social support from distant sources, followed in order by Hispanic ($M = 1.83$, $SD = 0.91$) and non-Hispanic White respondents ($M = 1.70$, $SD = 0.83$). Pairwise differences among the three groups on both of these measures all reached significance in post-hoc testing. These three groups did not differ on social support received from close ties after correcting for multiple comparisons.

The logistic regression models are presented in Table 3. Odd ratios and associated 95% confidence intervals for the key predictors are plotted in Fig. 1. Model 1 presents data from the full sample without any interaction terms. As shown, trust in doctors, social support from close ties, and social support from distant ties were all negatively associated with the endorsement of the two misinformation items.

Model 2 presents data for non-Hispanic White, non-Hispanic Black, and Hispanic respondents only, allowing for interactions between trust/social support and group indicators (vs. non-Hispanic White). As shown in Table 3, the interaction between trust and being Hispanic was significant for the COVID-19 scheme item. For the COVID-19 vaccine item, three interactions were significant: those between trust and being non-Hispanic Black, between social support from close ties and being Hispanic, and between social support from distant others and being non-Hispanic Black.

The pattern of these interactions is more easily understood by examining each key predictor in Fig. 1. For the COVID-19 scheme item, trust in doctors was a consistent negative predictor of misinformation endorsement– respondents reporting greater trust in their doctors were less likely to say the COVID-19 scheme statement was true, regardless of their racial and ethnic background. The difference between non-Hispanic White and Hispanic respondents was a matter of magnitude, not a qualitative difference in the nature of the relationship. When it comes to social support from close ties, only one relationship emerged significant– Hispanic respondents receiving greater support were less likely to endorse the misinformation. For social support from distant ties, again only one relationship was significant– non-Hispanic White respondents receiving greater support indicated a lower likelihood to accept the misinformation.

For the COVID-19 vaccine item, trust in doctors emerged as a significant predictor for two groups - non-Hispanic White and Hispanic respondents reporting greater trust were less likely to endorse the item; the association for non-Hispanic Black was also negative but was not significant. The difference between non-Hispanic White and non-Hispanic Black respondents was significant according to the interaction results. The same pattern was observed for social support from close ties. Non-Hispanic White and Hispanic respondents receiving greater support from close others were less likely to accept the statement as true; a negative association was also observed for non-Hispanic Black respondents but it did not reach significance. In this case, the difference between non-Hispanic White and Hispanic respondents reached significance according to the interaction results, although the nature of the associations remained negative for both groups. For social support from distant ties, all three groups exhibited a significant association with misinformation endorsement, albeit in different directions. Non-Hispanic White and Hispanic respondents reporting greater support from distant others were less likely to endorse the misinformation. Non-Hispanic Black respondents, on the other hand, were more likely to accept the misinformation if they had received greater support from distant others. The difference between non-Hispanic White and non-Hispanic Black respondents was significant based on the interaction results in Model 2, as was that between Hispanic and non-Hispanic Black respondents (based on an alternative specification of Model 2 contrasting the two groups not reported in Table 3).

The covariates behaved similarly in the two models. Being female, younger age (vs. 60+), graduating high school (vs. some college), non-Democratic political party identification, CLI, and previous COVID infection were positively associated with endorsement of both misinformation items. Being non-Hispanic Black (vs. non-Hispanic White) and having at least a bachelor's degree (vs. some college), were negatively associated with belief in both misinformation items.

Earning $100k or more in household income (vs. <$30K) and being foreign-born were negative predictors of misinformation endorsement in three of the four

Table 1 Sample characteristics ($N = 6,515$) and descriptive statistics for key Variables, AmeriSpeak 2021, United States

