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Television News Media Consumption and Misperceptions about COVID-19 among US Populations at High Risk for Severe Health Outcomes Early in the Pandemic

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Abstract

Research indicates that misperceptions that become part of people's initial mental models about an issue tend to persist and influence their attitudes even after the misperception has been corrected. Recent work on evolving mental models suggests that communication efforts about the ongoing COVID-19 pandemic and its aftermath may be improved by crafting messages that acknowledge biases and misunderstandings about the virus and other infectious diseases that may remain among members of the target audience. This study was designed to provide insight into such biases by: (1) establishing salient categories of COVID-related misperceptions in the earliest months of the pandemic in the United States among (a) the general population, and (b) demographic sub-populations at high risk of severe health outcomes; (2) identifying demographic predictors of misperceptions; and (3) examining the relationship between consumption of different television news outlets and agreement with misperceptions about COVID-19. A national sample of 1,000 adults in the United States (48.1% male; *M* age = 47.32, SD = 18.01; 72.9% White/Caucasian, 14.3% Black/African American, 15.9% Hispanic/Latinx) completed a survey between March 19 and March 25, 2020. Results identify prevalent classes of salient early COVID-19 misperceptions. Adjusting for numerous covariates, data indicated individuals over the age of 60 held the fewest COVID-related misperceptions among various demographic sub-populations, misperceptions were most prevalent among Black respondents, and increased consumption of television network news was associated with lower levels of misperception. Consumption of some 24-hour news networks (FOX and MSNBC) were significant positive correlates of misperceptions.

The 2019 novel coronavirus (COVID-19) outbreak is one of the most severe pandemics in recent history. As scientists continue to study COVID-19, new information about the virus is discovered on a daily basis, often with implications for managing the outbreak. In times of crisis, the media play a vital role in keeping the public informed about best practices for maintaining public health and safety (Reynolds & Seeger, 2005). For example, in early March 2020, a national probability-based survey in the United States indicated mainstream broadcast media and print media use were associated with more accurate beliefs about COVID-19 lethality and correct information about protection from infection, respectively (Jamieson & Albarracin, 2020). The sheer amount of information that has dominated media channels over the course of this pandemic, however, may also serve as a barrier to keeping the public accurately informed. In February 2020, the World Health Organization (WHO) declared a massive COVID-19 infodemic, defined as " … an overabundance of information – some accurate and some not – that makes it hard for people to find trustworthy sources and reliable guidance when they need it" (Pan American Health Organization, 2020).

Over the course of the global pandemic, misinformation (i.e., incorrect information that is spread through deliberate and accidental means, (Southwell et al., 2021) and misperceptions (i.e., false beliefs that are 'not supported by clear evidence and expert opinion,' (Nyhan & Reifler, 2010) about COVID-19 have been widespread and highly prevalent in the United States (e.g., Jamieson & Albarracin, 2020; Motta et al., 2020).

Fact checking outlets have been diligent in trying to limit the spread of misinformation about the virus (Reuters Institute, 2020), but it is impossible to debunk every false claim in a timely manner (Izadi, 2020). Moreover, in some cases a correction that simply negates a false claim, as fact checks often do, may not effectively achieve its purpose (Johnson & Seifert, 1994; Lewandowsky et al., 2012; Sherman & Kim, 2002; Thorson, 2016). Best practices for effective correction of misperceptions that persist in the face of simple negation correctives involve use of more tailored, in-depth techniques to produce "enhanced correctives" (Cappella et al., 2015) that foster healthy skepticism, affirm the population of interest's worldviews and identity, and use compelling and memorable techniques for communicating facts (Caulfield, 2020; Lewandowsky et al., 2020).

In recent years, researchers have called for a mental models approach to understanding public perceptions of infectious diseases that recognizes people's perceptions of new viruses and outbreaks are often shaped by their perceptions of, and experience with, viruses and outbreaks in the past (Southwell et al., 2021). For example, Southwell et al. (2021) highlighted an anchoring effect (i.e., a tendency to rely on initial information even in the face of new information; Tversky & Kahneman,

1974) among Guatemalans' perceptions of the Zika virus amidst an outbreak in 2016. Focus group participants tended to base their beliefs about Zika on their knowledge of, and experience with past, mosquito-borne diseases. Even when presented with information that Zika is unique in that it can be transmitted sexually and that symptoms of the virus are not always visible, many participants still intended to base their sexual behavior on visual symptoms of the virus.

