Adherence to COVID-19 mitigation measures among American adults: the need for consistent and unified messaging

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Abstract

In the United States, elite and media communications about the risks of, and mitigation strategies for, COVID-19 have been characterized by lack of consensus. In this study, we draw from a nationally representative sample of American adults to examine the associations between exposure to different media and platforms (mainstream, conservative, liberal or social media) and adherence to COVID-19 mitigation measures such as physical distancing and mask use. We also examine the individual and social factors associated with adherence to mitigation measures. We find that exposure to conservative outlets, being republican, having low confidence in scientists and high perception of information overload are associated with low adherence. In contrast, exposure to liberal and mainstream news outlets, being democrat, having high confidence in scientists, and low perception of information overload are associated with high adherence. The findings suggest the need for consistent and unified public health messaging that cuts across partisan splits and the growing skepticism in science.

Introduction

The United States is one of the countries that have been hardest-hit by the coronavirus (COVID-19) pandemic, with more than 11 million confirmed cases and about 260 000 deaths as of early December 2020 [1]. Given the considerable length of time required for vaccine development, the primary protection strategies that have been strongly recommended by global and national public health authorities such as the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC) included physical ('social') distancing, using mask or face coverings, hand washing and/or sanitizing, and cleaning and/or disinfecting surfaces that are frequently touched [2]. These mitigation measures, if performed consistently, are shown to be helpful in slowing down the spread of the infection in both indoor and public settings [3].

To promote public adherence to these measures, well-planned public health communications are required. As such, the CDC, state and local public health authorities have been providing guidance and communication resources to public health communicators and educators to launch campaigns and/or disseminate prevention information within their jurisdictions [4]. Additionally, several non-governmental organizations have taken active part in designing and disseminating public health communications with the aim of influencing public

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attitudes and behaviors related to the pandemic [5]. While campaigns and public service announcements are important public health tools to provide the public with lifesaving messages, research shows that the news media, including online media, are also one of the main sources of health-related information for most Americans [6]. The news media, as a source of information on health and health-care, have also been shown to influence health-related beliefs and behaviors as well as public health policies and practice [7–9].

Despite the public's considerable reliance on the news media for health-related information, over the past few years, the US news media have become increasingly polarized leading to partisan divides among audiences in the use and trust of media sources [9, 10]. Partisan divides and polarization of the media would create a situation whereby the public may not be able to receive coherent and credible information on issues of great public health consequences such as the COVID-19 pandemic. Some media even engaged in conspiracy theories and framed the COVID-19 pandemic in a way that is inconsistent with scientific evidence and expert recommendations [11]. The media's polarization was also accompanied and/or precedented by lack of consensus in political elite communications, particularly, cues sent to the public by the members of the US House and Senate [12]. Indeed, there is already some evidence showing that exposure to different media and platforms for COVID-19 information is associated with variations in response to the pandemic. For example, Simonov and colleagues found that a 10% increase in Fox News cable viewership was associated with a 1.3 percentage point reduction in the propensity to stay at home during the early stages of the pandemic [11]. In a similar study, Bursztyn and colleagues investigated the effects of viewership to two Fox cable news shows: *Hannity* and *Tucker Carlson Tonight*. These two shows, according to the authors, had relatively similar content prior to January 2020, but differed sharply in their coverage of the COVID-19 pandemic leading to time differences in people's adoption of preventive behaviors [13]. Interestingly, the authors also found that areas with greater exposure to the show downplaying the threat of the pandemic experienced a greater number of cases and deaths [13]. Additionally, another study that looked at the association between trust in media and COVID-19 mitigation behaviors found that people who trust Fox News more than CNN engaged in fewer preventive and more risky behaviors related to the pandemic [14].

The present study expands on this recent body of literature by examining whether and how reliance on different media and platforms for COVID-19 information is associated with adherence to recommended COVID-19 mitigation measures. Specifically, while previous research has focused on the effects of viewership to one or two media or shows on one or more COVID-19 mitigation measures, this study has examined the association of reliance on the major US media (classified as conservative, mainstream, and liberal) and social media sources with the four widely recommended mitigation measures—physical distancing, use of mask or face covering, hand washing and/or sanitizing, and cleaning and/or disinfecting frequently touched surfaces.

Methods

Study design and participants

Data for this study come from a large nationwide online probability-based panel called the KnowledgePanel®. The KnowledgePanel, maintained by the global public opinion research firm Ipsos, was created by combining random digit dialing (RDD) and address-based sampling (ABS) methods. The combination of RDD and ABS methods helped overcome the problems associated with cell phone penetration that threatened the representativeness of samples from many RDD surveys. Because surveys among panel members are administered online, panel members without access to the Internet were provided with a web-enabled device and free Internet service by Ipsos.

A nationally representative sample of 1012 Americans aged 18 years and older participated in this survey. Assuming 60% response rate (based on

American Association of Public Opinion Research), 1822 panel members were contacted to reach our target sample size. Following a pretest among 25 participants, the survey was administered in English and Spanish in July 2020.

Measures

Outcome variables

Adherence to physical distancing was measured by asking two questions: 'As a result of COVID-19, have you (i) avoided places where many people are gathered together, like sporting events, shopping malls or public transportation, and (ii) reduced human contact with people outside of your immediate family such as signs of affection (hug/kiss), shaking hands or sign of peace during worship'. Respondents were asked to indicate how often they have done each on a scale of 1–4, with 1 being 'Never', 2 being 'Rarely', 3 being 'Often' and 4 being 'Always'. Adherence to use of mask or face covering, hand washing and/or sanitizing, and cleaning and/or disinfecting touched surfaces were measured by asking: 'As a result of COVID-19, have you (i) used a face-mask when in public, (ii) washed your hands or used hand sanitizer, (iii) cleaned surfaces that are touched frequently (such as doorknobs)'. Respondents were asked to indicate how often they have done each on a scale of 1–4, with 1 being 'Never' and 4 being 'Always'. For analysis, we dichotomized the responses for each variable into 'low' and 'high' adherence.