	Unweighted %	Weighted %
Sex		
Male	39.8	47.1
Female	60.2	52.9
Age		
18–29	8.4	18.7
30–34	23.2	26
45–59	23.8	24.2
60+	44.5	31.1
Race and Ethnicity		
NH White	71.5	62.8
NH Black	10.7	12.1
Hispanic	10.5	16.6
NH non-Black minority	7.2	8.5
Education		
Less than HS	3.2	9.1
HS graduate	15.1	27.3
Some college	37.4	27.7
Bachelor's degree	24.8	20.8
Graduate degree	19.4	15.2
Income		
< $30k	20.9	26.5
$30K - <$60K	27.4	26
$60K - <$100K	25.6	23.6
$100k+	26.1	24
Marital status		
Currently married	47.9	47
Other	52.1	53
Employment status		
Currently employed	51.6	53.8
Other	48	45.7
Political party/leaning		
Democrat	37.9	34.3
Lean Democrat	12.2	12
Independent/None	15.1	19.1
Lean Republican	10.6	9.7
Republican	23.8	24.4
Nativity		
Foreign born	8.4	10.1
Native born	91.1	89.1
Criminal legal involvement		
Yes	12.8	14.8
No	86.7	84.8
Had COVID		
Yes	16.6	18.8
No	76.8	74
Not sure	6.3	6.9
Insurance		
Yes	92	88
No	7.5	11.5
General health		
Excellent	8.8	7.5
Very good	37.3	36.5
Good	36.3	37.3

Table 1 (continued)

	Unweighted %	Weighted %
Fair	14.7	15.5
Poor	2.6	3.1
COVID-19 scheme[a]		
Yes	14.4	17.6
No	84.4	81
COVID-19 vaccine[b]		
Yes	29.4	34.3
No	69.4	63.9
	Unweighted *M*(*SD*)	Weighted *M*(*SD*)
Trust in doctors	4.24(0.84)	4.12(0.87)
Social support - close	2.46(1.10)	2.47 (1.09)
Social support - distant	1.77 (0.89)	1.78 (0.90)

Note. Percentages do not always add up to 100% due to missing values. [a]COVID-19 is a scheme for rich people and big companies to make money off of the testing and vaccine. [b]The COVID-19 vaccines are coming out so fast because they have not been carefully tested

Table 2 Trust in Doctors and social support by race and ethnicity

	Trust in Doctors (M/SD)	Social Support– Close (M/SD)	Social Support– Distant (M/SD)
NH White (*n* = 4094)	4.21/.83[a]	2.45/1.07	1.70/.83[a]
NH Black (*n* = 790)	3.98/.91[b]	2.55/1.10	1.99/1.02[b]
Hispanic (*n* = 1080)	3.87/.93[c]	2.48/1.15	1.83/.91[c]
NH and non-Black minority (*n* = 551)	4.10/.82[b]	2.56/1.12	1.94/1.03[bc]

Note. Different superscripts in cells represent significant difference in post hoc mean comparisons with Sidak correction. Analyses were weighted and did not adjust for additional covariates

models. Less than high school education (vs. some college), earning between $30 and $60K (vs. <$30K), and being married were negatively associated with misinformation endorsement in one model each.

Health status showed a nonlinear pattern of associations with the misinformation outcomes. Compared to good health, excellent and poor health were both positively associated with the endorsement of the two items. Moreover, very good health was negatively associated with endorsing the COVID-19 scheme item, and fair health was positively associated with endorsing the COVID-19 vaccine item. Finally, being non-Hispanic Other in race and ethnicity were positively associated with endorsing the COVID-19 vaccine misinformation item.

Discussion

This study examined the role of trust in doctors and social support in endorsement of COVID-19 misinformation in a nationally representative household sample of U.S. adults.

Drawing upon social capital theory [98, 99], this study framed trust in doctors and social support as network-based resources that influence individuals' and communities' susceptibility to prevalent misinformation about the COVID-19 pandemic and the development and roll-out of COVID-19 vaccines. In our analyses, trust in doctors emerged as a relatively consistent and significantly negative correlate of misinformation endorsement. Only in the case of non-Hispanic Black individuals for the COVID-19 scheme item, did the negative association miss significance by a narrow margin. These findings support our hypothesis and align well with previous research which found trust in an information source to be key to public perception and acceptance of health information [39]. Of note, trust can help reduce uncertainty regarding complex issues—a factor of particular importance in the context of health emergencies characterized by the overflow of conflicting health claims [100]. As a dimension of linking social capital, trust in healthcare providers is an important predictor of attention to expert health information [101, 102] and a crucial component of the interpersonal doctor-patient relationship that can increase patient compliance with medical recommendations [103, 104]. Our findings add to the existing literature on trust by demonstrating that the role of trust in doctors is equally robust in shielding the public against misinformation across major racial and ethnic groups in the U.S.