If perceptions of past diseases anchor beliefs about newer developing diseases, it stands to reason that early information and perceptions about COVID-19 will likely anchor perceptions about the virus over the course of the pandemic. Left even partially uncorrected, misperceptions that make their way into people's mental models about COVID-19 are likely to bias processing of subsequent information about this virus and recommendations from public health professionals, and potentially other infectious diseases as well. The present study was conducted to identify some of the earliest misperceptions about COVID-19 that may impact the population's processing of subsequent information and recommendations about the pandemic by (1) establishing salient categories of COVID-related misperceptions that existed in the earliest days of the COVID-19 pandemic among (a) the general population in the United States and (b) populations at high risk of severe health outcomes associated with COVID-19 in the United States; (2) identifying demographic predictors of misperceptions, with particular emphasis on sub-groups who were at high risk of severe health outcomes associated with COVID-19; (3) examining the relationship between consumption of different television news outlets and misperceptions about COVID-19.

Challenges of correcting misinformation and misperceptions about COVID-19

An increasing body of literature in psychology, political communication, and health communication documents a phenomenon in which people's attitudes that have been shaped by misinformation persist even when the misinformation has been immediately corrected and people are able to demonstrate they believe, understand, and later recall the correction (Ecker et al., 2010). Thorson (2016) coined the term "belief echoes" to explain experimental results demonstrating that in some cases, simple negation correctives serve to correct the cognitive aspect of the misinformation, but fail to erase participants' affective responses to it.

Belief echoes are thought to form through two distinct processes – one deliberative and one automatic (Thorson, 2016). Deliberative belief echoes may occur when a person is presented with new information that makes it into an interpretive framework, or mental model (Johnson & Seifert, 1994), they have formed to make sense of the world around them. If people make inferences based on this misinformation, then even when the misinformation is corrected, the inferences may still linger. When misinformation is integrated into an individual's existing mental models, attempts to remove it with a simple negation are unlikely to be effective because removing that information would leave a gap in processing. Research indicates that in the absence of an alternative model to fill a gap in processing, people will opt to use an incorrect model to process their surroundings even when they are aware it is inaccurate (Ecker et al., 2010).

Automatic belief echoes may occur when misinformation generates a strong and automatic affective response in the recipient. The online processing model suggests this response may become integrated into one's summary evaluation of the target of misinformation (Fazio, 1995; Lodge et al., 2011). Scholars suggest that in order to avoid belief echoes when correcting this type of misinformation, correctives should be designed to generate an equally affective response to rival that which was previously integrated into the target population's summary evaluation of the topic of misinformation (Cappella et al., 2015; Lewandowsky et al., 2020, 2012).

Misperception salience

Designing enhanced correctives is time-consuming and intensive, as each type of misperception requires a specialized correction. Fortunately, not all misperceptions are susceptible to belief echoes upon correction, and simple negations are often sufficient for elimination (Caulfield, 2020). Thus, the creation of enhanced correctives may be reserved for misinformation and misperceptions that are widespread in a population and persist in the face of simple negation corrective efforts. Literature on the spread and correction of misinformation suggests that corrections that attempt to address misperceptions that are not widespread in a population may be counterproductive, as the correction may serve to further circulate misinformation that people otherwise might not have heard or attended to (Jamieson & Albarracin, 2020). Thus, it is important to first establish whether a misperception is salient within a population before making any recommendations to address it.

Salience is not a defined characteristic in this context, but the researchers proposed correcting misperceptions held by Ajzen and Fishbein's (1980) benchmark of 10% of the population in agreement with the claim. Therefore, the first aim of this study is to identify salient categories of COVID-19 misperceptions that warrant the creation of enhanced correctives.

RQ1: What categories of COVID-19 misperceptions are believed by at least 10% of the population in the United States?

Misinformation and misperceptions in demographic groups that were at high risk

It is well-established that COVID-19 poses a disproportionate risk to adults over the age of 60, Black/African American individuals, and Hispanic/Latinx individuals in the United States (Centers for Disease Control and Prevention, 2020). Many of these differences can be attributed to social determinants that make individuals more susceptible to contract the virus and less likely to receive proper care once infected, including occupations in essential work settings that prohibit social distancing, crowded housing conditions, and lack of access to high quality health insurance (Centers for Disease Control and Prevention, 2020). As such, it is particularly important to ensure that members of these populations are well-informed about COVID-19 so they may take proper

protective action in an effort to slow the rate of disease spread within these groups that were at high risk. To date, the authors are not aware of any investigations into the prevalence of COVID-19 misperceptions among demographic groups that were at high risk in comparison to the general population within the United States. Insight into these and other demographic variables associated with COVID-19 misperceptions can be useful for identifying target populations most in need of enhanced correctives designed to reflect their worldviews and evoke emotional responses. Even if demographic variables are associated with more COVID-19 misperceptions, it is less of a priority to create an enhanced corrective if the misperception is not salient (10% agreement) within the demographic group that was at high risk.

RQ2: What categories of COVID-19 misperceptions are believed by at least 10% of demographic populations that were at high risk in the United States?

RQ3: Are different categories of COVID-19 misperceptions more widespread among demographic populations that were at high risk in comparison to the general population?