Independent variables

These included exposure to different media and platforms for COVID-19 news, perceived information overload, political party identification, confidence in scientists, and demographic and social factors (age, gender, race/ethnicity, education, household income and employment).

Exposure to different media and platforms for COVID-19 news. This variable was measured by providing respondents with six groups of media and platforms adapted from previous research [15]. The six groups are (i) mainstream print outlets (such as the Associated Press, *The New York Times*, the *Washington Post* or the *Wall Street Journal*), (ii) conservative outlets (such as Fox News, Rush Limbaugh, Breitbart News, One America News or The Drudge Report), (iii) liberal sources (such as MSNBC, Bill Maher or Huffington Post), (iv) mainstream broadcast (such as ABC News, CBS News or NBC News), (v) online news media aggregators (such as Google News or Yahoo News) and (vi) social media sources (such as Facebook, Twitter or YouTube). A recent study from the Pew Research Center also supports the ideological basis of this classification [16]. Respondents were asked to indicate whether each of this group of media is their 'major source', 'minor source' or 'not a source' for COVID-19 news.

Perceived information overload. This variable was measured by asking respondents to indicate their agreement to the statement 'there are so many different recommendations about COVID-19 that it is hard to know which ones to follow' on a four-point scale with 1 being 'Strongly disagree' and 4 being 'Strongly agree'. For analysis, we dichotomized the responses into low versus high perceived information overload.

Political party identification. This was measured by asking respondents to identify themselves as republican, democrat, independent or other.

Confidence in scientists. This variable was measured by asking respondents to indicate whether they have 'a great deal of confidence', 'only some confidence' or 'hardly any confidence at all' in scientists or researchers working on science. For analysis, we dichotomized the responses into 'a great deal of confidence' and 'hardly any confidence'.

We used standard and commonly used questions to measure demographic and social factors: gender, age, education, income, race/ethnicity and employment.

Statistical analysis

We examined bivariate associations of demographic and social factors with adherence to each of the four mitigation measures as well as with the four measures combined using contingency tables and assessed independence with second-order Rao and

Scott adjusted-Wald test. We then built generalized linear models (GLM) with binomial distribution and logit link to regress adherence to each of the four mitigation measures as well as the four measures combined on the communication factors (exposure to different media and platforms for COVID-19 news and perceived information overload), controlling for gender, age, race/ethnicity, education and income. All analyses were conducted with sampling weights using the complex samples analytic procedures of SPSS version 20.

Results

Adherence to mitigation measures

Adherence to each of the four mitigation measures (physical distancing, mask use, hand washing or sanitizing, and cleaning or disinfecting surfaces) was generally high. However, there were significant differences across population sub-groups.

Adherence across demographic and social groups

The data showed that women are generally more adherent to the mitigation measures compared to men. For all mitigation measures except mask use there were significant differences (ranging from 3.5 to 16.5%) between men and women in adhering to the measures. For all four mitigation measures combined, 54.7% women compared to 38.2% men reported high adherence. Age-based differences were also seen in adherence to some of the measures, with 95.2% of people aged 60 and above compared to 86.1% of people 18 to 29-year-olds indicating high adherence to mask use, and 98.4% of people 60 and above compared to 93.5% of those 18 to 29-year-olds reporting high adherence to the hand washing/sanitizing measure (Table I).

The data did not show any significant differences in adherence based on race/ethnicity and education. However, there were income-based differences in adherence to hand washing/sanitizing, with 85% of those earning a household annual income of less $10 000 compared to 99% and 98% of those earning $25 000–<$50 000 and $50 000–<$75 000, respectively, reporting high adherence. Similarly, employment-based differences in adherence to all four measures combined were seen, with 80.7% of individuals who identified themselves as full-time students compared to 40.8% of people who said they are employed reporting high adherence (Table I).

Significant differences in adherence to physical distancing and cleaning/disinfecting surfaces as well as with the four measures combined were observed based on political party identification. Specifically, 97.4% of the respondents who identified themselves as democrats compared to 92.1% and 88.2% of the people who identified themselves as independent and republican, respectively, reported high adherence to physical distancing. Similarly, 90.3% of those who identified themselves as democrats compared to 85.3% and 78.6% of those who identified themselves as independent and republican, respectively, reported high adherence to cleaning/disinfecting touched surfaces (Table I).

Moreover, significant differences in adherence to all mitigation measures except one—cleaning/disinfecting surfaces—were discerned based on people's confidence in scientists. Specifically, 95.5%, 96.4% and 97.5% of people with high confidence in scientists compared to 88.4%, 88.1% and 94.3% of those with low confidence reported high adherence to physical distancing, mask use and hand washing/sanitizing, respectively. For the four mitigation measures combined, 53.3% of people with high confidence in scientists compared to 37.1% of those with low confidence reported high adherence (Table I).

