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Article

Partisan media, untrustworthy news sites, and political misperceptions

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Abstract

This study investigates the potential role both untrustworthy and partisan websites play in misinforming audiences by testing whether *actual exposure* to these sites is associated with political misperceptions. Using a sample of American adult social media users, we match data from individuals' Internet browser histories with a survey measuring the accuracy of political beliefs. We find that visits to partisan websites are at times related to misperceptions consistent with the political bias of the site. However, we do not find strong evidence that untrustworthy websites consistently relate to false beliefs. There is also little evidence that visits to less partisan, centrist news sites are associated with more accurate political beliefs about these issues, suggesting that exposure to politically

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neutral news is not necessarily the antidote to misinformation. Results suggest that focusing on partisan news sites—rather than untrustworthy sites—may be fruitful to understanding how media contribute to political misperceptions.

One problematic feature of American politics is the public's susceptibility to believing political falsehoods. These misperceptions—which are personal beliefs that are inaccurate or not substantiated by evidence (Vraga and Bode, 2020)—threaten to erode core aspects of the democratic process like voting, trust in media, and the legitimacy of institutions (Bennett and Livingston, 2018).

How do these political misperceptions emerge? While it is clear that individuals' prior attitudes and beliefs contribute to misperceptions (Flynn et al., 2017; Tappin et al., 2020), social-psychological explanations like this often fail to account for the news media environments people inhabit. When considering how media might promote false beliefs, observers have often focused on social media platforms like Facebook and Twitter (Lazer et al., 2018; Pasquetto et al., 2020). Yet, evidence suggests the influence of social media on exposure to, engagement with, and belief in political misinformation may be minimal for the majority of the public (Garrett, 2019; Guess et al., 2019). Such findings highlight the need to investigate whether other forms of media use, including other potential sources of problematic content, may promote misperceptions (Allen et al., 2020).

This project focuses on two other potential culprits for political misperceptions: partisan news and untrustworthy websites online. Partisan news sites often cover issues in a way that favors one political party over the other or are critical of political opponents (Baum and Groeling, 2008; Budak et al., 2016). Although the audience size of these outlets is relatively small and few individuals use these sites exclusively (Guess, 2021), partisan news sites have become central to the ecosystem of American news and can amplify misleading content and misinformation (Faris et al., 2017; Marwick and Lewis, 2017). Untrustworthy sites are different in that they explicitly offer content that is factually inaccurate and are often designed to purposefully mislead (Guess et al., 2020b). These untrustworthy sites may also play an important role in the political media environment. Content from these so-called "fake news" sites is frequently shared online, albeit only by a small minority of users (Altay et al., 2020; Grinberg et al., 2019; Vosoughi et al., 2018), and these sites can influence other media outlets' coverage (Vargo et al., 2018), undermine trust in mainstream media and governmental institutions (Nelson and Taneja, 2018), and affect political beliefs and behavior (Lazer et al., 2018).

There is some evidence that partisan news exposure is linked to political misperceptions (Feldman et al., 2014; Garrett et al., 2016, 2019; Meirick, 2013), but these relationships often focus on a narrow set of media outlets, particularly cable television channels like Fox News or MSNBC, or rely on self-reported exposure to partisan news, which is prone to misestimations of use (Prior, 2013). Relatedly, although people are rarely exposed to untrustworthy sites (Allen et al., 2020; Guess et al., 2020b; Nelson and

Taneja, 2018), their influence on false beliefs needs further investigation (Guess et al., 2020a). Importantly, it is unclear whether *actual exposure* to a broad range of partisan media and untrustworthy sites predicts political misperceptions.

This study addresses that question and takes advantage of a unique method to overcome some shortcomings in prior work on media use and misperceptions. We combine Internet browsing data with a survey of 671 American adults that tapped individuals' beliefs in a number of prominent political falsehoods. Using browsing history data, we examine how often respondents visited 140 of the most prominent political news sites in the 90 days prior to the survey—including both Republican- and Democratic-leaning partisan sites, as well as 668 sites categorized as untrustworthy (Allcott et al., 2019; Eady et al., 2019a). We then use those behavioral measures of exposure to partisan news and untrustworthy sites to predict a diverse set of political beliefs. We find that partisan media exposure—more so than untrustworthy site exposure—at times predicts false beliefs, even when accounting for alternative explanations like partisanship and education. Before turning to our study design and results, we begin by offering a theoretical foundation for our hypotheses and research questions.

Partisan media and misperceptions

Partisan media are defined as outlets that cover news and politics in a way that favors one political party or ideology over others, and offer opinionated coverage (Levendusky, 2013). This embrace of one political side may emerge in the news stories outlets choose to cover or how they frame issues (Baum and Groeling, 2008). Of course, sources vary greatly in the extent to which they demonstrate partisan slant. Some outlets provide objective coverage in their news reporting but favor a liberal or conservative perspective in opinion sections. For example, news reporting at Fox News and the New York Times does not exhibit significant differences in ideological slant; however, the opinion content of these outlets demonstrates clear bias toward conservative and liberal perspectives, respectively (Budak et al., 2016).