Our data also showed that racial and ethnic minority groups had lower levels of trust in doctors than their non-Hispanic White counterparts. Thus, factors driving trust in doctors and health experts across different communities remain a matter of urgent attention. In particular, future research should consider ways to build and/or restore trust in communities historically distrustful of health experts and disproportionately affected by health

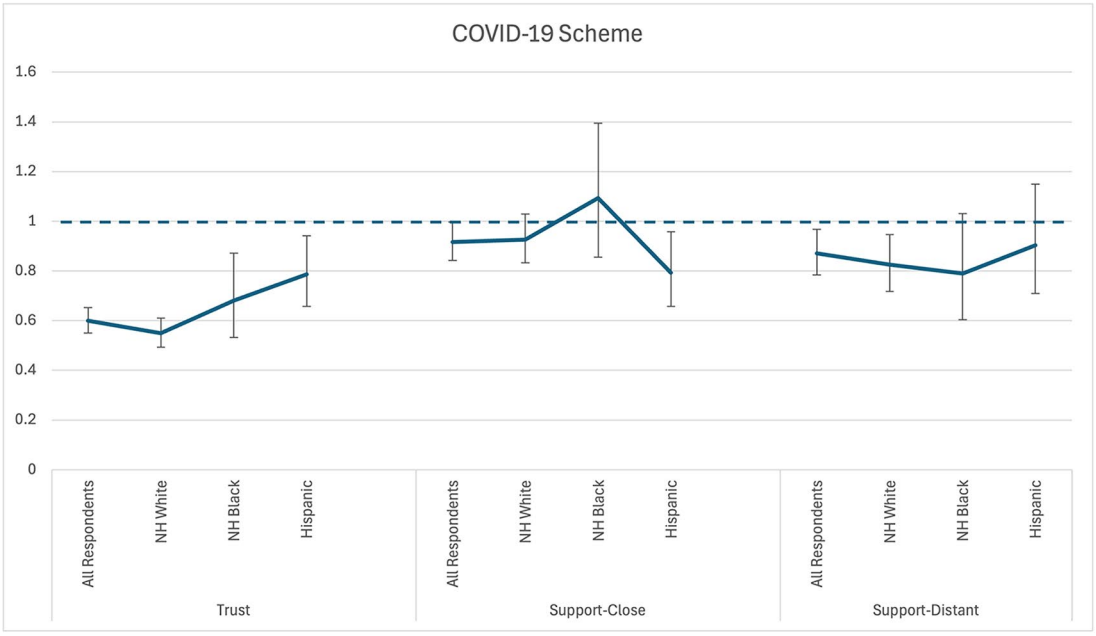
Table 3 Logistic regression of misinformation endorsement on trust in doctors and social support