Adherence and communication factors

Our data showed that adherence to mitigation measures also varies depending on source of COVID-19-related news. Specifically, the odds of adhering to physical distancing was lower (OR: 0.2; 95% CI: 0.09–0.41) among people whose major sources of COVID-19 news were conservative outlets (such as Fox News, Rush Limbaugh, Breitbart News, One America News or The Drudge Report) compared to

Table I. *Omnibus chi-square tests assessing associations of demographic and social factors with adherence to the COVID-19 mitigation measures*

Demographic and social factors	Adherence to mitigation measures														
	Physical distancing			Mask/face covering use			Hand washing/sanitizing			Cleaning/disinfecting surfaces			Four measures combined[a]		
	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F
Gender															
Male	10.3	89.7	$F_{(1,\ 1011)} = 5.69$, $P = 0.02$	9.6	90.4	$F_{(1,\ 1011)} = 3.19$, $P = 0.08$	5.9	94.1	$F_{(1,\ 1011)} = 6.23$, $P = 0.01$	20.3	79.7	$F_{(1,\ 1011)} = 13.0$, $P = 0.000$	61.8	38.2	$F_{(1,\ 1011)} = 15.87$, $P = 0.00$
Female	5.4	94.6		5.5	94.5		2.4	97.6		9.9	90.1		45.3	54.7	
Age															
18–29	9.3	90.7	$F_{(2.92,\ 2952.35)} = 0.87$, $P = 0.46$	13.9	86.1	$F_{(2.85,\ 2882.2)} = 3.03$, $P = 0.03$	6.5	93.5	$F_{(2.92,\ 2551.89)} = 2.66$, $P = 0.05$	16.0	84.0	$F_{(2.94,\ 2976.82)} = 0.58$, $P = 0.63$	48.1	51.9	$F_{(2.87,\ 2905.08)} = 1.31$, $P = 0.27$
30–44	8.9	91.1		7.8	92.2		6.3	93.7		15.1	84.9		58.9	41.1	
45–59	8.5	91.5		5.1	94.9		2.9	97.1		11.9	88.1		55.6	44.4	
60+	5.2	94.8		4.8	95.2		1.6	98.4		16.6	83.4		50.3	49.7	
Education															
Less than high school	12.0	88.0	$F_{(2.86,\ 2896.78)} = 1.53$, $P = 0.21$	6.2	93.8	$F_{(2.81,\ 2840.58)} = 2.48$, $P = 0.06$	6.0	94.0	$F_{(2.89,\ 2917.84)} = 1.20$, $P = 0.31$	14.3	85.7	$F_{(2.89,\ 2922.64)} = 0.69$, $P = 0.55$	55.2	44.8	$F_{(3,\ 2990.74} = 0.80$, $P = 0.49$
High school	8.2	91.8		9.9	90.1		5.7	94.3		13.3	86.7		47.1	52.9	
Some college	9.1	90.9		9.9	90.1		3.8	96.2		13.5	86.5		49.0	51.0	
Bachelor's degree or higher	5.0	95.0		3.8	96.2		2.4	97.6		17.7	82.3		56.5	43.5	
Race/Ethnicity															
White, non-Hispanic	8.0	92.0	$F_{(2.43,\ 2458.72)} = 0.37$, $P = 0.73$	8.2	91.8	$F_{(2.40,\ 2428.14)} = 0.92$, $P = 0.41$	3.4	96.6	$F_{(2.43,\ 2882.2)} = 0.57$, $P = 0.60$	16.1	83.9	$F_{(2.27,\ 2292.55} = 0.91$, $P = 0.41$	55.2	44.8	$F_{(2.87,\ 2905.08} = 0.90$, $P = 0.41$
Black, non-Hispanic	5.2	94.8		4.4	95.6		4.6	95.4		14.0	86.0		47.1	52.9	
Hispanic	8.4	91.6		6.0	94.0		5.0	95.0		10.6	89.4		49.0	51.0	
Other, non-Hispanic	8.6	91.4		9.5	90.5		6.6	93.4		16.1	83.9		56.5	43.5	
Income															
<$10,000	11.0	89.0	$F_{(5.44,\ 5499.98)} = 0.39$, $P = 0.87$	17.2	82.8	$F_{(5.24,\ 5294.01)} = 0.77$, $P = 0.58$	15.1	84.9	$F_{(5.17,\ 5221.5)} = 2.23$, $P = 0.05$	24.3	75.7	$F_{(5.51,\ 5569.25)} = 1.93$, $P = 0.08$	49.5	50.5	$F_{(5.48,\ 5541.07)} = 1.00$, $P = 0.43$
$10 000 to <$25 000	8.1	91.9		7.3	92.7		5.7	94.3		11.0	89.0		58.3	41.7	
$25 000 to <$50 000	8.8	91.2		6.9	93.1		1.2	98.8		12.2	87.8		47.3	52.7	
$50 000 to <$75 000	5.5	94.5		5.2	94.8		2.3	97.7		13.0	87.0		49.1	50.9	
$75 000 to <$100 000	9.9	90.1		9.8	90.2		6.6	93.4		25.5	74.5		59.7	40.3	
$100 000 to <$150 000	6.4	93.6		5.5	94.5		3.2	96.8		12.5	87.5		58.0	42.0	
>$150 000	8.0	92.0		8.9	91.1		4.9	95.1		14.4	85.6		52.0	48.0	

(continued)