The majority of Americans do not rely heavily on partisan news outlets (Guess, 2021; Prior, 2013) but those who do often hold very different attitudes than people who primarily use non-partisan news sources (Levendusky, 2013; Stroud, 2011). Given that some individuals self-select into like-minded partisan media sources, it is difficult to clearly disentangle whether these differences are attributable to media content or existing partisan beliefs (Prior, 2013). Yet, experimental research suggests that exposure to partisan news—particularly when individuals opt in to this content—can shape attitudes and beliefs and polarize audiences (Arceneaux and Johnson, 2013; Levendusky, 2013). Importantly, partisan news consumers tend to hold less accurate beliefs about a range of political issues and figures (Feldman et al., 2014; Garrett et al., 2016, 2019; Meirick, 2013).

There are several explanations for why partisan media users are more likely to be politically misinformed. First, in offering coverage favoring one political side, partisan media outlets may provide misleading information congenial to the aligned party. For example, Fox News was dismissive in its coverage of climate change and included critics who doubted its existence. Viewers of the network were subsequently more likely to

report skepticism about climate change (Feldman et al., 2012). Second, many partisan outlets actively promote content that is false or misleading, sometimes with the intention of creating confusion or incorrect beliefs (Bennett and Livingston, 2018; Faris et al., 2017; Jamieson and Cappella, 2008; Marwick and Lewis, 2017; Vargo et al., 2018). For instance, during the 2016 US presidential election, Fox News heavily covered unsubstantiated allegations and scandals surrounding Hillary Clinton's campaign, and most of this coverage was negative (Patterson, 2016). Finally, partisan media tend to report news in a more emotionally evocative way, engaging in attacks on political opponents and displaying other forms of incivility (Hasell, 2020; Young, 2019). This coverage can create strong affective reactions in the audience (Garrett et al., 2019; Hasell and Weeks, 2016) and increase dislike of political opponents, both of which make audiences more vulnerable to believing false claims that harm the other party (Kim and Kim, 2019; Weeks, 2015).

Users of partisan media may therefore believe inaccurate information that benefits their favored party or political figures. For example, users of conservative outlets were more likely to believe that Barack Obama was born outside of the United States, a claim that was harmful to Democrats and favorable to Republicans. Similarly, users of liberal news were more likely to accept false claims about prominent Republicans (Garrett et al., 2016). At the same time, consuming partisan news may help users hold *more* accurate beliefs when a false claim is incompatible with the outlet's ideology. For instance, users of liberal news were more accurate in their assessments of climate change and Obama's birthplace, perhaps because these outlets spent considerable time debunking misinformation on these topics (Feldman et al., 2012; Garrett et al., 2016). Based on existing literature, we expect the following:

> *H1*. Visits to partisan media sites online are related to less accurate beliefs about party-favorable false claims.

> *H2*. Visits to partisan media sites online are related to more accurate beliefs about party-opposed false claims.

Untrustworthy political sites and misperceptions

In addition to partisan outlets, untrustworthy sites also exist in the political media environment. Untrustworthy sites are not driven by journalistic values of accuracy, accountability, and verification, but instead provide content that is false or misleading (Guess et al., 2020b). An important distinction between untrustworthy and partisan sites is that the latter engage in factual reporting, even if their opinionated content is biased (Budak et al., 2016).

An important but relatively unanswered question is whether untrustworthy sites promote political misperceptions. While there is an abundance of false content from untrustworthy sites circulating on social media (Vosoughi et al., 2018), the majority of people do not visit these sites or engage with them (Allcott et al., 2019; Guess et al., 2019, 2020b; Nelson and Taneja, 2018). If most people rarely visit untrustworthy sites, it is unlikely that they will have a strong influence on political beliefs. Indeed, studies

suggest that belief in content directly stemming from untrustworthy websites remains quite low for the general public (Guess et al., 2020a).

Yet, there are also reasons to suspect that individuals exposed to untrustworthy sites may be susceptible to believing misinformation. Individuals who visit untrustworthy sites tend to strongly prefer like-minded political content, spend more time on webpages on untrustworthy sites than they do with real news sites, and are considerably more likely to believe false claims published by the sites (Guess et al., 2020b). Guess et al. (2020a) demonstrate that individuals who visited an untrustworthy website at least once during a 1- to 3-week period were more likely to hold political misperceptions than people who never visited these sites. In addition, content from untrustworthy sites may be prone to other information processing biases. For example, repeated exposure to false stories from untrustworthy websites may create the feeling that the content is true, which can promote belief in those claims (Pennycook et al., 2018).

However, much of the existing research on the link between untrustworthy sites and misperceptions relies on analyses of cross-sectional survey data that do not examine the volume of untrustworthy site exposure on beliefs or account for other types of media use that could also affect misperceptions, including partisan media (e.g. Guess et al., 2020a). Given the relative scarcity of existing research on this potential relationship, rather than offering a directional hypothesis, we ask the following research question:

> *RQ1*. What is the relationship between exposure to untrustworthy websites and political misperceptions?

