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The Electoral Misinformation Nexus: How News Consumption, Platform Use, and Trust in News Influence Belief in Electoral Misinformation

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Abstract Electoral misinformation, where citizens believe false or misleading claims about the electoral process and electoral institutions—sometimes actively and strategically spread by political actors—is a challenge to public confidence in elections specifically and democracy more broadly. In this article, we analyze a combination of 42 million clicks in links and apps from behavioral tracking data of 2,200 internet users and a four-wave panel survey to investigate how different kinds of online news and media use relate to beliefs in electoral misinformation during a contentious political period—the 2022 Brazilian presidential elections. We find that, controlling for other factors, using news from legacy news media is associated with belief in fewer claims of electoral misinformation over time. We find null or inconsistent effects for using digital-born news media and various digital platforms, including Facebook and WhatsApp. Furthermore, we find that trust in news plays a significant role as a moderator. Belief in electoral misinformation, in turn, undermines trust in news. Overall, our findings document the important role of the news media as an institution in curbing electoral misinformation, even as they also underline the precarity of trust in news during contentious political periods.

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Introduction

Electoral misinformation, where citizens believe false or misleading claims about the electoral process and institutions—sometimes actively and strategically spread by political actors—is a challenge to public trust in elections specifically and democracy more broadly (Hernández-Huerta and Cantú 2022; Rossini, Mont'Alverne, and Kalogeropoulos 2023), with the potential to undermine political institutions and fuel violence when people distrust the electoral process. What role do different kinds of news consumption, digital platform use, and trust in news play in hindering or helping the spread of such electoral misinformation? These are the questions we address in this article.

The context is one in which the rapid growth of digital media, especially widely used platforms like Facebook, YouTube, WhatsApp, and their competitors, and numerous documented cases of misinformation on many of them, has drawn attention to the role of media in political processes. As Nelson and Taneja (2018) have argued, "Social network sites play an outsized role in generating traffic to fake news." But others have suggested that those concerned about misinformation spread, and people's belief in false and misleading claims, need to consider the role of news organizations too. As Tsfati et al. (2020) write, "Mainstream news media [play] a significant and important role in the dissemination of fake news" (see also Allen et al. 2020). While several empirical studies have cautioned that identified sources of false information are a small, even very small, part of most people's media use (Watts, Rothschild, and Mobius 2021; Altay, Nielsen, and Fletcher 2022), it is clear that we need further empirical analysis of these issues, in particular analysis that looks across different kinds of media use (news, platforms), examines the role of other factors (in our case trust), and looks beyond the United States.

Studies have examined how misinformation circulates online, where people get it, and the consequences for political attitudes (Sanderson et al. 2021; Mundim, Vasconcellos, and Okado 2023), including the role played by polarization and trust in institutions (Guess, Nyham, and Reifler 2018; Hameleers and van der Meer 2020). Findings are mixed, however, in showing whether accessing news from legacy sources, as opposed to digital outlets, reduces beliefs in misinformation, has no effect, or even has the opposite effect in the case of platforms (Nielsen, Schulz, and Fletcher 2021; Theocharis et al. 2021; Altay, Nielsen, and Fletcher 2023). One reason for these varied findings may be that studies do not sufficiently account for how audiences think about the sources of information they are exposed to—what sources they trust and do not trust—in addition to what they see. Understanding this relationship is particularly important when it comes to misinformation concerning voting, as trust in democracy requires at least

some public confidence in the way elections are administered. Previous studies demonstrate that conspiratorial beliefs contribute to electoral mistrust (Norris, Garnett, and Grömping 2020) and that belief in electoral misinformation is in turn associated with lower levels of trust in the electoral system (Rossini, Mont'Alverne, and Kalogeropoulos 2023), but we know much less about how changing news consumption habits are associated with beliefs in specific electoral misinformation and all its many democratic implications, including electoral trust. The attacks against the US Capitol on January 6, 2021, and in Brazil against the buildings of the Congress, Presidency, and Justice on January 8, 2023 (Phillips and Downie 2023), underscore the risks of leaving electoral misinformation unchecked.