Television news outlets associated with misinformation and misperceptions

Prior studies have established links between exposure to particular news outlets and COVID-19 misperceptions (e.g., Jamieson & Albarracin, 2020). Given the established correlation between different demographic sectors of the population and specific media news outlets (Shearer, 2018), it is important to examine news consumption patterns of demographic groups that were at high risk compared to lower risk groups and to investigate whether or not demographics and exposure to different media news outlets account for unique portions of the variance in agreement with misinformation about COVID-19.

Sustained efforts to identify misperceptions about COVID-19 could benefit from information about the specific news outlets that have been more strongly associated with prior misinformation or misperceptions. A recent meta-analysis revealed that continued influence after the correction of misinformation is weakened when the correction is attributed to the original source of the misinformation (Walter & Tukachinsky, 2019). Thus, corrections may be strengthened by involving the source of the misinformation they are designed to rebut.

RQ4: To what extent is exposure to different television news sources related to higher levels of COVID-19 misperceptions?

RQ5: Do news consumption patterns of demographic groups that were at high risk (over 60-years-old, Black/African American race, and Hispanic/Latinx ethnicity) differ from news consumption patterns of lower-risk groups within these demographic sectors?

Method

Participants

Respondents for this study were reached through SSRS, a full-service market research firm, and their research partner, Dynata, the world's largest first-party data and insights platform. More information on Dynata panel quality assurance practices may be found in their panel book online (Dynata, n. d.). For the present survey, Dynata invited adult opt-in panelists from their United States loyalty panel, targeting by gender, age, race, education, and region. Panelists were asked to take part in a 20-minute online survey. In total, 1,587 panelists were invited and 1,000 respondents completed the full questionnaire online. All surveys were completed between March 19, 2020 and March 25, 2020. SSRS regularly monitored data collection to check for demographic composition of the sample and data quality. Cases determined to be poor-quality, as defined by surveys with a length of survey completion of less than 33% of the median length of survey completion or cases where a participant straightlined at 75% or more of grids, were removed from the final data. Data were weighted to reflect a nationally representative sample on gender, age, race, education, and region. The margin of error for this study was 3.16, and the design effect was 1.04. All procedures were approved by the Institutional Review Board at the University of Delaware.

In total, 1,587 adult (18+) panelists were invited and 1,000 respondents completed the full questionnaire online (unweighted: 48.1% male; age M = 47.32, SD = 18.01; 72.9% non-Hispanic white, 14.3% Black/African American, 15.9% Hispanic/Latinx; 31.3% Democrat, 38.3% Independent, 26.8% Republican; 33.4% four-year college degree or higher; 43.5% annual household income of $60,000 or higher). Participants were compensated for survey completion, with incentives distributed by the panel provider through their standard procedures.

Measures

Data used for this study were collected as part of a larger project designed to address a number of separate research questions surrounding communication and COVID-19. In addition to standard demographic variables including age, race, Hispanic/Latinx ethnicity, and education (which was dichotomized into college degree vs. no college degree and included in the regression analysis as a covariate), the following variables were used in this analysis. ***Misperceptions***

A Google search using the search terms "coronavirus" and "COVID-19" combined with "myths," "misperceptions," and "misinformation" was conducted during the first week of March 2020 to identify the most prevalent types of misinformation about COVID-19 circulating the internet. Twelve statements were created to assess belief in six categories of misperceptions that were reflected across multiple websites that appeared in a Google search. Statements were cross-referenced with the WHO and the CDC websites to ensure they were based on established

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misinformation about the virus, and that no additional misinformation was addressed on these websites that wasn't identified in the initial search.

Searching multiple websites until perceived saturation is reached has been used in previous published studies to identify misinformation about relatively new or understudied issues (Gratale et al., 2017; Hornik et al., 2021). Participants were asked to rate how much they agreed with each statement on a 7-point Likert scale. Higher scores indicated higher agreement with belief/information. The six categories of misperceptions were: 1.) inevitability (single item: "There isn't really anything that can be done to prevent the coronavirus from spreading," $M = 3.10$, $SD = 1.97$, $SEM = .06$); 2.) hoax (single item: "The coronavirus is a hoax," $M = 2.37$ $SD = 2.20$, $SEM = .06$); 3.) contagiousness (two reverse-coded items, e.g., "People who contract coronavirus and do not feel or display any symptoms can still spread the virus to others," $M = 2.22$, $SD = 1.35$, $SEM = .04$, $\alpha = .69$); 4.) US superiority (four items, e.g., "The U.S. has been spared from the worst of the coronavirus because of the swift and decisive action taken by our government agencies," $M = 3.05$, $SD = 1.62$, $SEM = .05$; $\alpha = .80$); 5.) Asian stigmatization (two items, e.g., "Asian people are more likely to carry the virus than other people," $M = 2.46$, $SD = 1.86$, $SEM = .06$, $\alpha = .88$); and 6) severity (two items, "If you are young and healthy, it's fine to go to restaurants and bars," $M = 2.66$, $SD = 1.81$, $SEM = .06$, $\alpha = .73$). The mean score of each category with more than one item was calculated to create an index score ranging from 1 (strongly disagree) to 7 (strongly agree).