Centrist media and misperceptions

Because exposure to partisan media and untrustworthy sites may be associated with reduced belief accuracy, one promising proposition is to encourage use of centrist or non-partisan media. Individuals who rely on sources other than partisan news are less likely to believe misinformation on issues like health care reform and climate change (Feldman et al., 2014; Meirick, 2013), suggesting a positive impact of centrist news on belief accuracy. Using centrist media outlets may direct focus on true information, leading to more accurate beliefs.

Although centrist sites have the potential to improve belief accuracy, journalists' pursuit of objective news reporting may paradoxically perpetuate misperceptions. Journalists have traditionally followed the norm of objectivity by neutrally reporting multiple sides of a dispute, even if those accounts factually contradict one another (Bennett, 2016). Centrist news organizations often shy away from adjudicating factual disputes for fear of being labeled biased (Pingree et al., 2014), and often simply reflect what political actors say rather than sort out the truth for the audience (Bennett, 2016). This type of false balance or equivalence reporting makes it possible that exposure to centrist news will not improve belief accuracy for certain issues, as audiences (who hold prior beliefs about these issues) are presented both sides without much factual adjudication, leaving them confused, uncertain, or even wrong about the facts (Dixon and Clarke, 2013). In addition, people exposed to news from centrist sites may be motivated to process that

information in a way that is consistent with their existing political views, which could encourage them to ignore or discredit facts (Flynn et al., 2017). Taken together, centrist news outlets may promote accurate beliefs, create confusion around the truth, or be processed in a partisan manner. Given these mixed expectations, we ask the following research question:

> *RQ2*. What is the relationship between exposure to non-partisan, centrist news websites and political misperceptions?

Method

This study uses a unique approach to test links between exposure to partisan, untrustworthy, and centrist sites and political misperceptions. We combine results of a survey of American adults with web traffic data from survey respondents' Internet browser histories (collected with their consent). This approach is advantageous to self-reported measures of exposure because it explicitly examines the link between *actual exposure* to various sites online and acceptance of political misinformation. Granted, we cannot ascertain exposure to content outside of website visits, be it tuning into partisan news on TV, scrolling on social media, visiting untrustworthy sites through mobile chat apps like Whatsapp, or interpersonal discussions. While no study can accurately capture individuals' entire media ecology, our approach, though not free of limitations, can assess actual online exposure and pair it with respondents' beliefs.

Sample

Study participants were recruited in March and April 2018 using Facebook advertisements targeting American adults living in the United States. The recruitment strategy focused on Facebook to ensure that all respondents used that social media platform. Roughly 69% of American adults use Facebook, making it by far the most used social networking platform in the United States (Pew Research Center, 2019). The study's advertisements appeared in the right-hand column of 266,827 Facebook users' pages and 3735 users clicked on the study link (1.4% click-through rate). Participants were then directed to a web page that described the study, invited them to complete a survey, and provided a link to download Web Historian (Menchen-Trevino, 2016; Menchen-Trevino and Karr, 2018), an open-source tool that collects participants' web browsing history, as detailed below. The survey data were collected between 28 March and 30 April 2018. A total of 764 participants completed the survey and 736 uploaded their web browsing data; 65 respondents did not have sufficient browsing data (i.e. fewer than 7 days of browsing or less than 2000 site visit records) and were removed from analyses, leaving 671 respondents with both survey data and acceptable browsing histories.[1,2]

The recruitment strategy is limited in that it does not produce a probability based sample, but it does result in a sample that is diverse and resembles the US population in a number of ways. Participant ages ranged from 18 to over 65 (median age category of

35–39 years old); education levels ranged from less than high school to a graduate degree (4-year college degree being the median); 74.5% of respondents were women and 78.7% were White. The sample was geographically diverse and included respondents from 48 states and the District of Columbia. The relatively well-educated sample with a higher number of women is likely due in part to these groups being more active Facebook users (Pew Research Center, 2019).

Web browsing data

To collect web browsing data, we relied on Web Historian (Menchen-Trevino, 2016), an open-source software extension for Google Chrome that collects all browsing history data stored on an individual's computer and displays it to them using visualizations (e.g. network graph of websites visited, word cloud of most used search terms, searchable table of browser history; see Supplemental Information for details). After reviewing their data, participants were provided an informed consent form and could participate in the survey either with or without uploading their browsing data. Survey participants received an Amazon gift card, and those who uploaded their browsing data had a chance to win one of five $100 Amazon gift cards. Web Historian collects all web traffic by the user in the previous 90 days so the data set includes users' web history for the roughly 3-month period *before* they took the survey. Depending on when participants joined the study, Web Historian retrieved visits starting between 28 December 2017 and 30 January 2018 and ended on the date participants began the survey. Overall, the data set included over 15 million visits to websites, with the median participant visiting 432 different domains over the collection period.[3]

Measures

Partisan media exposure. Web Historian (Menchen-Trevino, 2016) collects data at the visit level, meaning that each visit to a web page is a record in the data and includes a timestamp, the full URL of the site visited, and the title of the page. If, for example, the New York Times home page was visited twice, the data would indicate two separate visits with the same URL but different time stamps. Having data at the site visit level allows us to calculate how frequently participants visited specific websites over the 90-day period before completing the survey.