In this article, we combine behavioral web and mobile tracking with online survey data to investigate how news consumption online—and trust or distrust in specific news sources—relates to beliefs in electoral misinformation during the 2022 Brazilian presidential campaign. This was a contentious electoral contest in which misinformation about the voting system circulated widely (Nickas, Milhorance, and Ionova 2022), and one that took place in a polarized environment where trust in news has declined substantially in recent years (Newman et al. 2022). We use a unique dataset with behavioral tracking data (rather than less reliable self-reports of news consumption) of 2,200 internet users in Brazil (resulting in 42 million clicks in links and apps) combined with four online survey waves with the same respondents, conducted before, during, and after the 2022 presidential elections, allowing us to assess the dynamic relationship between exposure to news, trust in news, and beliefs in electoral misinformation over time. Our dataset, which is rare in contexts outside the United States and a few other unusual places, provides a more holistic view of media usage during the campaign by including different kinds of news consumption as well as digital platform use. The unique dataset allows us to advance the literature on electoral trust by demonstrating the important role played by the type of news consumed—and attitudes about that news—on levels of belief in electoral misinformation, which as prior research has shown ultimately relates to trust in electoral processes, the perceived legitimacy of democracies more broadly, and prospects for peaceful transitions of power. In so doing, we also expand prior political communication work focused solely on news exposure as a factor in contributing to misinformation beliefs by demonstrating the importance of trust in news as a moderating factor in these relationships.

Our findings indicate that exposure to news from legacy news brands is significantly associated with lower levels of belief in electoral misinformation, while using digital-born news organizations is not associated with any changes in misinformation beliefs. We also show how trust in news reinforces the positive impacts of consuming legacy brands. Simultaneously, belief in electoral misinformation appears to undermine and reduce trust in news

from legacy brands, suggesting that trust is not only an important moderating variable, it can also change in response to events. Our findings have implications for whether journalism can contribute to protect democracies, showing how reliance on and trust in professionally produced news might help safeguard the electoral process, even as they also underline the precarity of trust in news during contentious political periods. Our study also has implications for securing electoral processes that are seen as fair and legitimate by citizens, and, therefore, deserve their trust.

Examining the Relationship between News, Media Use, and Beliefs in Electoral Misinformation

Exposure to Different Sources of News and Information Online

While misinformation has always existed in one form or another, the contemporary digital media environment and the rising importance of tech platforms play an important role in enabling misinformation to spread more rapidly, increasing its potential to undermine trust in democratic institutions. Specifically when it comes to elections, some studies find that misinformation and challenges to electoral results undermine democracies. Examining consequences of misinformation in a survey analyzing the 2022 Brazilian elections, Rossini et al. (2023) find a negative association between belief in misinformation and trust in the electoral process. This aligns with other findings that candidates' refusal to accept electoral outcomes increases supporters' distrust in the election process (Hernández-Huerta and Cantú 2022), since misinformation claims circulating in Brazil during the elections were targeted at the voting system and provided Bolsonaro supporters with a rationale for rejecting his defeat. In the United States, Lee and Jones-Jang (2022) likewise find that belief in electoral misinformation increases political cynicism; whereas Green et al. (2023) find that those who engaged with electoral misinformation online were less likely to vote, and Nisbet et al. (2021) demonstrate that perceived prevalence of electoral misinformation reduces satisfaction with democracy. These previous results underscore the potential implications of misinformation beliefs for trust in elections, reinforcing the importance of understanding the role of news consumption as a factor in shaping these beliefs and/or countering them.

Several studies in recent years have shown correlations between using digital media platforms and belief in misinformation (Stecula, Kuru, and Jamieson 2020; Nielsen, Schulz, and Fletcher 2021), including in electoral contexts (Allcott and Gentzkow 2017; Vaccari, Chadwick, and Kaiser 2022; Rossini, Mont'Alverne, and Kalogeropoulos 2023), although others have suggested that effects may vary depending on the specific platform (Theocharis et al. 2021; Valenzuela, Muñiz, and Santos 2022). Such results

have underscored that the changing media environment may well be a factor in shaping the spread of misinformation, at least in some contexts and in some countries.