Two-week television news exposure

Participants were asked to rate how often they watched each of the listed news outlets in the past two weeks. The response scale ranged from 1 (not at all) to 5 (very often). News outlets included: national network news broadcast on networks like ABC, CBS, or NBC ($M = 3.40$, $SD = 1.41$, $SEM = .05$); CNN ($M = 2.73$, $SD = 1.56$, $SEM = .05$); FOX News Channel ($M = 2.71$, $SD = 1.53$, $SEM = .05$); and MSNBC ($M = 2.44$, $SD = 1.46$, $SEM = .05$).

Political party

Participants were asked to select the term that best described their political party affiliation on an 8-point scale. Response options were: strong democrat (1), democrat (2), independent that leans democratic (3), independent (4), independent that leans republican (5), republican (6), strong republican (7), and other (8). Those who selected "other" ($n = 36$) were excluded from regression analyses that entered political party affiliation as an ordinal covariate.

Analyses

Frequency counts were calculated first on the entire sample (RQ1) and then on each demographic subset of interest (RQ2) to determine the percentages of participants with a value between 6 (agree) and 7 (strongly agree) in each misperception category index. Including only those who selected 6's and 7's and excluding those who selected 5's (somewhat agree) served to calculate a more conservative estimate of misperception salience because the virus and pandemic were so new and uncertain at the time of data collection. Bivariate correlations among misperception categories that served as dependent variables were sufficiently greater than zero.[1] Therefore, multivariate multiple regression analysis was performed to account for these correlations when examining whether the demographic variables (RQ3) and exposure to different news sources (RQ4) were associated with each category of salient COVID-19 misperceptions. Political party affiliation and education were included in the model as control variables. Assumptions associated with linearity, homoscedasticity, and independence were met. To address RQ5, three-way ANOVA tests were calculated to observe differences in news consumption between high and low-risk groups within each demographic group examined. Sampling weights were included in all analyses to reflect a nationally representative sample on gender, age, race, education, and region

Results

RQ1 asked what categories of misperception about COVID-19 are believed by at least 10% of the sample, and RQ2 asked which of these categories are believed by at least 10% of groups at high risk in the sample. Table 1 reports the percentages of each demographic group as well as the full sample who agreed with each misperception category index. Among all respondents, all but one category surpassed the 10% threshold for salience. Only 5.1% of participants met the agreement threshold for misperceptions about contagiousness. It should be noted, however, that this is the only category composed of two reverse-coded items. Thus, rather than calculating the percentage of people who *agreed* with the statement that asymptomatic and pre-symptomatic people *are not contagious*, the number presented for this category reflected the percentage

Table 1. % (S.E. of the Mean) who agree/strongly agree with misinformation/misperceptions.

Type of Misperception	Inevitability	Hoax	Contagiousness	US Invulnerability	Asian Stigmatization	Severity
Under 60	28.6% (.02)	19.9% (.02)	6.6% (.01)	18.6% (.01)	18.4% (.01)	20.8% (.02)
60+	11.7% (.02)	3.0% (.01)	2.1% (.01)	2.2% (.01)	1.6% (.01)	1.0% (.01)
White	21.5% (.02)	11.8% (.01)	3.2% (.01)	10.2% (.01)	10.7% (.01)	10.6% (.01)
Black	34.1% (.04)	25.4% (.04)	10.8% (.03)	26.1% (.04)	22.3% (.03)	28.8% (.04)
Other	21.0% (.04)	17.7% (.03)	9.7% (.03)	17.0% (.03)	16.3% (.03)	20.4% (.04)
Non-Hispanic/Latinx	20.9% (.01)	12.6% (.01)	3.8% (.01)	11.2% (.01)	11.3% (.01)	11.9% (.01)
Hispanic/Latinx	35.1% (.04)	24.4% (.03)	12.1% (.03)	24.2% (.03)	22.1% (.03)	27.9% (.04)
Overall	23.2% (.01)	14.5% (.01)	5.1% (.01)	13.4% (.01)	13.1% (.01)	14.5% (.01)

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of people who *disagreed* that people can have no symptoms and *still be contagious*. The most salient misperception was that the spread of COVID-19 was inevitable.

Misperceptions were less prevalent among individuals over the age of 60 across all categories. The only category that met the 10% salience requirement for those over 60 years of age was that the spread of COVID-19 was inevitable. Across all categories, agreement among Black/African American and Hispanic/Latinx participants was at least five percentage points higher than the sample as a whole, and the two groups were within two percentage points of each other across all categories. The most salient misperception (inevitability) and least salient misperception (contagiousness) within race groups mirrored that of the rest of the population; however, between 22 and 30% of these groups agreed with three other categories of misinformation. This reflects substantially greater misperception-salience among these demographic groups that were at high risk.