Using the visit-level data, we created three behavioral measures of actual exposure to liberal, conservative, and centrist news. We categorize the partisan slant of the websites at the outlet level using the ideological news media scores created by Eady et al. (2019a). The media ideology scores are based on the assumption of homophily in that social media users (here, members of Congress) are more likely to share political news stories from outlets that are ideologically aligned with their own political view (see Barberá, 2015). For example, Democrats in Congress are more likely to share content from liberal sites, while Republicans are more likely to share links from conservative sites (Eady et al., 2019b). To create the scores, the last 3200 tweets sent by all members of the US Congress were collected, quote tweets were removed,[4] and links to external web pages were extracted. Then, the links to news and political websites were examined. Based on

how frequently links from a population of news sites were tweeted by the accounts of members of Congress, 140 of the most popular political media websites online were identified. These sites include traditional media sites, sites of television news channels, and sites that are widely considered to be highly partisan (Eady et al., 2019a). Finally, a NxM politician-outlet matrix is used to calculate a Bayesian Item Response Theory model that locates members of Congress, as well as media outlets on the same ideological scale (very similar to Barberá's (2015) method for estimating ideology of social media users). The ideological placement of members of Congress was used to successfully validate the scale: the Pearson correlation between the resulting outlet scores and the first DW-NOMINATE score of the politicians is very high (.93). Simply put, sites shared more frequently by Republican and conservative members of Congress will have an ideological score that leans conservative, while those shared more frequently by Democratic and liberal members of Congress will have an ideological score that leans liberal. Sites that are shared by more moderate members of Congress on the left and right will have a more centrist ideological score (see Eady et al., 2019a, 2019b).

Based on these calculations, each news outlet was assigned a score ranging from −3 (most liberal) to +3 (most conservative). Using these scores, we categorized the 140 media outlets as being either liberal, centrist, or conservative. We looked for natural cut-points in the data that made intuitive sense and had face validity. We categorized liberal sites as those with an ideological score of −.70 or lower, whereas conservative sites included those with scores of .70 or higher. Sites with scores between −.69 and .69 were categorized as centrist. These cut-points resulted in roughly similar numbers of liberal sites ($N = 49$), centrist sites ($N = 57$), and conservative sites ($N = 38$). Although these cut-points are somewhat subjective, the data do offer face validity and were validated in previous work using an objective, empirical scoring system (Eady et al., 2019a, 2019b).[5] For example, known left of center sites like Huffington Post or Mother Jones are classified as liberal, right-leaning sites like Breitbart or Fox News are categorized as conservative, and most legacy media are coded as centrist (e.g. PBS, CBS News, Washington Post, Reuters) (see Supplemental Information B for list of sites and corresponding ideological scores).[6]

Finally, to create the three types of news exposure variables, we returned to the browser history data. Each participant was assigned a score for liberal, centrist, and conservative site exposure variables based on the total number of unique URLs per day for the sites in these categories. If, for example, the browser history data indicate that in the previous 90 days a participant visited 15 unique pages (at the day level) on the Fox News website and 7 pages on Breitbart, that individual would be assigned a score of 22 for the total number of visits to conservative websites.[7]

Consistent with prior studies (Guess, 2021; Prior, 2013), descriptive statistics indicate that use of partisan websites (as well as centrist sites) was minimal for most participants. Of the respondents, 18.2% visited zero liberal sites, while 44.1% and 8.2% visited zero conservative and centrist sites, respectively. The mean number of visits to the three types of sites was low (Liberal $M = 38.28$, standard deviation [SD] = 115.40, median = 7; Centrist $M = 74.73$, $SD = 176.96$, median = 23; Conservative $M = 7.98$, $SD = 47.28$, median = 1). As expected, the distribution of these variables is highly skewed, with a few users visiting a great number of sites and the majority of users visiting very few or

none. Therefore, the three variables were subjected to a log base 10 transformation (after adding a constant term of one to allow for the transformation of zero values) that helped normalize the distribution (Liberal sites $M = 0.94$, $SD = 0.71$; Centrist sites $M = 1.33$, $SD = 0.73$; Conservative sites $M = 0.40$, $SD = 0.50$).