Separate from the question of digital media use broadly, however, studies have produced somewhat inconsistent findings pertaining to the impact of different kinds of news exposure and belief in misinformation. One recent study in Brazil, India, and the UK focusing on COVID-19 (Altay, Nielsen, and Fletcher 2023) found little impact associated with platform use but in some cases a negative relationship between news use and belief in misinformation, suggesting that engagement with journalistic sources may make people more resilient to misinformation. These effects varied, however, across countries and across categories of media outlets.

Scholars have suggested that exposure to online news can increase belief in misinformation by drawing attention to false and misleading content (Tsfati et al. 2020). Such concerns are particularly pronounced in the Global South (Albuquerque 2016). Wasserman and Madrid-Morales (2019) show that online news consumption predicts perceived exposure to misinformation in African countries.

Some also find different effects of misinformation sharing according to the kinds of news people are using. Here we distinguish between legacy and digital-born media, a distinction that transcends the technological features of news—given that most legacy media organizations are also online—and foregrounds differences in their historical roles and trajectories. Following other scholars (Langer and Gruber 2021), we use the term "legacy" media to refer to organizations that existed before the internet and are shaped by the logics (professional, commercial, etc.) of the previous era, often occupying a central place in their countries' media systems (Nielsen 2016). "Digital-born" media, on the other hand, are organizations that emerged online (that is, not simply digital extensions of legacy media organizations), and which are usually smaller than legacy media when it comes to reach and resources, and more often follow different logics when producing news, in some cases emphasizing partisan viewpoints or expressing support to specific social groups (Nicholls, Shabbir, and Nielsen 2016).

In Brazil, Rossini et al. (2021) find no effects of legacy media use on misinformation sharing, but those who use social media as a source of news are more likely to have accidentally shared misinformation on Facebook. When looking at reported news consumption during the 2022 Brazilian elections, Rossini et al. (2023) show that people who use social media and partisan digital-born outlets are more likely to believe in electoral misinformation, while they find no significant association for those who use mainstream media. Furthermore, a study shows that digital-born media sources are more likely to be included in tweets by Bolsonaro's supporters to endorse his opinions about the coronavirus (Santos 2021).

Interpreting such varied findings is challenging for four reasons. First, most previous work has relied entirely on self-reports about exposure to information, which has limitations due to the inability of many people to accurately recall their own media usage (Vraga and Tully 2020). Second, much of this recent work has largely centered on the COVID-19 pandemic. Third, the preponderance of studies, including the small number of prior studies that use behavioral tracking data, have usually focused on the United States (Guess et al. 2021; Wojcieszak et al. 2023), where exceptionally high levels of partisan polarization and low levels of trust in news make it difficult to separate what is specific to the American context or generalizable elsewhere in the world. And fourth, studies do not always differentiate between the type of news outlets that individuals are exposed to. This last point is important because digital-born brands tend to have lower levels of trust, and often produce different content to most legacy organizations (Lecheler and Kruikemeier 2016; Schulz, Fletcher, and Popescu 2020; Newman et al. 2022)—Toff et al. (2021) show that the most trusted brands in Brazil are all legacy media organizations.

In short, we do not know how the use of different types of news organizations and digital platforms plays out during a contentious election. This leads us to formulate the following competing hypotheses pertaining to the effects of accessing legacy news, as prior research has not always indicated consistent expectations.

H1a) People who more frequently access legacy news sources will be less likely to believe electoral misinformation.

H1b) People who more frequently access legacy news sources will be more likely to believe electoral misinformation.

As there is more consensus in the literature raising concerns about the role of alternatives to legacy news media, especially digital platforms, in contributing to beliefs in misinformation, we formulate two additional hypotheses predicting that accessing digital-born (non-legacy) news sources and accessing digital platforms in general will each be associated with higher rates of belief in misinformation.

H2) People who more frequently access digital-born news sources will be more likely to believe in electoral misinformation.

H3) People who more frequently access digital platforms will be more likely to believe in electoral misinformation.