Table I. *(continued)*

Demographic and social factors	Adherence to mitigation measures														
	Physical distancing			Mask/face covering use			Hand washing/sanitizing			Cleaning/disinfecting surfaces			Four measures combined[a]		
	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F	Low %	High %	Adjusted F
Party identification															
Republican	11.8	88.2	$F_{(1.77, 1789.35)} = 8.24$, $P = 0.001$	7.8	92.2	$F_{(2, 2012.31)} = 2.39$, $P = 0.09$	5.1	94.9	$F_{(1.86, 1883.25)} = 2.15$, $P = 0.12$	21.4	78.6	$F_{(2, 2020.60)} = 5.19$, $P = 0.01$	65.5	34.5	$F_{(2, 2021)} = 9.06$, $P = 0.00$
Democrat	2.6	97.4		3.6	96.4		1.9	98.1		9.7	90.3		43.3	56.7	
Independent	7.9	92.1		9.0	91.0		4.3	95.7		14.7	85.3		57.0	43.0	
Employment															
Employed	10.0	90.0	$F_{(4.24, 4285.75)} = 2.28$, $P = 0.06$	8.1	91.9	$F_{(4.23, 4278.14)} = 1.60$, $P = 0.17$	4.6	95.4	$F_{(4.2, 4234.93)} = 2.28$, $P = 0.06$	14.2	85.8	$F_{(4.64, 4695.18)} = 0.86$, $P = 0.50$	59.2	40.8	$F_{(5, 5018.20)} = 4.23$, $P = 0.001$
Currently laid off or on furlough	4.6	95.4		9.0	91.0		5.8	94.2		11.9	88.1		49.2	50.8	
Retired	4.0	96.0		4.6	95.4		2.2	97.8		18.0	82.0		51.4	48.6	
Homemaker	5.6	94.4		5.7	94.3		0.9	99.1		15.0	85.0		44.4	55.6	
Full-time student	2.1	97.9		0.9	99.1		0.9	99.1		6.5	93.5		19.3	80.7	
Other	8.2	91.8		15.5	84.5		9.1	90.9		19.3	80.7		50.5	49.5	
Confidence in scientists															
Low confidence	11.6	88.4	$F_{(1, 1011)} = 9.94$, $P = 0.002$	11.9	88.1	$F_{(1, 1011)} = 12.11$, $P = 0.001$	5.7	94.3	$F_{(1, 1011)} = 4.70$, $P = 0.03$	16.3	83.7	$F_{(1, 1011)} = 0.93$, $P = 0.34$	62.9	37.1	$F_{(1, 1011)} = 15.77$, $P = 0.000$
High confidence	4.5	95.5		3.6	96.4		2.5	97.5		13.6	86.4		46.7	53.3	

[a]For the combined variable, scores range 5–20 with a median of 18. Low adherence groups are those scoring less than the median (<18).

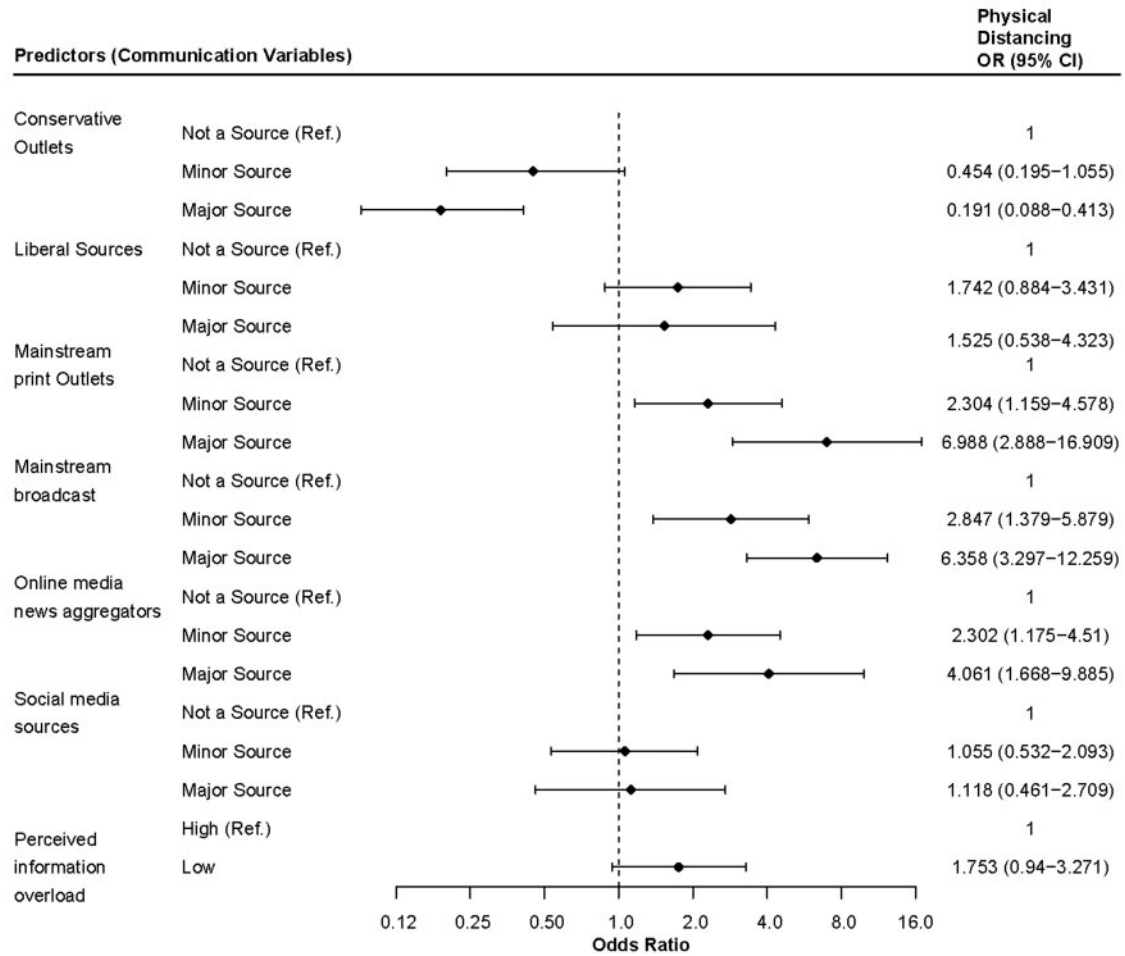

Fig. 1. Odds ratios and 95% CI plots for communication variables predicting adherence to physical distancing (ORs adjusted for gender, age, education, income and race/ethnicity).

those for whom such media were not a source of COVID-19 news. On the contrary, the odds of adhering to physical distancing was much higher among people whose major sources of COVID-19 news were mainstream print outlets such as the Associated Press, The New York Times, the Washington Post or the Wall Street Journal (OR: 6.99; 95% CI: 2.89–16.91) and mainstream broadcast such as ABC News, CBS News or NBC News (OR: 6.36; 95%CI: 3.30–12.26) compared to people for whom these media outlets were not a source of news about the pandemic (Fig. 1). Similarly, the odds of adhering to physical distancing were higher (OR: 4.06; 95%CI: 1.67–9.89) among people whose major COVID-19 news sources were online media aggregators such as Google News or Yahoo News compared to people for whom these media were not a source of news about COVID-19.