Untrustworthy website exposure. Our measure of untrustworthy website exposure was calculated using a list of 668 untrustworthy websites created by Allcott et al., (2019).[8] Their list, which is the most expansive to date, was created by combining five existing lists of untrustworthy sites previously gathered by researchers, journalists, and fact-checking sites (see Supplemental Information for list). We used the browsing data to examine how frequently respondents visited these sites in the 90 days before taking the survey. Consistent with prior research (Guess et al., 2020b), visits to these untrustworthy websites were very rare; 60.8% of respondents visited zero sites and 95.6% visited four or less. The mean number of visits across respondents was 1.19 ($SD = 3.60$) and the range was from 0 to 49 sites visited. As with the partisan media variables, the untrustworthy site exposure variable was log-transformed to help normalize its distribution ($M = 0.19$, $SD = 0.29$).

Political belief accuracy. The dependent variable is the accuracy of respondents' beliefs about a set of political statements. The accuracy of each statement was determined by the researchers in accordance with the best available evidence produced by journalists, fact-checkers, and related experts at the time of the study. Claims lacking strong evidence demonstrating that they were true when the study was fielded were coded as false. The topics used were selected because they were all prominent stories in the news in the months leading up to the study and were prone to public misperceptions.[9] We focus on six political misperceptions that varied along several dimensions to provide evidence that any observed relationships are not entirely driven by specific topics. Importantly, the claims varied in terms of the political party that might benefit from it being true; some claims have positive implications for Republicans and others are more favorable to Democrats.[10] While this set of claims is not representative of the entirety of political misinformation circulating online, it does offer a reasonable test of the relationships between types of media exposure and misperceptions.

   In the survey, participants saw six statements presented in random order and reported whether they believed each claim to be definitely true, probably true, probably false, definitely false, or unsure. Responses to each claim were recoded into a 5-point scale such that greater values indicate more accuracy, with "unsure" answers serving as the midpoint. The six claims are summarized in Table S1 in the Supplemental Information.

Control variables. The models also account for several covariates including demographics like age, race, and gender. We also include two stringent covariates: education and political interest. The latter was measured using two items on 7-point scales that asked participants how interested they are in politics and how closely they follow politics on TV, radio, newspapers, or the Internet, with higher responses indicating greater interest ($M = 4.80$, $SD = 1.62$, $r = .85$). Most importantly, because political misperceptions are driven in large part by prior political beliefs (Flynn et al., 2017; Tappin et al., 2020), we

controlled for party affiliation (1 = strong Democrat to 7 = strong Republican; M = 3.16, SD = 1.83). Finally, to better ensure that browsing data matched the participant taking the survey, we controlled for whether individuals other than the survey taker used the computer from which browser data were provided (18.2% yes: dichotomous variable coded high when others used computer) and whether respondents used other devices to access the Internet (90.2% yes: dichotomous variable coded high when other devices used).

Results

The hypotheses and research question were tested using six ordinary least squares regressions, one predicting belief accuracy for each claim. Positive coefficients for the predictor variables indicate the variable is associated with more accurate beliefs, while negative coefficients signify associations with less accurate beliefs.[11] Recall that due to a skewed distribution, the partisan, centrist, and untrustworthy site use variables were log transformed for analyses. One way to interpret regression coefficients for log-transformed independent variables is in terms of percent change in the dependent variable when divided by 100 (Benoit, 2011).

The first hypothesis predicted that visits to partisan websites relate to less accurate beliefs about party-favorable false claims. For conservative media use, the results are consistent with H1 (see Table 1). Visits to conservative sites were associated with falsely believing that Vladimir Putin did not order interference in the US election, $b = -.29$ (.10), $p = .005$, and that Hillary Clinton lied to the Federal Bureau of Investigation (FBI) about her use of an email server, $b = -.26$ (.13), $p = .046$ (all reported p-values are two-tailed). This pattern emerged for the other two conservative-favorable claims, though neither reached the traditional cut-off of statistical significance ($p < .05$) (Robert Mueller cleared Donald Trump in the Russia investigation, $b = -.11$ (.12), $p = .36$; more gun owners lead to less crime, $b = -.21$ (.13), $p = .12$). We did not find the same relationship between liberal site exposure and liberal-favorable claims. Visiting liberal news sites did not significantly reduce belief accuracy for the two liberal-favored claims, Trump knew of Russian campaign help, $b = -.02$ (.10), $p = .87$; Parkland school shooter was a White supremacist, $b = -.13$ (.10), $p = .21$. To summarize, visits to partisan media sites were significantly related to party-favorable misperceptions but only for two conservative claims.

H2 predicted that visits to partisan sites associate with more accurate beliefs about party-opposed false claims. Support for the hypothesis would be found if, for example, use of liberal news improved belief accuracy for the conservative and Republican-favored claims. There is support for the prediction in four out of the six claims, as visits to liberal sites significantly relate to more accurate beliefs about Mueller clearing Trump, $b = .29$ (.10), $p = .004$, and the influence of gun owners on crime levels, $b = .41$ (.11), $p < .001$. There was also support for the hypothesis when looking at both liberal-favored claims. Here, visits to conservative sites were associated with more accurate beliefs about Trump's knowledge of campaign involvement with Russia, $b = .36$ (.11), $p = .002$, and the Parkland school shooter's ties to white supremacy groups, $b = .29$ (.13), p

Table 1. Predicting political belief accuracy.