The Role of Trust in News

While accessing digital-born news media and using digital platforms may increase beliefs in electoral misinformation, exposure to news alone may not be enough if people generally distrust these sources. Anspach and Carlson

(2022), for example, found that a lack of trust in mainstream news was associated with higher levels of belief in misinformation when respondents were exposed to it. It is rare, however, for studies focused on misinformation to consider the role played by trust, which is surprising given that considerable research has shown that trust serves as an important lens through which people evaluate credibility of information (for a review, see Strömbäck et al. 2020). For these reasons, we present H4:

> *H4) Levels of overall trust in news moderate the relationship between news use and beliefs in electoral misinformation.*

One complication here, however, is that trust in news may not be a stable attitude. It may change over time in response to events in the news and how they are covered—including during elections (Fletcher, Newman, and Schulz 2020). Valenzuela et al. (2022) found that belief in misinformation was correlated with decreases in trust in news over time, with lower trust, in turn, predicting higher levels of belief in misinformation. In other words, distrust in factual sources of information and belief in misinformation may influence each other in a negative feedback loop.

Such dynamics may be particularly important when it comes to beliefs in electoral misinformation. Past work has shown how trust toward specific news outlets and trust in news in general can be affected by messages disseminated by political leaders (Egelhofer et al. 2022), the degree to which people consume partisan brands (Guess et al. 2021), and exposure to misinformation in different contexts (Wasserman and Madrid-Morales 2019; Ognyanova et al. 2020). H5, therefore, considers the effect of misinformed beliefs on trust itself:

> *H5) Beliefs in electoral misinformation over time will predict declines in trust in news from legacy news organizations.*

The Brazilian Political Information Environment

We test these hypotheses in the context of the contentious 2022 presidential elections in Brazil, an upper-middle-income country which remains overall free but with serious challenges to both political rights, civil liberties, and the independence of news media and safety of journalists,[1] and an election with widely circulated misinformation about the voting system. In 2022, right-wing populist president Jair Bolsonaro ran for reelection against former president Lula da Silva, who was the winner with 51 percent of the votes. The contest was widely seen as one of the most consequential elections for the country since it became a democracy again in the late 1980s (Simon 2022). Bolsonaro's term was marked by the erosion of democratic norms

1. See the World Bank and Reporters Without Borders for more details.

(Boese et al. 2022). During the election, Bolsonaro was accused of disseminating misinformation about the voting system and electoral fraud (Gragnani and Horton 2022) through digital platforms, which he used to communicate directly with supporters (Chagas 2022). Lula's campaign was also accused of spreading misinformation on social media during the campaign (Horton and Gragnani 2022). Both candidates often requested the Electoral Justice, the institution responsible for regulating elections in Brazil, to remove content they saw as misleading. There were episodes of political violence during the campaign (Malleret 2022), as well as after results were released. As a country with historically moderate to high levels of trust in news that has seen a precipitous decline in recent years (Newman et al. 2022), registering particularly low levels of trust in political coverage (Mont'Alverne et al. 2022), Brazil combines several conditions that make it a relevant case to investigate how news consumption online, and trust in those sources, relates to beliefs in electoral misinformation.

The shifting role played by legacy news media in Brazil also makes the election an intriguing case for examining these dynamics. Although the Brazilian media environment has long been dominated by the presence of large news conglomerates, audience attitudes toward legacy news outlets in Brazil have undergone significant changes in recent years. Mainstream news organizations have been one of Bolsonaro's frequent targets of attacks and misinformation (Barão, Fontes, and Marques 2022). In the past, however, these outlets were seen as conflicting with the Workers' Party, which held the presidency from 2003 to 2016 (Marques, Mont'Alverne, and Mitozo 2021). Nonetheless, traditional brands remain relevant, with 58 percent of Brazilians saying they get news by watching television at least once a day, and 58 percent saying they use WhatsApp for news daily (Mont'Alverne et al. 2022). Digital-born media (such as from content creators on YouTube) also seem to play an important role in partisan citizens' media diets (Santos, Chagas, and Marinho 2022), but the news media habits of citizens who are not engaged in politics are poorly understood, and they tend to be the majority in a country with a tradition of low party affiliation (Speck, Braga, and Costa 2015).

Data and Methods

Our data come from tracking study participants' web browsing behaviors (and specifically news use), which we combined with surveys of their attitudes before, during, and after national elections in Brazil. We collected 14 weeks of mobile and desktop/laptop tracking data (URL clickstream and app uses), resulting in a total of 42 million links or apps panelists clicked on, and ran four survey waves with the same individuals during the same

Table 1. Dates in which behavioral tracking data and survey were collected.