RQ3 asked whether being a member of a demographic group that was at high risk was a significant predictor of each of the six categories of COVID-19 misperceptions. Table 2 reports unstandardized regression coefficients from a multivariate multiple regression analysis that regressed each misperception category onto: over 60 years of age, Black/African American race, Hispanic/Latinx ethnicity, network news consumption, CNN consumption, FOX News consumption, MSNBC consumption, political party identification (included as a covariate), and education (included as a covariate). Results indicated that holding education, political party affiliation, ethnicity, age, and television news media constant, being Black/African American was significantly associated with all categories of misperception except for the assertion that nothing can be done to prevent the spread of coronavirus, which was still marginally significant (p = .059). Holding the same variables and race constant, being Hispanic/Latinx was also significantly associated with five out of six categories of misinformation and misperception. The third demographic category, being older than 60, had an opposite effect. Holding all other variables constant, being older than 60 was a significant negative predictor of all six categories.

RQ4 asked whether exposure to different news sources related to misperceptions about COVID-19. As reported in Table 2, linear regression analyses indicated that separate television news sources were differentially related to COVID-19 misperceptions. The news outlets most strongly associated with misperceptions were MSNBC and FOX. With the exception of contagiousness, increased exposure to FOX and MSNBC were significantly related to increased misperceptions about COVID-19. Exposure to CNN was not significantly associated with any of the misperception categories examined. Increased consumption of television network news was negatively related to three out of six misperception categories. Although all tolerance values were less than 0.1, indicating that multicollinearity was not a problem, correlations among some of the news consumption variables were above 0.7. In order to examine the stability of predictors, coefficients for each independent variable were run as a single predictors in the multivariate regression analysis. Patterns of significance remained the same.[2]

Table 3 presents the mean scores of viewership in the past two weeks for the total sample as well as all demographic groups that were at high risk examined in this study. Participants over the age of 60 consumed significantly more network news and significantly less CNN, FOX, and MSNBC than participants under the age of 60. Otherwise, there were no significant differences among racial groups or ethnic groups in their levels of television news consumption.

Post Hoc analyses

Comparing misperceptions in demographic groups that were at high risk to the rest of the population was a major focus of this analysis. For a clear comparison, the continuous variable age was dichotomized to reflect a categorical over vs. under-60 variable. Given the established age group differences among network and cable news consumption patterns (Shearer, 2018), it is possible that some of the news exposure effects are being driven by age differences that were unaccounted for using the dichotomous age variable. To explore this possibility, the multivariate regression analysis was re-run using age as a continuous predictor. Results indicated significant negative relationships between age and all COVID misperception categories. With age as a continuous predictor, the only remaining significant correlation between

Table 2. Multivariate multiple linear regression analyses predicting misperception categories[a].

	Inevitability	Hoax	Contagiousness	US Invulnerability	Asian Stigmatization	Severity
Misperception Correlates	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)
African American	.359 (.190)[a]	.721 (.195)***	.608 (.150)***	.531 (.153)***	.594 (.172)**	.557 (.168)**
Latinx	.502 (.184)**	.332 (.193)	.381 (.147)**	.326 (.154)*	.339 (.171)*	.463 (.167)**
Over 60	−.857 (.133)***	−.955 (.116)***	−.440 (.087)***	−.740 (.095)***	−.879 (.108)***	−.889 (.105)***
Network News	.051 (.047)	−.075 (.044)	−.170 (.034)***	−.079 (.035)*	−.013 (.039)	−.093 (.039)*
CNN	−.021 (.052)	.015 (.043)	.049 (.043)	.018 (.039)	.023 (.046)	.088 (.047)
FOX	.193 (.045)***	.200 (.043)***	−.063 (.033)[a]	.300 (.034)***	.228 (.042)***	.196 (.039)***
MSNBC	.215 (.055)***	.307 (.048)***	.011 (.043)	.164 (.041)***	.283 (.049)***	.241 (.048)***
Party	.076 (.037)*	.084 (.034)*	.046 (.028)	.083 (.028)**	.068 (.034)*	.033 (.032)
Education	−.306 (.124)*	−.285 (.116)*	−.250 (.086)**	−.283 (.092)**	−.035 (.109)**	−.329 (.104)**
R^2	.184	.265	.132	.297	.270	.277

[a]p = .05; * p < .05; ** p < .01; *** p < .001

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Table 3. Television news media consumption among demographic groups at high risk.