	Putin and US election interference	Clinton lied about email server	Mueller cleared Trump of wrongdoing	More gun owners lead to less crime	Trump knew of election help from Russia	Parkland school shooter was a White supremacist
Visits to conservative news sites (log)	−.29 (.10)**	−.26 (.13)*	−.11 (.12)	−.20 (.13)	.36 (.11)**	.29 (.13)*
Visits to liberal news sites (log)	.09 (.08)	.17 (.11)	.29 (.10)**	.41 (.11)***	−.02 (.10)	−.13 (.11)
Visits to centrist news sites (log)	.21 (.08)*	.11 (.10)	.18 (.10)#	.17 (.10)	−.16 (.09)#	.15 (.10)
Visits to untrustworthy sites (log)	−.28 (.16)#	−.21 (.21)	−.27 (.20)	−.95 (.21)***	.23 (.18)	−.05 (.20)
Party affiliation (Rep. coded high)	−.21 (.02)***	−.34 (.03)***	−.22 (.03)***	−.30 (.03)***	.28 (.03)***	.13 (.03)***
Age	.04 (.02)*	.02 (.02)	.03 (.02)	.00 (.02)	−.00 (.02)	.04 (.02)*
Gender (women coded high)	.07 (.09)	−.18 (.11)	−.27 (.11)*	−.01 (.11)	−.13 (.10)	−.25 (.11)*
Education	.01 (.02)	.04 (.03)	.04 (.03)	.06 (.03)*	−.03 (.03)	.02 (.03)
Race (White coded high)	.05 (.09)	−.03 (.12)	−.02 (.11)	−.19 (.12)	.11 (.10)	−.07 (.12)
Political interest	.09 (.03)***	.02 (.03)	.10 (.03)**	−.01 (.03)	.02 (.03)	.02 (.03)
Other users of Internet browser	−.00 (.10)	−.04 (.13)	−.15 (.12)	−.19 (.13)	.03 (.11)	−.07 (.12)
Use of other browsers	.30 (.13)*	.10 (.16)	.46 (.15)**	.15 (.16)	−.48 (.14)***	−.03 (.16)
Constant	3.18 (.23)***	3.26 (.29)***	3.05 (.28)***	4.21 (.29)***	2.01 (.25)***	2.14 (.28)***
R^2 (F)	.27 (17.53)	.30 (20.91)	.29 (19.54)	.35 (25.27)	.29 (19.25)	.11 (6.08)
(df)	(12, 576)	(12, 576)	(12, 576)	(12, 576)	(12, 576)	(12, 576)

N = 589. Unstandardized coefficients reported. Standard errors in parentheses.
#$p < .10$, *$p < .05$, **$p < .0$, ***$p < .001$ (all p-values are two-tailed).

$= .026$. We did not find that liberal site visits were significantly linked with improved accuracy about Putin's election interference or Clinton's email server.

The first research question examined whether visits to untrustworthy news sites predicted less accurate beliefs. The data offer little evidence that untrustworthy websites are associated with widespread belief in false political claims. We see evidence of this for only one of the six claims, as individuals who more frequently visited untrustworthy news sites were significantly more likely to believe that more gun owners in society contributes to less crime, $b = -.95 (.21)$, $p < .001$.

Our second research question asked whether visiting centrist sites predicts reduced political misperceptions. For the most part, visits to these sites were not related to improvements in belief accuracy. Of the six claims, only one coefficient was significant; the more people visited centrist sites, the more likely they were to accurately report that Putin ordered US election interference, $b = .21 (.08)$, $p = .011$. In one instance, visits to centrist sites were associated with reduced belief accuracy; individuals who used centrist sites were more likely to say that Trump knew about campaign help from Russia, a claim that was not definitively supported by evidence at the time of the study, $b = -.16 (.09)$, $p = .068$. In short, using centrist media did not systematically relate to either misperceptions or more accurate beliefs.

Consistent with past work (Flynn et al., 2017), in each of the six regression models, party affiliation significantly predicted false beliefs in the expected direction. Although our models indicate that partisanship predicts misperceptions, controlling for it allows us to demonstrate the independent relationship between partisan media/untrustworthy site exposure and false beliefs, beyond any influence of party affiliation.

Discussion

Significant percentages of the American public are misinformed about politics. Yet, questions remain about how media exposure is related to these misperceptions. This study advances the understanding of the role that both partisan media and untrustworthy sites play in misinforming the public by explicitly examining whether actual exposure to these sites is associated with false beliefs. By systematically comparing exposure to both types of sites and simultaneously including them in the analytical models, this study helps disentangle whether partisan media or untrustworthy sites are more strongly related to misperceptions. The results indicate that partisan media—more so than untrustworthy sites—at times have the potential to mislead the public.