	COVID-19 Scheme[a]				**COVID-19 Vaccine[b]**			
	Model 1		Model 2		Model 1		Model 2	
	OR	P	OR	P	OR	P	OR	P
Trust in doctors	0.60	< 0.001	0.55	< 0.001	0.69	< 0.001	0.66	< 0.001
Social support - close	0.92	0.041	0.93	0.154	0.86	< 0.001	0.89	0.012
Social support - distant	0.87	0.01	0.83	0.006	0.83	< 0.001	0.78	< 0.001
Race/ethnicity (vs. NH White)								
NH Black	1.33	0.033	1.53	0.005	2.54	< 0.001	2.51	< 0.001
Hispanic	0.98	0.877	1.10	0.393	1.20	0.043	1.21	0.044
NH non-Black minority	1.30	0.083			1.69	< 0.001		
Trust X NH Black			1.24	0.106			1.28	0.021
Trust X Hispanic			1.44	< 0.001			1.03	0.724
Social Support -close X NH Black			1.18	0.222			0.94	0.528
Social Support -close X Hispanic			0.86	0.156			0.83	0.035
Social Support -distant X NH Black			0.96	0.775			1.64	< 0.001
Social Support -distant X Hispanic			1.10	0.521			0.95	0.641
Female (vs. male)	1.20	0.019	1.20	0.024	1.23	0.001	1.25	< 0.001
Age (vs. 60+)								
18–19	1.72	< 0.001	1.89	< 0.001	1.48	< 0.001	1.68	< 0.001
30–44	1.78	< 0.001	1.91	< 0.001	1.67	< 0.001	1.69	< 0.001
45–59	1.29	0.028	1.33	0.018	1.42	< 0.001	1.48	< 0.001
Education (vs. Some college)								
Less than HS	0.93	0.597	0.77	0.08	1.19	0.137	0.95	0.7
HS graduate	1.35	0.001	1.28	0.01	1.25	0.004	1.28	0.003
Bachelor's degree	0.69	0.001	0.64	< 0.001	0.57	< 0.001	0.58	< 0.001
Graduate degree	0.60	< 0.001	0.66	0.008	0.54	< 0.001	0.50	< 0.001
Household Income (vs. <$30K)								
$30K - <$60K	0.82	0.056	0.77	0.015	1.04	0.615	1.00	0.966
$60K - <$100K	1.00	0.989	0.99	0.895	0.88	0.151	0.87	0.145
$100k+	0.77	0.037	0.80	0.085	0.72	0.001	0.66	< 0.001
Married (vs. other)	0.83	0.028	0.84	0.053	1.01	0.851	1.04	0.596
Employed (vs. other)	1.16	0.073	1.09	0.333	0.97	0.627	0.93	0.342
Party (vs. Democrat)								
Lean Democrat	1.39	0.045	1.17	0.384	1.21	0.101	1.14	0.305
Independent/None	3.14	< 0.001	2.99	< 0.001	3.21	< 0.001	3.32	< 0.001
Lean Republican	7.92	< 0.001	7.89	< 0.001	6.02	< 0.001	6.20	< 0.001
Republican	6.38	< 0.001	6.66	< 0.001	6.64	< 0.001	7.06	< 0.001
Foreign born (vs. native)	0.65	0.005	0.84	0.293	0.76	0.013	0.75	0.03
Criminal legal involved (vs. no)	1.96	< 0.001	1.90	< 0.001	1.19	0.045	1.14	0.144
COVID (vs. no or not sure)	1.46	< 0.001	1.37	< 0.001	1.58	< 0.001	1.48	< 0.001
Health status (vs. Good)								
Excellent	1.74	0.005	1.70	0.009	2.35	< 0.001	2.30	< 0.001
Very good	0.73	0.009	0.65	< 0.001	1.00	0.989	1.01	0.907
Fair	1.05	0.566	1.03	0.789	1.20	0.011	1.21	0.013
Poor	1.91	< 0.001	1.84	< 0.001	1.54	< 0.001	1.56	< 0.001
Insurance (vs. no)	0.82	0.064	0.81	0.07	0.80	0.021	0.82	0.044
Nagelkerke R^2		0.267		0.272		0.292		0.306
Weighted *N*		6261		5814		6261		5809

Note. Model 2 was estimated with only non-Hispanic White, non-Hispanic Black, and Hispanic respondents

[a]COVID-19 is a scheme for rich people and big companies to make money off of the testing and vaccine. [b]The COVID-19 vaccines are coming out so fast because they have not been carefully tested