Demographic	National Network M (SD)	CNN M (SD)	FOX News M (SD)	MSNBC M (SD)
Under 60	3.30 (1.39)	2.94 (1.52)	2.84 (1.48)	2.60 (1.43)
(*n* = 677)	*SEM* = .05	*SEM* = .06	*SEM* = .06	*SEM* = .06
60+	3.61[a] (1.43)	2.28[b] (1.53)	2.44[b] (1.59)	2.07[b] (1.47)
(*n* = 319)	*SEM* = .08	*SEM* = .09	*SEM* = .09	*SEM* = .08
White	3.42 (1.61)	2.57 (1.57)	2.32 (1.49)	2.60 (1.57)
(*n* = 727)	*SEM* = .05	*SEM* = .06	*SEM* = .06	*SEM* = .06
Black	3.47 (1.32)	3.32 (1.41)	3.07 (1.41)	2.94 (1.39)
(*n* = 141)	*SEM* = .11	*SEM* = .12	*SEM* = .12	*SEM* = .12
Other	3.19 (1.18)	3.02 (1.44)	2.97 (1.34)	2.51 (1.28)
(*n* = 128)	*SEM* = .10	*SEM* = .13	*SEM* = .12	*SEM* = .11
Non-Hispanic/Latinx	3.41 (1.43)	2.65 (1.56)	2.62 (1.53)	2.35 (1.46)
(*n* = 833)	*SEM* = .05	*SEM* = .05	*SEM* = .05	*SEM* = .05
Hispanic/Latinx	3.36 (1.29)	3.15 (1.49)	3.20 (1.42)	2.88 (1.43)
(*n* = 133)	*SEM* = .10	*SEM* = .12	*SEM* = .11	*SEM* = .11
Overall	3.40 (1.41)	2.73 (1.56)	2.71 (1.53)	2.44 (1.46)
(*N* = 996)	*SEM* = .05	*SEM* = .05	*SEM* = .05	*SEM* = .05

Television news consumption in the past two weeks was measured on a 5-point scale with 1 labeled as "never," 3 labeled as "sometimes," and 5 labeled as "very often."
[a]Group mean differs from the mean of the under 60 demographic at $p < .01$
[b]Group means differ from the mean of the under 60 demographic at $p < .05$

network news consumption and COVID misperceptions was the negative relationship with misperceptions about contagiousness. Importantly, however, FOX News and MSNBC consumption both remained significant positive predictors of all COVID misperceptions except for contagiousness.

The negative relationship between age and misperceptions was unexpected, as traditionally aging has been associated with increased susceptibility to misinformation (Brashier & Schacter, 2020) and other studies have identified individuals who were 65 + as being particularly susceptible to COVID-related misinformation (Bapaye & Bapaye, 2021). One potential explanation for this finding may be due to a combination of the timing of the survey and the outlets through which people were obtaining their information about the virus. Research suggests that in the beginning of a crisis, there are few differences in the information that is shared by different news outlets (Perse & Lambe, 2016). Non-traditional news content containing misinformation and conspiracy theories about COVID-19 may be posted online and shared through social media almost instantaneously, however. Thus, it stands to reason that in the earliest days of the pandemic, those who obtained news about the virus through social media would be exposed to more misinformation about it than those who obtained their news about the virus through traditional media channels. To answer a research question for a separate study, participants were asked about their information seeking habits. Participants were asked to rate their agreement on a scale of 1 (strongly disagree) to 7 (strongly agree) on the following items: "I actively search news media to help me understand about the coronavirus," and "I follow social media to acquire information about the coronavirus." Three-way ANOVA with planned contrasts indicated that participants over the age of 60 actively searched social media (M = 2.25, SD = 1.85) less than participants under the age of 60 (M = 3.86, SD = 2.13, $p < .001$), and the difference between participants over 60 (M = 4.30, SD = 2.07) and those under 60 (M = 4.54, SD = 1.88) searching news media for coronavirus information was not significant (p = .372). African American participants scored significantly higher than non-African American participants on actively seeking information about coronavirus on news media (M = 4.06, SD = 1.91 vs. M = 3.22, SD = 2.20, p = .012), but the difference was not significant for social media (M = 4.81, SD = 1.82 vs. M = 4.40, SD = 1.96, p = .802). Participants who are Hispanic/Latinx actively searched social media (M = 4.02, SD = 1.97) more than the rest of the sample (M = 3.21, SD = 2.19, $p < .001$), and the difference between participants who are Hispanic/Latinx (M = 4.60, SD = 1.88) and non-Hispanic/Latinx participants in the sample (M = 4.43, SD = 1.96) searching news media for coronavirus information was not significant (p = .885). When the two items were added as covariates into the multivariate regression model predicting the categories of COVID misperceptions, actively searching news media was significantly negatively associated with all categories of misperception and actively searching social media for coronavirus information was significantly positively associated all categories of misperception except for misperceptions about contagiousness. Coefficients for all other predictors remained similar and patterns of significance were the same across all categories of misperception with both covariates included, however, indicating that differing information strategies is not the sole driver of misperceptions among demographic groups that were at high risk.