We find that visits to partisan media sites relate to belief in some false claims that are consistent with the partisan or ideological bias of the media outlet, as suggested by past work (Feldman et al., 2014; Garrett et al., 2016, 2019; Meirick, 2013). The observed relationships, however, were limited to use of conservative sites and conservative-favored claims and did not emerge for liberal sites' visits and liberal-favored misperceptions. A similar pattern of results was found in work that examined self-reported partisan media use and misperceptions (Garrett et al., 2019). What explains the partisan asymmetry in beliefs? One explanation may lie in how liberal and conservative media cover political falsehoods. While both spin content to favor their side, it may be

that conservative media promote falsehoods in different ways that make them more believable. Some note that far-right media use political mis- and disinformation as a strategy to advance political agendas (Bennett and Livingston, 2018; Marwick and Lewis, 2017). Our analyses cannot test this explanation, as we did not look at the content of the sites. It may also be that observed differences in beliefs are a function of the claims we selected. For example, the claim about a link between the Parkland school shooter and White supremacy was less well known and did not receive the volume of media coverage that more prominent claims about Trump or Clinton did. Both of these issues highlight important directions for future work; we know little about how partisan media on the left and right cover political misinformation across a broad range of topics, and how that specific coverage relates to beliefs.

In contrast to concerns about untrustworthy sites, we find little evidence that exposure to such sites consistently predicts false beliefs. This null relationship may be due to the fact that people are rarely exposed to them. Consistent with prior work (Allen et al., 2020; Guess et al., 2019; Nelson and Taneja, 2018), the majority of respondents never visited one of the 668 untrustworthy sites over a 90-day period. Because these sites are not reaching people, their political influence (and researchers' statistical power to detect a relationship) are limited.[12] The evidence leads us to echo others (e.g. Guess et al., 2020b) in concluding that the role of untrustworthy websites may be overstated. This is not to say that these sites are not potentially important sources of false information; they certainly are and their influence may grow in coming years. But the data suggest that partisan media may be more likely to contribute to misperceptions than untrustworthy sites, leading us to encourage researchers to better understand how these more widely used partisan sites misinform the American public.

We also find that visits to centrist sites did not consistently promote accurate beliefs about the tested claims. While using centrist news in most instances did not hurt, it also rarely helped for these claims. This does not mean that centrist news outlets cannot help people be accurately informed; these outlets report true and correct information and it is likely that using these sources promotes or reinforces accurate beliefs about true information, particularly true information that is not covered by more partisan outlets. Rather, this finding suggests that exposure to credible, centrist news outlets may not be enough to correct some pieces of misinformation. The data here do not provide an easy explanation for why centrist news exposure did not promote accurate beliefs. It may be that partisans come to centrist news with established beliefs—some of which are false—and the dynamics of motivated reasoning make it difficult to change those beliefs, even if people are exposed to correct(ive) information. Alternatively, centrist news may cover false claims less than partisan outlets. If so, users of centrist media may not see much false information, but they may also not see much corrective information (which may help explain the null relationships). Another possibility is the way centrist media cover issues associated with political falsehoods. As noted earlier, because journalists are often reluctant to strongly adjudicate factual disputes, or to clearly highlight when one politician or issue position is blatantly inaccurate (Bennett, 2016; Pingree et al., 2014), centrists news organizations' adherence to objectivity can create false balances or equivalencies that have the potential to confuse or even misinform. For example, media coverage that provides scientific evidence of the safety of vaccines alongside

anti-vaccine claims promotes uncertainty about vaccine safety relative to coverage of the factual information alone (Dixon and Clarke, 2013). Sorting out which of these mechanisms is at play is an important task for future work.

Moving forward, our study highlights the need for a few other areas of research. Though this study is among the first to test a link between actual exposure to partisan media and false beliefs, we are not able to identify the mechanisms through which this relationship occurs. There is self-reported evidence that partisan media create emotional responses in the audience (Hasell and Weeks, 2016), which can drive misperceptions (Garrett et al., 2019; Weeks, 2015). This is a promising start, but future research should explore whether actual exposure to partisan news does in fact trigger emotions that lead to false beliefs, in addition to testing other explanations. Similarly, future research must examine how these claims are covered in various media outlets, as well as how people process this information from various sources.