Blocks	Dates	Why is it included?
Block 1	July 24–Aug. 20, 2022 Survey: Aug. 8–25, 2022	Includes the period before the official electoral campaign starts and the first week of the campaign
Block 2	Sept. 11–Oct. 1, 2022 Survey: Sept. 16–Oct. 1, 2022	Includes the last three weeks of the official campaign and election day (first round)
Block 3	Oct. 2–Nov. 5, 2022 Survey: Oct. 31–Nov. 10, 2022	Includes the entire second-round campaign, election day, and one week after the second round
Block 4	Dec. 5–Dec. 19, 2022 Survey: Dec. 5–Dec. 19, 2022	One month after the second round, when protests against the election results were taking place

period.[2] For recruitment and data collection, we partnered with the research firm Netquest, which runs a nationally representative panel in Brazil. Our initial sample consisted of 2,200 participants, and we finished the fourth wave with 1,321 respondents. Like most tracking studies, but especially given lower levels of internet access in Brazil, our sample tends to be more educated, richer, and more politically interested than the country as a whole, but Netquest applied quotas for age, gender, region, and social class. No weights were applied to the data.

In Brazil, the official campaign period spanned August 16 through October 29, 2022. First-round voting occurred on October 2, and the second round on October 30. We have collected behavioral tracking data for blocks of time as specified in table 1.

Variables

Beliefs in electoral misinformation

We asked four questions pertaining to beliefs about electoral misinformation. Each refers to actual claims made by politicians and other actors about the voting machines, vulnerability of the electoral system to fraud, and its transparency. Respondents were asked to state how accurate they thought each claim to be on a four-point scale. Two claims were asked across all four waves: (1) "Votes are counted in a secret room by TSE (Electoral Justice)"[3]

2. The project was approved by the Central University Research Ethics Committee (CUREC) of the University of Oxford.

3. Fact-checked on May 11, 2022: https://www.aosfatos.org/bipe/bolsonaristas-reportagem-jn-fora-contexto-desinformacao-sala-secreta-tse/ (accessed June 4, 2023).

(rated somewhat or completely accurate by 50.9 percent on average across the four waves); and (2) "There is no way of auditing electronic voting machines in Brazil"[4] (rated accurate by 47.3 percent). Two other claims were added in wave 2 (and asked in all subsequent waves) after they started circulating more widely—including being fact-checked by news organizations—after our first wave was in the field or being programmed: (3) "There is a secret document revealing flaws in the process of counting the votes in the 2018 elections"[5] (rated accurate by 36.4 percent); and (4) "There is a software able to change votes inside the voting machines"[6] (rated accurate by 35.6 percent).[7] In each wave for each respondent, we summed the claims the respondent somewhat or completely agreed with, resulting in a 0–4 scale (0–2 in the first wave), where 0 means respondents held no beliefs about electoral misinformation and 4 means they rated all four claims as accurate.

Digital news exposure

We measured exposure to digital news using the behavioral tracking data. We examine the use of 22 news organizations, recording how many times a respondent clicked on a link or a mobile app belonging to each organization and had material from the site open for five seconds or more. This generated a continuous variable measuring the frequency of views of each organization. These news organizations are among the most widely used in Brazil, according to ComScore data and the Digital News Report (Newman et al. 2022). We also included relevant niche organizations, which makes us confident that we are covering the most important news sources in Brazil. Our hypotheses require categorizing news organizations as legacy versus digital-born sources. Following Langer and Gruber (2021) and Nicholls et al. (2016), we consider as legacy organizations broadcasters, newspapers, magazines, or other outlets whose existence predates the internet era, even as they maintain an online presence. News organizations categorized as digital-born, on the other hand, are those that originated in the digital environment and are not formally connected to any legacy organization. See table 2.

4. Fact-checked on September 7, 2021: https://www.aosfatos.org/todas-as-declara%C3%A7%C3%B5es-de-bolsonaro/8048/ (accessed June 4, 2023).

5. Fact-checked on August 1, 2022: https://www1.folha.uol.com.br/poder/2022/08/nao-e-verdade-que-existe-documento-secreto-revelando-falhas-na-apuracao-das-eleicoes-de-2018.shtml (accessed on June 4, 2023).