The odds of adhering to mask use were also higher among people whose major sources of COVID-19 news were mainstream print outlets such as the Associated Press, The New York Times, the Washington Post or the Wall Street Journal (OR: 7.49; 95% CI: 2.33–24.07) and mainstream

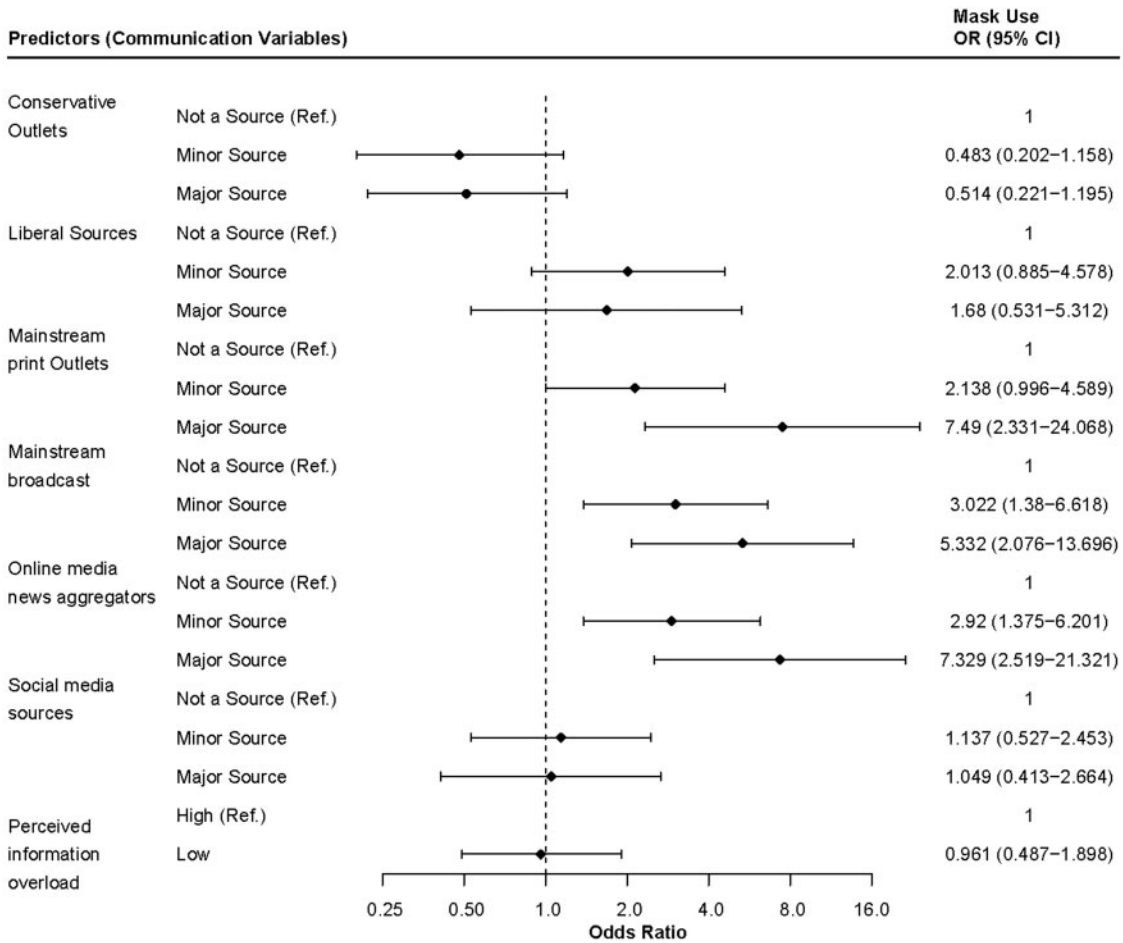

Fig. 2. Odds ratios and 95% CI plots for communication variables predicting adherence to mask/face covering use (ORs adjusted for gender, age, education, income and race/ethnicity).

broadcast such as ABC News, CBS News or NBC New (OR: 5.33; 95%CI: 2.08–13.70) compared to people for whom these media outlets were not a source of news about COVID-19. Similarly, the odds of adhering to mask use were higher (OR: 7.33; 95%CI: 2.52–21.32) among people whose major COVID-19 news sources were online media aggregators such as Google News or Yahoo News compared to people for whom these media were not a source of news about COVID-19 (Fig. 2).

Exposure to mainstream broadcast as a major source of COVID-19 news was also significantly associated with adherence to hand washing/sanitizing and cleaning/disinfecting surfaces. Specifically, the odds of adhering to hand washing/sanitizing (OR: 2.99; 95%CI: 1.11–8.05) and cleaning/disinfecting (OR: 2.46; 95%CI: 1.38–4.40) were higher among people whose major sources of COVID-19 news were mainstream broadcasts compared to those who reported these media were not their source of COVID-19 news (Figs. 3 and 4). The odds of adhering to cleaning/disinfecting surfaces were also higher (OR: 2.49; 95%CI: 1.32–4.70) among people whose major sources of COVID-19 news were mainstream print outlets compared to