While the novel findings shed light on the relationship between partisan media and political beliefs, the study does have limitations. The sample was a convenience sample, rather than a probability based sample. Although not representative of the population, this sample allows us to reasonably test our hypotheses among a subset of social media users. Nonetheless, future work should replicate the design with a nationally representative sample. Participants in the study also agreed to provide browsing data and people who are comfortable providing access to browsing histories may systematically differ from those who do not. The analyses are also cross-sectional, so we are not able to establish a causal relationship. There is the potential of self-selection effects such that individuals predisposed to believing certain claims opt for like-minded partisan media. Despite this possibility, partisan media exposure is at times associated here with false beliefs, over and above the influence of partisan affiliation. We can also not eliminate the possibility that reported false beliefs reflect prior attitudes about the targets of the claims rather than true beliefs (Kim and Kim, 2019). This highlights the need for future work to incorporate experiments to better establish the causal direction at work. It is also possible that the findings were in part a function of the topics or issues used to assess belief accuracy. For example, four of the six items were favorable to Republicans. While this does introduce imbalance in the partisan target of the claims, such asymmetries reflect evidence suggesting conservatives are more likely to be exposed to and engage with misinformation (Grinberg et al., 2019). Also, although we took care to select topics about a variety of political issues or politicians that were in the news during the time of the study, our selection of topics was not random. However, the items here tapped beliefs about six diverse political claims, providing a reasonable test of the relationship between media exposure and false beliefs. That said, future research should replicate these analyses using a different set of false claims. Finally, we are not able to account for other potential sources of misinformation, including cable television news, chat apps, partisan and untrustworthy sites visited on other devices (e.g. cell phone), or interpersonal conversations. Although the analyses here examine a very broad range of media, future research should aim to also account for these other possible paths to misperceptions.

Despite these limitations, this study offers evidence that exposure to partisan media is at times related to misperceptions consistent with the political bias of the site. Although partisan media have relatively small audiences, there is growing evidence that their

audiences behave and think differently than the public at large. The findings here suggest that partisan media—perhaps more so than untrustworthy sites—have the potential to promote false beliefs, which may have consequences for democratic outcomes and institutions. Assessing their continued political influence may therefore be more important than ever before.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Data for a second wave of the study were collected in July 2018. Analyses in this article focuses only on W1 data, as we are primarily interested in how media exposure associates with false beliefs, rather than changes in beliefs over time.
2. Extensive measures were taken to ensure respondents' privacy. The Institutional Review Board at each US-based author's university approved the study. Further, the Web Historian tool was explicitly designed to better explain the informed consent process to participants (Menchen-Trevino, 2016). Participants received a detailed explanation about what information the research team could access, how data would be used, and how privacy was being protected. See Supplemental Information for more details.
3. The websites analyzed were active between 30 December 2017 and 30 April 2018.
4. Quote tweets are often used to criticize the other side rather than to reflect one's views.
5. While the categorization of media outlets offers face validity, we recognize that some sites may anecdotally appear to fit better in a different category. It is important to note that scores here are based on empirical data and assessments of site ideology based on Twitter sharing patterns of members of Congress rather than actual content (Eady et al., 2019a, 2019b). These scores were used to ensure that the categorization of sites was based on objective criteria rather than our own subjective views. The anonymized data set that includes site scores is available, which will allow researchers to assess different categorizations of sites.
6. The data and all variable coding are available at the following doi via the Harvard Dataverse: DOI:10.7910/DVN/PGQUWF.

7. The day-level unique URLs' measure allows us to account for regular home-page visitors accurately; if we only measured unique URLs over the entire 90-day time period, someone who visited the home page of the New York Times once would have the same score as someone who visited every day, whereas with this process, the everyday visitor would have a score of 90.
8. The Allcott et al. (2019) list included 672 sites. Four sites (dailywire, ijr, dailycaller, and wnd) that were on their list were also on our list of partisan media sites. After exploring these four sites, we opted to keep them in our list of partisan media.
9. Three of the six claims were centered on Trump and/or election misconduct. We chose this broad topic because it dominated the news in early 2018. US intelligence officials had released several reports outlining the scope of Russian interference in the 2016 presidential election and the Mueller investigation was ongoing. We added the claim about Clinton and emails because this was one of the most prominent false claims during the 2016 election and false beliefs lingered into 2018. Finally, we asked the gun ownership and Parkland shooting questions in direct response to the Parkland, FL school shooting, which took place in February 2018.
10. Four of the claims were politically favorable to Republicans and two were favorable to Democrats. We determined party favorability by considering which party would benefit more politically from the misperception. For example, Republicans benefit politically from false claims about Putin's election interference and Trump's knowledge of campaign help from Russia because they are consistent with Trump's claim that election misconduct did not occur in 2016. Similarly, Republicans are more likely to benefit from claims that Clinton lied about her emails and that more guns lower crime because these claims fit with long-standing Republican criticism of both Clinton and gun control legislation. Democrats were deemed to benefit from claims that Trump knew about campaign help from Russia because it would indicate Trump lied or withheld information. Finally, Democrats have also highlighted the threat of violence from White supremacy groups, so the claim that the Parkland shooter was associated with those groups is consistent with those concerns.
11. Several respondents did not provide an answer to the question about partisan identification, which contributed to a smaller sample for the regression models.
12. We conducted a series of sensitivity power analyses to assess the effect sizes for the media exposure variables that could be detected by this study, given various inputs (e.g. alpha, power levels, sample size) (Faul et al., 2009; Lakens, 2021). These analyses indicate that the study has less power to detect smaller effects for untrustworthy news site visits than for partisan and centrist news sites. Sensitivity power analyses for all media exposure variables, along with plots of sensitivity power analyses curves, are described and reported in Supplemental Information D.

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