6. Fact-checked on July 1, 2022: https://projetocomprova.com.br/publica%C3%A7%C3%B5es/nao-ha-dispositivo-nas-urnas-eletronicas-capaz-de-alterar-votacao-ao-contrario-do-que-diz-postagem/ (accessed on June 4, 2023).

7. Separate tabulations for the percentages who evaluated each claim as somewhat or completely accurate in each wave are reported in Supplementary Material section F.

Table 2. News brands categorized as legacy or digital born.

Category	Brands
Legacy	Band, BBC Brasil, CNN Brasil, Folha de S. Paulo, G1, Gazeta do Povo, Globo, Jornal O Globo, Jovem Pan, O Estado de S. Paulo, R7, Record TV, Rede TV, SBT, TV Brasil, UOL
Digital born	Brasil 247, Brasil Sem Medo, Diário do Centro do Mundo, Jornal da Cidade Online, Metrópoles, O Antagonista

Legacy organizations represent most news-related clicks and app uses across all waves, responsible for an average of 96 percent of online news viewed by our respondents. By contrast, digital-born organizations account for just 4 percent of people's news views during the campaign. News outlets (combining legacy and digital) represent just 0.8 percent of the 42 million links and apps people clicked on during the entire period. This low level of news use is in line with other studies (Fletcher, Newman, and Schulz 2020; Wojcieszak et al. 2023). Figure 1 shows the frequency of distribution of news views and how skewed news consumption is because of the large number of people who use little or no online news, and the presence of a small number of people who consume news very frequently (see Supplementary Material section E for more details).

Platform use

We also used the tracking data to record participants' frequency of access to digital media platforms. We did so for the most-used platforms in Brazil

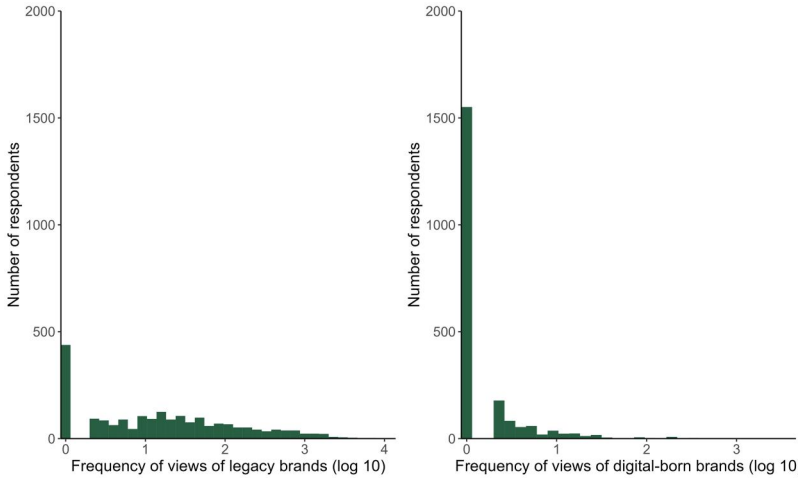

Figure 1. Distribution of frequency of use of legacy and digital-born brands.

(Newman et al. 2022): Facebook, Twitter, YouTube, Instagram, WhatsApp, Google, Telegram, and TikTok. Because this measure only captures platform use in general, we also use a survey-based measure for whether respondents used each of these platforms *to get news* in the past week (see survey questionnaire in Supplementary Material section A).

Trust in news

Trust in news in general and at the brand level was measured following the approach recommended by Strömbäck et al. (2020), asking, "Generally speaking, to what extent do you trust, or not trust information from the news media in Brazil?" with response options in a 1–5 scale, where 1 is do not trust at all and 5 is trust completely. We asked a similar question about respondents' attitudes toward the 22 news brands that we examined in the tracking data ("Generally speaking, to what extent do you trust information from the following sources?"). As a measure of trust in news from legacy brands, we created a composite variable by averaging across respondents' brand-level trust for legacy brands specifically. The measure of trust in legacy news organizations includes only reported levels of trust in the 16 organizations categorized as legacy media, excluding digital-born organizations.