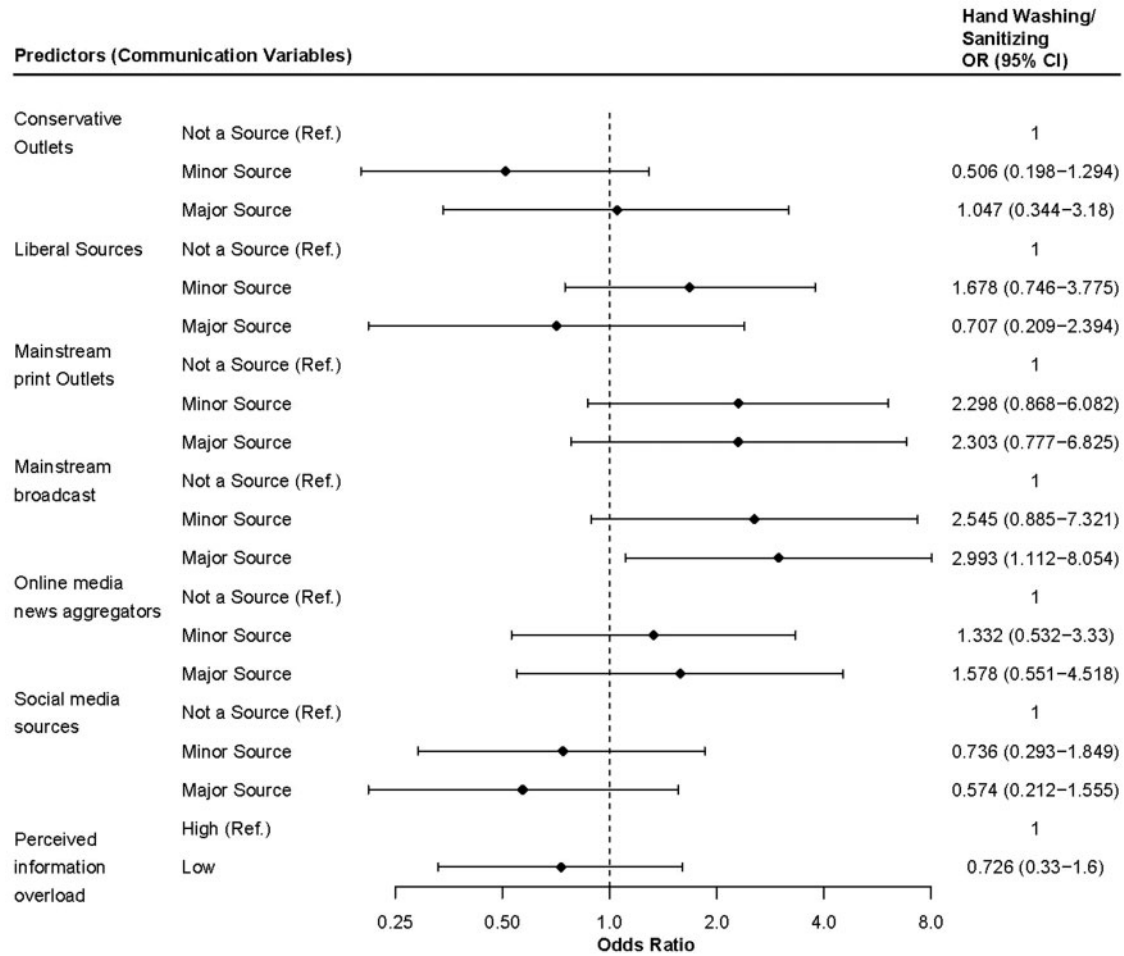

Fig. 3. Odds ratios and 95% CI plots for communication variables predicting adherence to hand washing/sanitizing (ORs adjusted for gender, age, education, income and race/ethnicity).

those for whom such media were not a source of COVID-19 news.

The above observations persisted when we looked at the associations of exposure to the different media with adherence to the four mitigation measures combined; exposure to conservative outlets stood in stark contradiction with exposure to the other media outlets: liberal sources, mainstream print, mainstream broadcast, and online news aggregators such as Google News and Yahoo News. The odds of adhering to the four measures combined was lower (OR: 0.60; 95%CI: 0.38–0.94) among people whose major COVID-19 news sources were conservative outlets compared to those for whom such media were not a source of news about COVID-19. In contrast, the odds of adhering were higher among people whose major COVID-19 news sources were liberal sources such as such as MSNBC, Bill Maher or Huffington Post (OR: 1.92; 95%CI: 1.13–3.327), mainstream print (OR: 3.14; 95%CI: 2.01–4.91), mainstream broadcast (OR: 2.26; 95%CI: 1.42–3.61) and online news media aggregators (OR: 2.30; 95%CI: 1.39–3.83)