A. COVID-19 Scheme[a]



B. COVID-19 Vaccine[b]

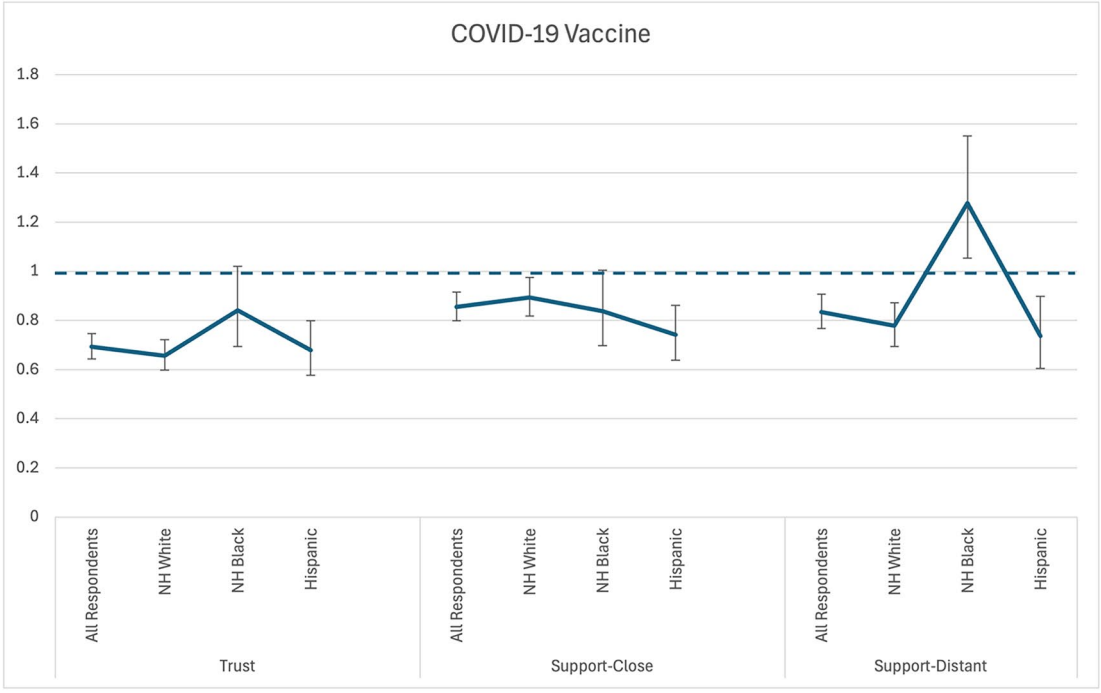


Fig. 1 Associations of trust in doctors and social support with misinformation endorsement (odds ratios) across non-Hispanic White, non-Hispanic Black, and H ispanic respondents

COVID-19 Scheme[a]

Note: Markers are odds ratios. Error bars are 95% confidence intervals. [a]COVID-19 is a scheme for rich people and big companies to make money off of the testing and vaccine. [b]The COVID-19 vaccines are coming out so fast because they have not been carefully tested

misinformation [101, 105, 106], an effort that will clearly require engagement with the community to achieve these goals.

Our findings suggest that social support from close/interpersonal and distant/communal ties can mitigate health misinformation. Yet we found a mixed pattern in these relationships across the three racial and ethnic groups considered. For Hispanic respondents, support from close ties was significantly associated with resistance to misinformation for both misinformation items, highlighting the role of strong networks of close others and the health benefits of such networks for this population. The pattern is consistent with the existing research suggesting an overall preference for interpersonal close ties and the prizing of interconnectedness among kin and extended relative social networks among Hispanic communities in the U.S [107–109]. Support from more distant communal ties was negatively associated with the endorsement of the vaccine misinformation item—corroborating existing research showing that weak ties play a role in circulating accurate health information and counteracting the potential information deprivation of close-knit, co-ethnic, and familial networks among Hispanic communities [110–112]. Support from distant social relationships, however, was unrelated to the endorsement of the COVID-19 scheme item. This finding suggests that for the Hispanic population, the role of distant, communal ties might be limited and dependent, at least in part, on the nature of the misinformation item.

For non-Hispanic Black respondents, our data showed that social support from neither interpersonal nor communal sources was a protective factor against misinformation. Perhaps most striking, for the COVID-19 vaccine item, we observed a significant positive association between social support from distant ties and the belief that the vaccines had not been adequately tested, suggesting that some of the larger networks connecting Black individuals might have facilitated, rather than mitigated, the spread of misinformation about the COVID-19 vaccines. Exactly why that might be, demands careful attention from public health and health communication research. Black Americans might not be influenced as much by the level of support from close ties because the support is too limited or insufficiently potent to mount meaningful resistance to prevalent misinformation. Furthermore, support received from more distant sources might have elements that encourage skepticism toward health experts and authorities due to historical mistreatment and structural racism. Whatever the case, more scholarly attention to and a better understanding of the networks in which health (mis)information is shared in non-Hispanic Black communities is needed [113].

Finally, for non-Hispanic White Americans, social support from both interpersonal and communal ties seems to offer protection against misinformation. In the case of the COVID-19 scheme item, however, the role of interpersonal support from close ties appears to be relatively weak—its association with endorsement of this item did not reach statistical significance. This finding invites more attention to the unique characteristics of specific misinformation items and the psychosocial mechanisms responsible for their dissemination. The COVID-19 scheme idea reflects a certain level of conspiracy thinking, which might be a feature of homogenous, strong network ties among some White Americans [114]. If this is the case, support from within such networks might offer little benefit in countering conspiracy-based misinformation. The strong partisan divides are also of concern, underscoring the need for culturally competent public health messaging from trusted messengers that can cross partisan lines.