Discussion

The present paper identified six categories of widespread misperceptions that occurred during the first few weeks of the COVID-19 outbreak in the United States, the populations most likely to hold them, and television news sources that were most associated with them. Because COVID-19 is a novel virus, the public's early COVID-related beliefs are likely to be included in the mental models they construct to understand the pandemic, making initial misperceptions about the virus and its spread particularly susceptible to deliberative belief echoes and increasing the likelihood that these misperceptions might bias processing of subsequent messages and recommendations related to the pandemic. Also, several of the most prevalent misperceptions identified in this study (e.g., coronavirus is a hoax; Asian stigmatization) may be tied

to narratives that invoke strong emotional responses such as anger and fear, which makes them susceptible to automatic belief echoes. Specifically tying these misperceptions to either type of belief echoes is beyond the scope of the present paper, but identifying early misperceptions that are likely to persist in the face of simple negation correctives provides insight into some misinformed biases that may influence people's processing of information in later phases of the COVID-19 pandemic.

Analyses indicated that in March of 2020, the most widespread misperception about COVID-19 among the general public (as well as within subpopulations that were at high risk) examined here was the inevitability of COVID-19 spread. This misperception may reflect the time period during which the survey was conducted, when public health officials knew very little about the virus, its spread, or containment. In fact, it may be argued that the statement "There isn't really anything that can be done to prevent the coronavirus from spreading" may not have been labeled clear cut "misinformation" at the time. The focus of this paper, however, is not on identifying *misinformation* that circulated about the pandemic, but rather early *misperceptions* about COVID-19 that may persist as part of people's mental models for coronavirus and other infectious diseases over the course of the pandemic and beyond. Over time, scientists and health professionals identified a number of mitigation strategies for reducing and preventing spread of the virus, including social distancing, mask wearing, and quarantining after a potential exposure. Thus, although information about how the virus spreads was unclear at the time, choosing "agree" (6) or "strongly agree" (7) on a 7-point scale of agreement with the statement that nothing can be done to prevent the virus from spreading turned out to be a clear misperception that may eventually serve to anchor beliefs about mask and social distance efficacy.

During this time, masks were not recommended as a safeguard for the general public and surface spread had not yet been determined to be a less likely means of virus transmission than face-to-face contact with infected persons. Over the next several months between the initial outbreak and the development of a vaccine, several strategies for mitigating the spread of the virus were identified, most notably the effectiveness of mask wearing among the general public (Eikenberry et al., 2020; Lyu & Wehby, 2020). Although most Americans eventually supported widespread face mask use as a means for slowing virus spread (Pew Research Center, 2020), the issue became particularly controversial among certain sectors of the population (McKelvey, 2020). Given early agreement with the inevitability of virus spread and public health officials' early recommendations discouraging face masks among the general public, followed by a reversal just a few short weeks later (World Health Organization, 2020a, 2020b), an enhanced corrective that provided a more in-depth narrative about developments in our understanding of how the virus spreads and how it might be contained may have been an effective way to eliminate deliberative belief echoes about the utility of face masks.

In addition to identifying salient categories of misperceptions, the present study highlighted demographic groups that were at high risk whose mental models may be most and least likely to include these misperceptions. Individuals over the age of 60 were the least misinformed demographic group examined in this study. It is unclear exactly why this is the case, particularly because, as previously noted, generally aging is associated with increased susceptibility to misinformation (Brashier & Schacter, 2020) and other studies identified individuals who were 65+ as being particularly susceptible to COVID-related misinformation (Bapaye & Bapaye, 2021). One possibility for this finding is that data for this study were collected too early in the pandemic. In this particular instance, being over 60 years old was related to less agreement with all categories of misinformation and only one category of misinformation out of six met the 10% agreement salience threshold in this group. Further, the percentage of people in this group who held misperceptions was less than half the percentage of people in the entire sample who held such misperceptions. Thus, early misperceptions about COVID-19 are less of a concern for target populations over the age of 60 than they are for the two other groups examined in this study.

Conversely, enhanced correctives designed to correct misperceptions in the other two demographic groups – individuals who self-identified as Black/African American race and individuals who self-identified as Hispanic/Latinx ethnicity – are vital. The 10% salience threshold was met by both demographic groups across all categories of COVID misperceptions. Misinformation was most problematic among the Black/African American sub-sample, as Black/African American race was associated with misinformation across all six categories whereas Hispanic/Latinx ethnicity was a significant positive predictor of three out of six categories.