Analytic Approach

To test our hypotheses, we estimated multilevel growth-curve models with the number of electoral misinformation beliefs as the dependent variable and frequency of digital news use as one of the key predictors. We also control

for demographic and political attitudes. To test H4, we add trust in news in general as a potential moderating variable interacted with news use. To test H5, we focus on trust in news in legacy brands as a dependent variable and examine whether belief in misinformation significantly predicts levels of trust across the survey waves (see Supplementary Material section B for details).

Multilevel growth-curve models allow us to account for changes in the dependent variables across the four waves and their cumulative effects over time (Hox 2010). This strategy was employed by other studies with similar designs to ours (Boukes 2019; Altay, Nielsen, and Fletcher 2023). We factorize the "wave" variable to examine whether respondents increase the number of misinformation claims they rate as accurate over time, interacting this "wave" variable with our independent variables to investigate whether people who use above average amounts of legacy news, for example, acquire fewer false beliefs over time than people who use below average amounts of legacy news. Because we introduce two new misinformation items between waves 1 and 2 based on new false claims that emerged in that period (we can think of this as the misinformation acquisition phase), we expect the slope between these waves to rise—but for the steepness of that slope to be different for people with different levels of news use. Between waves two and four (which we call the misinformation retention phase), we do not introduce any further misinformation items. Thus, comparing the steepness of the slopes for different levels of media use shows whether people retained or lost those beliefs to different extents (of course, people could also continue to acquire beliefs during this phase if they had not already—but this seems unlikely for timely misinformation). Another advantage of this approach is that growth-curve models do not require balanced panel data, minimizing the effects of attrition between waves (Shehata et al. 2015; Andersen and Hopmann 2018). Following the approach by Frankel and Hillygus (2014), we ran panel attrition tests to find if some demographics were more likely to drop out from the panel. The correlation shows (Supplementary Material sections C and D) that no demographic group was disproportionately affected by attrition.

Results

News Use and Belief in Misinformation

To test our first hypotheses, we examine the relationships between media use and the number of claims of electoral misinformation respondents believed over the course of the election. Since we added new claims in wave 2, we are looking at how much electoral misinformation people acquired when compared to wave 1 and then how much they retain it in waves 3 and

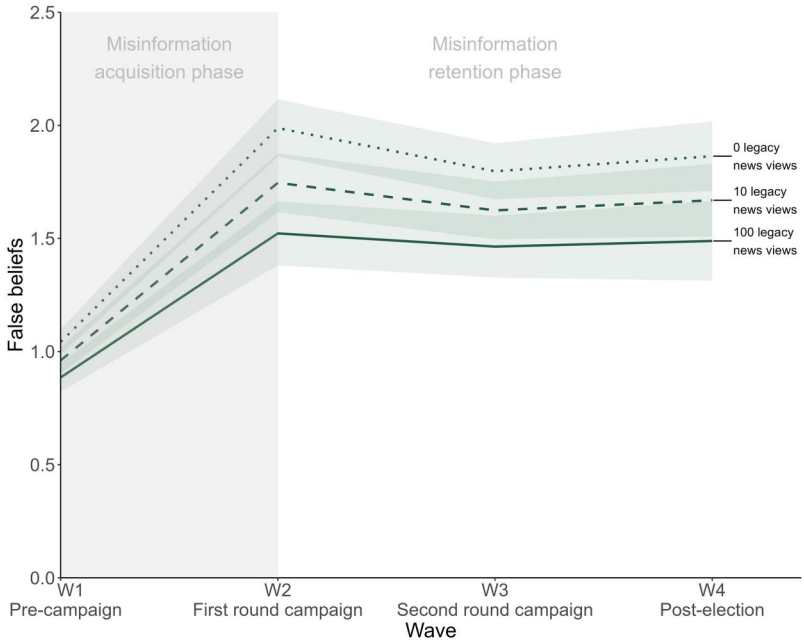

Figure 2. Predicted numbers of electoral misinformation claims respondents believed over time based on results from Model 5.

4. We find that the more respondents accessed sources of legacy news media, the fewer beliefs they held in electoral misinformation across the waves (Model 1), even when we control for demographics, political attitudes, and usage of other sources (Models 3, 4, and 5). Those who use legacy news more frequently acquired less electoral misinformation between waves 1 and 2 when compared with people that use them less often and this did not change in waves 3 and 4 (figure 2). The results are consistent with H1a and lead us to reject the alternative hypothesis H1b. See table 3.