Our analysis focused on two common misinformation beliefs during the pandemic—one symptomatic of conspiracy thinking and the other reflecting misperceptions based on false knowledge or based on plausible but scientifically ungrounded concerns regarding COVID-19 vaccines' rapid approval and distribution. Although we were interested in exploring the distinction between the two items, our findings revealed more similarities than differences in their associations with the social capital variables. The similarities were particularly clear among Hispanic and non-Hispanic White respondents. For these two groups, trust in doctors and social support from both close and distant others showed consistent negative associations with both misinformation items, albeit not always reaching statistical significance. We saw more differences between the two items among non-Hispanic Black respondents, for whom the associations involving social support varied in directionality depending on the source, with support from distant others emerging as a lone positive predictor of misinformation endorsement (vis-à-vis the COVID-19 vaccine item) in the entire study.

As noted earlier, the positive relationship between social support from distant others and the endorsement of vaccine misinformation by non-Hispanic Black respondents is an important finding and warrants careful attention to both the qualitative differences between misinformation types and how they might interact with specific characteristics of social networks on which Black communities rely for social support in health emergencies [76]. The discrepancies between Black communities and the other two racial and ethnic groups may be attributed to structural, relational, and informational variations in distant support networks within these populations. Network dynamics shaped by these variations can significantly impact how misinformation and misperceptions propagate within communities. Most concerning, targeted misinformation campaigns could

exploit historical trauma and mistrust in institutionalized medicine among minoritized communities to propagate false beliefs about important public health measures, such as vaccination [76, 115, 116]. Vigilance and effective countermeasures against unintentionally propagated misperceptions or intentionally motivated misinformation campaigns should be priorities within public health efforts serving Black populations.

Overall, our findings suggest that more nuance and granularity are necessary when understanding the role of social support in combating health misinformation across different racial and ethnic populations. These groups exhibit unique patterns when it comes to the linkage between social support and endorsement of specific misinformation items. Greater attention to the nexus of race and ethnicity, misinformation type, and the source of social support could lead to a clearer and more in-depth understanding of how misinformation infiltrates and persists in communities.

This study, anchored by social capital theory, views network-based social resources as important determinants of individual and community health [35, 98]. The literature further posits that different kinds of social capital reside in social networks connecting individuals within and across communities, organizations, and other social and institutional boundaries [10, 42]. Our study conceptualizes trust in doctors as a dimension of linking social capital critical for the dissemination of accurate health information in communities. It also suggests that the nature and impact of social support may vary as a function of social distance and tie strength, as well as other important community characteristics, such as race and ethnicity. Our study findings demonstrate the usefulness of social capital theory as a guiding framework for research on the role of social dynamics in health misinformation. Greater granularity and contextuality are warranted in the continued investigation of the relationship between social capital and health in community settings.

On the practical side, while trust in doctors emerges as a relatively robust factor fortifying individuals and groups against misinformation, the ways in which it might be built and leveraged requires more sustained reflection and targeted action. Doctors are well-positioned to play the role of trusted messengers addressing health misinformation with their patients, engaging in accurate public health messaging, and building public confidence in science and scientific knowledge. Yet, effective doctor-patient communication would need to go beyond simply addressing information deficits towards improving the quality of patient-provider relationships in which health information is shared. In other words, since studies have shown that both informational and emotional support from doctors are strongly correlated with patient trust [117], interventions leveraging trust in doctors should aim both at improving patients' access to evidence-based health information and creating supportive environments for patient-doctor interactions more broadly. Similarly, effective community-based health initiatives involving doctors and aimed at improving access to quality information and quality care, particularly for communities disproportionately affected by misinformation, must reflect tactile understanding of communities' social networks, address the challenges patients and communities face in fully trusting healthcare and providers, including issues stemming from structural and historical inequalities, in order to leverage and strengthen cognitive, emotional and instrumental dimensions of community networks for accurate health messaging. Social capital theory provides an apt framework for facilitating those complex but necessary interventions.