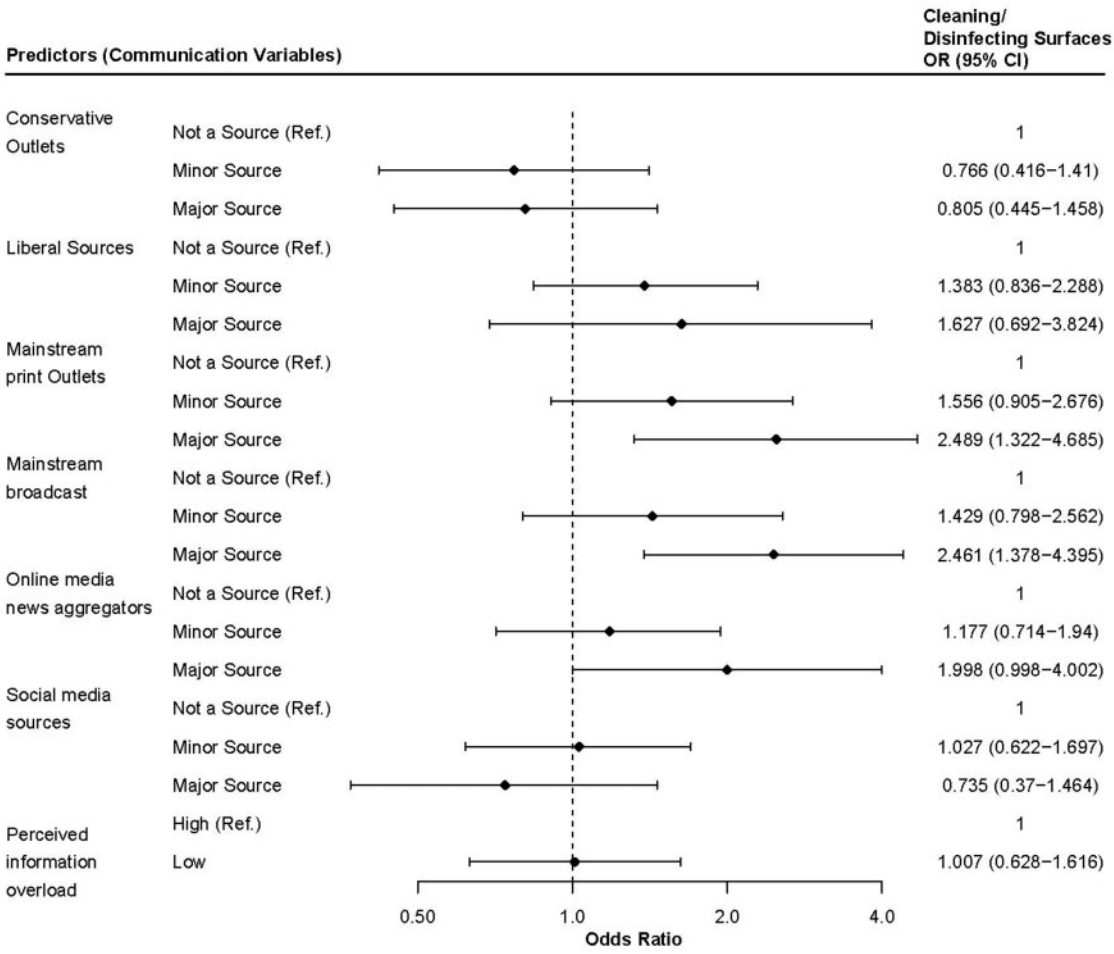

Fig. 4. Odds ratios and 95% CI plots for communication variables predicting adherence to cleaning/disinfecting surfaces (ORs adjusted for gender, age, education, income and race/ethnicity).

compared to people for whom these media sources were not a source of news for the pandemic (Fig. 5).

Additionally, the odds of adhering to the four measures combined was higher (OR: 1.72; 95%CI: 1.22–2.42) among people with low perceived COVID-19 information overload compared to people with high perceived COVID-19 information overload.

Discussion

COVID-19 has changed the world in a few months with tremendous far-reaching impact on almost every aspect of our lives. Hope abounds that vaccines that are currently underway will help curb the spread of the infection, although the logistics of deploying the vaccines as well as public acceptance of the vaccines remain important issues to address [17]. Until vaccines are deployed and even in