Finally, the present study contributes to the literature on news consumption and misinformation surrounding COVID-19 by examining whether increased consumption of different television news outlets was significantly related to agreement with different misperception categories about the virus. Results indicated national network news consumption (e.g., ABC, CBS, NBC) was associated with fewer misperceptions across most categories, although most of these relationships were no longer significant when controlling for age as a continuous predictor. Increased viewing of the two networks most often described as having a partisan slant (MSNBC as liberal and FOX News as conservative) was associated with significant increases in all but one category of misperceptions. CNN consumption was not significantly related to misperceptions. These findings suggest that perhaps the constant search for novel and emerging COVID-19 coverage may have contributed to the infodemic declared by the WHO in the early days of the pandemic. While network news coverage on health issues only constitutes a brief portion of the daily 22-minute network news broadcast (compared to hours of coverage on 24-hour news channels) perhaps the focused and succinct coverage of scientific health findings and recommendations made that information more

accessible for their audiences. It is important to note that these data were collected in the first few weeks of the COVID-19 pandemic in the United States. Research suggests that in the beginning of a crisis, there are few differences in the information that is shared by different news outlets (Perse & Lambe, 2016). This may account for the uniform trends in misperceptions across different cable news outlets that typically promote policy positions that are at odds with one another. Future research should investigate whether these trends persisted as the initial phase of the crisis waned in the United States.

This study was conducted in an effort to identify some initial categories of misperception in the United States about the COVID-19 pandemic, the demographic populations most in need of correctives, and the television news sources most strongly associated with them. The survey methodology used in this study afforded the strength of a weighted sample that reflected the US population on gender, age, race, education, and region. This allowed for an examination of salience both nationwide and within sub-groups that were at high risk. However, as with all methodological decisions, there were limitations that may affect the generalizability of the findings.

Limitations and future research

First, because the survey was conducted in the very early days of the COVID-19 pandemic, scientific knowledge about the virus and how it spreads was in its infancy, making it difficult to establish indisputable measures of knowledge and misperception because little was known about the virus or its spread at the time. When the survey was designed, very little was corrected in traditional fact-checking sites, such as FactCheck and Politifact. Several media outlets and public health organizations, however, were moving quickly to identify and correct misinformation that was circulating about the virus in real time. Thus, searches for "COVID-19" and "coronavirus" in combination with "myths," "misperceptions," and "misinformation" produced a series of articles created by public health organizations that provided insight into misperceptions that were likely to spread. Ultimately, the misperceptions identified in this study were indeed consistent with misinformation that was at the time or has since been corrected on FactCheck.org, and they remained prevalent among 10% of the population or more, indicating that the systematic approach to identify misinformation via Google was effective and that these misperceptions were persisting despite public health organizations' attempts to correct them.

Further, as the pandemic persists, old misperceptions may be effectively corrected and new misperceptions will undoubtedly spread. Thus, the misperception measure used in this study is neither exhaustive nor completely current (as no measure could be in the midst of an ongoing pandemic). Importantly, the categories of misinformation derived from this search were unequivocally false, yet analyses indicated that most were salient in the population as a whole and particularly among specific demographic groups that were at high risk. In view of current literature on the challenges of correcting misinformation that is based on misconceptions that have been integrated into the target population's mental models, it is essential to identify the earliest cases of misinformation upon which newer misconceptions may build. Future efforts to design enhanced correctives to address these categories of misinformation could benefit from establishing their salience several months into the pandemic in the United States, especially as all categories appear to persist in current and ongoing news media coverage of the pandemic.

The measures for this study were part of a larger survey designed to address communication focused questions related to COVID-19. Individual assessments were necessarily brief to ensure a manageable amount of time for survey completion (15–20 minutes) to increase the response rate. Even though Americans undoubtedly get mis/information about COVID-19 from a wide range of information sources, the current research is focused on exposure to television news because it remains the most popular source of news for Americans (Shearer, 2018). The present study contributes to the literature by examining unique variance in agreement with misperceptions about COVID-19 associated with exposure to different television news sources. Future studies may increase variance explained by examining how other sources of news and information further predict this outcome.

This study established that membership in certain demographic populations that were at high risk of suffering severe health outcomes from COVID-19 are associated with lower (in the case of Americans over the age of 60) and higher (in the cases of Black/African American and Hispanic/Latinx Americans) misperceptions about the present global pandemic holding political party identification, education, and consumption of different sources of television news constant. Future assessments are necessary to increase variance explained by other individual difference, demographic, and information source predictors of misperceptions as well as their interactions in an effort to correct existing misinformation and prevent future misperceptions from spreading. Membership in a high-risk demographic group in and of itself is not likely to be the cause of increased or decreased misperceptions about COVID-19. Because this was part of a larger study that examined COVID-related perceptions, intentions, and behaviors more broadly in a national sample, limitations on survey space and sample size did not allow us to probe these relationships further. Future research should be conducted with over-samples of the high and low-risk demographic groups of interest in order to examine the mechanisms through which these misperceptions are developed as well as potential moderators to these relationships. Overall, the present study prioritizes the identification of potentially dangerous misperceptions held by demographic groups that were most negatively impacted during the first few weeks of the pandemic in the United States. This helps provide insight into misperceptions that may influence target populations' processing and interpretation of new information and recommendations over the course of the pandemic and beyond.

Notes

1. Bivariate correlations available from the corresponding author upon request.
2. Results of the multivariate regression analyses with each individual IV as a single predictor is available from the corresponding author upon request.

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