Overall, our findings show that strengthening social capital in communities—particularly improving trust in doctors and strengthening social support networks—might help foster resistance to health misinformation and counteract the effects of the infodemic. Here, however, different approaches might be needed across racial and ethnic communities. For example, in Black communities, hosting health-related town halls facilitated by Black doctors—often viewed as trusted messengers and community leaders—may be received more openly by community members [118]. This strategy might also have the benefit of reshaping the information landscape in larger social networks among Black Americans so that social support received from these sources through other channels would be less likely to contribute to the growth and spread of misinformation. A related strategy might focus on the development of therapeutic alliance (TA) between Hispanic, Latino, and Black individuals and their physicians and physicians in their communities. TA is anchored by the development of bonds, collaboration on tasks, and agreement on goals [119]. While usually applied to the therapist-client relationship, developing a strong sense of TA in communities by increasing care and improving trust might help reduce the spread of misinformation as well. Finally, our data showed a strikingly strong association among White Americans between political party affiliation and misinformation endorsement. Finding ways to productively engage all political and cultural communities with effective public health communication [3] is likely critical to the containment of health misinformation, particularly conspiracy thinking, within White communities.

Our findings highlight the critical role of trust in doctors as a protective factor against health misinformation. Yet, leveraging such trust for effective and sustainable health communication interventions, particularly in communities with low trust in medical professionals to begin with, is no small feat. One strategy might be to

identify and involve doctors who have already earned community trust through ongoing engagement with local problems as credible messengers during health crises and, as importantly, in ongoing preventative efforts. Such efforts would extend the role of these trusted messengers beyond crisis response to health emergencies (such as a global pandemic) and focus on sustained participation in long-term initiatives that build social capital, enhance well-being, and strengthen community resilience in the health domain and beyond.

To this end, it is important to carefully evaluate available resources of trust in the community and their implications for shielding communities against misinformation [75, 120]. Where trust in medical professionals is low, it is especially important to identify alternative trusted community figures such as local leaders of grassroots organizations, local educators, or religious workers. Fostering long-term, collaborative partnerships between these community leaders and medical experts could help support accurate health messaging and overall community well-being. While implementing such initiatives might be challenging and requires long-term planning, it is essential for reducing vulnerability to misinformation and building trust as a foundation for future interventions.

Our findings should be considered in light of several limitations. First, the study assessed only the role of trust in doctors and social support in misinformation endorsement without linking these issues to behavioral outcomes such as actual vaccine uptake; however, there is a clear and strong relationship between misinformation endorsement and vaccine uptake [44, 121]. Second, we relied on relatively limited measures of trust, social support, and misinformation endorsement, all complex constructs; more detailed measures might enhance the richness of findings. Third, our study used cross-sectional survey data. More dynamic forms of longitudinal data and analytical approaches might afford additional nuance in understanding how health (mis)information diffuses in society and across different racial and ethnic groups. Fourth, our data are self-reported and may be impacted by social desirability and recall bias. Finally, the response rate for our study was modest. We used weights to adjust for sampling design and non-response bias, but cautious interpretation is warranted.

Conclusion

To conclude, this study sheds light on the relationship between social capital and health misinformation during the COVID-19 pandemic. The findings paint a nuanced picture of how trust in doctors and social support operate both in society at large and across racial and ethnic communities. Insights gained might help researchers and practitioners understand how misinformation spreads within and across social networks and which social resources are best mobilized to counteract its proliferation and impact.

Supplementary Information

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Supplementary Material 1

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Author contributions
UAH: Conceptualization, Investigation, Writing– original draft preparation; LS: Investigation, Writing– original draft preparation; AM: Investigation, Writing– Reviewing and Editing; BJT, PAL, HP, and JS: Methodology, Funding acquisition, Writing– Reviewing and Editing; FST: Conceptualization, Methodology, Funding acquisition, Writing– Reviewing and Editing; XZ: Conceptualization, Methodology, Formal analysis, Writing– original draft preparation. All authors reviewed the manuscript.

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Data availability
Data will be made available on request to Bruce Taylor (Taylor-Bruce@norc.org).

Declarations

Ethics approval and consent to participate
This study was approved by the NORC at the University of Chicago Institutional Review Board (IRB00000967) under its Federal-wide Assurance (FWA00000142). All participants indicated informed consent before completing the survey.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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