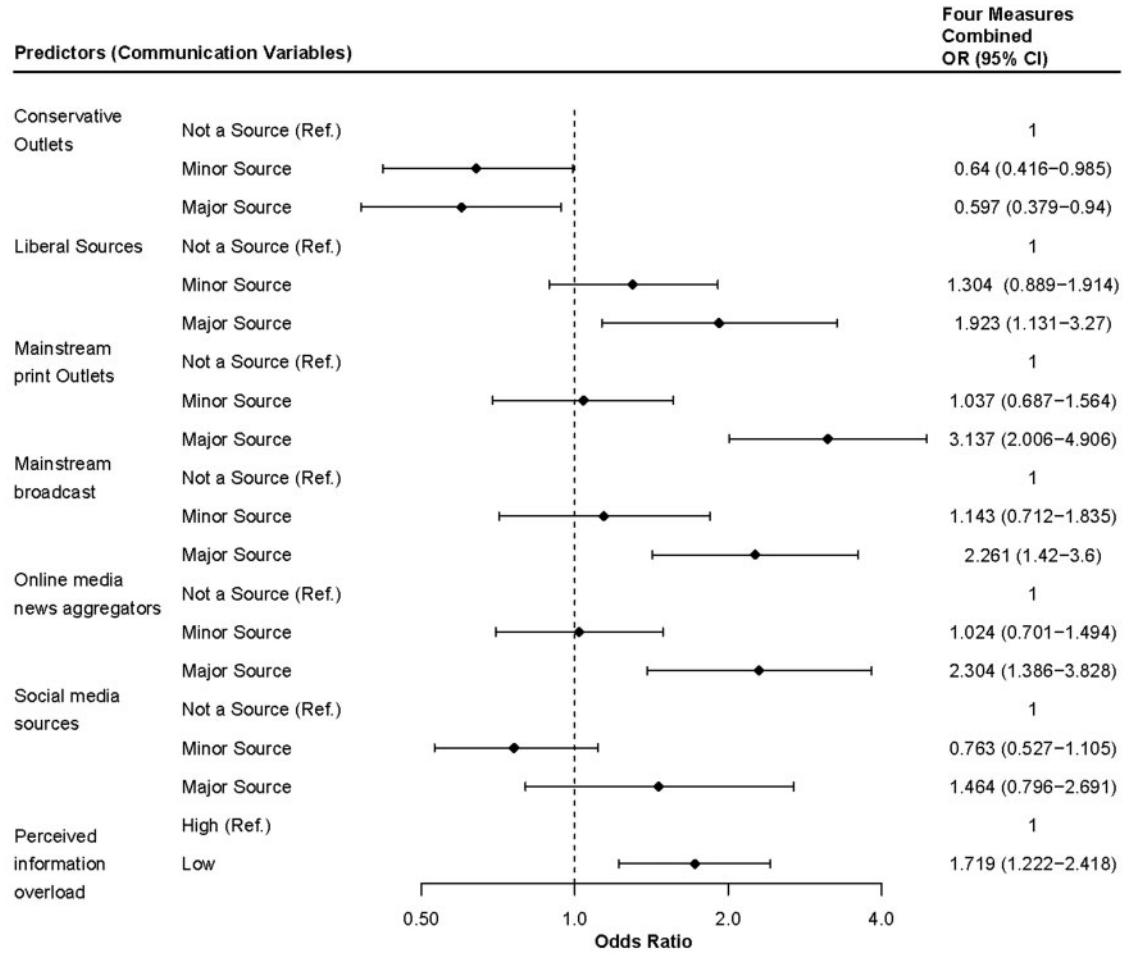

Fig. 5. Odds ratios and 95% CI plots for communication variables predicting adherence to the four mitigation measures combined (ORs adjusted for gender, age, education, income and race/ethnicity).

tandem with vaccines, public health mitigation measures remain crucial to save millions of lives.

This study found that adherence to each of the four mitigation measures was generally high. However, adherence differed across population subgroups. We found gender- and age-based differences in adherence, with women and older people being generally more adherent compared to men and younger people. Although our data did not show any clear pattern, there were also income-based differences in adherence, with people in the lowest income group being less adherent compared to those in the higher income groups. The data also indicated that people who identified themselves as full-time students were more adherent than those who identified themselves as employed. Although looking at the reasons why certain groups are less adherent than others was not within the scope of this survey, there could be various individual, socioeconomic and structural factors that contribute to lack of adherence among certain groups such as those

who are currently employed and people from low socioeconomic groups.

Beyond the common demographic and social factors, our data showed that adherence also differs based on political ideology (party identification) and confidence in scientists. People who identified themselves as republicans were less adherent compared to people who identified themselves as democrats. This finding is consistent with previous research that found the role of political differences in people's response to the pandemic in general [18] and the association between conservativism and low perception of personal vulnerability to and severity of the virus [10]. Partisan split on public health issues is not new; previous research has shown that conservatives and/or republicans are generally less likely to express pro-immunization attitudes compared to democrats and others [19, 20].

Trust in science or confidence in scientists is the other important factor associated with adherence to COVID-19 mitigation measures. Adherence was higher among people with high confidence in scientists compared to those with low confidence in scientists. This is consistent with several other studies in the United States and abroad that have shown that trust in science is a key factor associated with public response to the COVID-19 pandemic [21–23]. Indeed, this finding is not an isolated observation; it could be seen within existing literature in the social sciences that has documented variations in trust in science across population groups and the factors associated with such variations globally and in the United States. For example, in a study exploring time trends in public trust in science in the United States from 1974 to 2010, Gauchat reported that 'conservatives began the period with the highest trust in science, relative to liberals and moderates, and ended the period with the lowest' [24]. This decline has been shown to be associated with reliance on conservative media sources [25], and has been considered one of the mega-trends that accompanied the rise of rampant misinformation in the free-for-all opinion market of the social media [26].

COVID-19 has been overshadowed by politics. Elite communications on the crisis, particularly during the early months of the outbreak, have been characterized by lack of consensus [12]. Elite communications are often echoed and amplified by the media, and given that the US media have become increasingly polarized over the past decade [16], COVID-19 messages are likely to be selected, framed and presented to the public differently by the different media. Research has shown that exposure to different media are associated with differences in risk perceptions and beliefs about the lethality of the infection [13, 15]. This study has taken a step forward and brought additional evidence on the associations of exposure to the different media and platforms with COVID-19 related behavioral outcomes—performing or adhering to the four mitigation measures: physical distancing, mask or face covering use, hand washing and/or sanitizing, and cleaning and/or disinfecting surfaces.

Our data showed that adherence to public health mitigation measures varies depending on where one gets their COVID-19 related news. Exposure to conservative outlets was generally associated with low adherence whereas exposure to liberal, mainstream and online news aggregators such as Google News and Yahoo News was associated with higher adherence. Literature in health communication has long recognized the power of the news media in setting and framing public health issues and thereby influencing not only health beliefs and behaviors [7, 27,28] but also public health policies and practice [8]. Unfortunately, over the past years the US media have become polarized leading to partisan divides among audiences in the use and trust of media sources [16, 29]. Partisan divides and polarization of the media appear to be creating a situation whereby the public cannot receive coherent and credible information on the COVID-19 pandemic.

According to our study, adherence also varied depending on whether individuals think COVID-19 recommendations are so many and hard to follow. People who felt that there are so many different recommendations about COVID-19 that it is hard to know which ones to follow reported lower adherence compared to those who did not feel as such.

While this would more readily be attributed to the volume and variety of COVID-19 information circulating on the different media and platforms, it may as well be linked to the partisan divide and media polarization we referred to above and the resulting inconsistent and conflicting news and information they disseminate about the pandemic. Clearly, further research needs to look at the antecedents of people's perceptions of information overload.

In conclusion, despite its monumental health and socioeconomic impact, elite and media communications about COVID-19 have fallen short of being consistent, unified and impactful, leading to variations in adherence to mitigation measures that are key for slowing down the spread of the infection and saving millions of lives. In public health communication, a key first step in providing impactful health messaging is ensuring the 'exposure' to messages [30]. The lack of consensus in elite communications on the COVID-19 crisis coupled with media polarization has brought an additional challenge for public health communicators: the need for targeting the public with consistent and unified messages that cut across partisan splits, the growing skepticism in science and longstanding socioeconomic disparities. Indeed, as some surveys have already started to suggest, there is an urgent need for public health communicators not only to provide the public with consistent and unified COVID-19 messages but also to reset the conversation about the pandemic with a carefully selected and crafted language [31].

Conflict of interest statement

None declared.

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