When we consider the impact of accessing digital-born sources for belief in electoral misinformation, H2 is rejected. Higher than average frequency of using digital-born sources does not predict higher levels of misinformation acquisition between waves 1 and 2 (Model 2), even when controlling for demographics, political attitudes, and usage of other sources (Models 3, 4, and 5). As previously, between waves 2 and 4, there were no differences in misinformation retention by different frequencies of accessing digital-born news outlets.

We also tested for whether accessing digital media platforms predicted levels of belief in electoral misinformation (H3). We employed two approaches here, relying on clickstream data alone as well as when

Table 3. Multilevel growth-curve models examining the impact of news use on beliefs in electoral misinformation.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Use of legacy media*Wave 2	−0.12		−0.14	−0.15	−0.15	−0.15
	(SE = 0.04)		(SE = 0.04)	(SE = 0.04)	(SE = 0.04)	(SE = 0.04)
	(p = 0.00)		(p = 0.00)	(p = 0.00)	(p = 0.00)	(p = 0.00)
Use of legacy media*Wave 3	−0.07		−0.09	−0.09	−0.09	−0.09
			(SE = 0.04)	(SE = 0.04)	(SE = 0.04)	(SE = 0.04)
			(p = 0.02)	(p = 0.02)	(p = 0.03)	(p = 0.02)
Use of legacy media*Wave 4	−0.08		−0.09	−0.10	−0.11	−0.11
			(SE = 0.05)	(SE = 0.05)	(SE = 0.05)	(SE = 0.05)
			(p = 0.10)	(p = 0.05)	(p = 0.04)	(p = 0.03)
Use of digital-born media*Wave 2		0.06	0.19	0.17	0.16	0.13
Use of digital-born media*Wave 3		0.06	0.12	0.07	0.06	0.08
Use of digital-born media*Wave 4		−0.04	0.01	−0.02	−0.02	0.01
Use of Facebook for any reason*Wave 2					−0.00	
Use of Facebook for any reason*Wave 3					0.02	
Use of Facebook for any reason*Wave 4					0.04	
Use of WhatsApp for any reason*Wave 2					0.02	
Use of WhatsApp for any reason*Wave 3					−0.02	
Use of WhatsApp for any reason*Wave 4					−0.01	
Use of Facebook for news*Wave 2						−0.00
Use of Facebook for news*Wave 3						−0.03
Use of Facebook for news*Wave 4						0.00
Use of WhatsApp for news*Wave 2						0.10
Use of WhatsApp for news*Wave 3						0.05
Use of WhatsApp for news*Wave 4						0.04

(continued)

Table 3. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
N	6,920	6,920	6,920	6,920	6,920	6,816
N (Panelists)	2,176	2,176	2,176	2,176	2,176	2166
AIC	20,386.57	20,418.20	20,401.82	20,258.84	20,306.43	19,965.74
BIC	20,516.57	20,548.20	20,559.19	20,607.79	20,710.12	20,368.53
R2 (fixed)	0.07	0.06	0.07	0.14	0.14	0.14
R2 (total)	0.74	0.74	0.74	0.76	0.76	0.76

Note: Model 6 has fewer observations because participants who did not say they use Facebook or WhatsApp in the survey were excluded. In the other models, the number of panelists is 2,176, instead of 2,200, because 24 of them responded to the survey but were not sharing their clickstream data. Models are controlled for support for political leader (Lula), political interest, education, gender, age, religion, and ethnicity. All standard errors and *p*-values are reported in the Supplementary Material. All statistical tests conducted for the models are two-tailed.

combined with survey response, given that frequencies from tracking data do not differentiate whether respondents were accessing news on platforms or using them for other purposes. In Model 5, we include levels of use of WhatsApp and Facebook from the tracking data as predictors, but we find no relationship between using them and belief in electoral misinformation during the campaign. We tested this relationship with all platforms (none of them were significant) but focus on these two because they are among the most widely used in Brazil (Mont'Alverne et al. 2022). In model 6, using our survey responses, and again focusing on WhatsApp and Facebook, we find no relationship between getting news on these platforms and belief in electoral misinformation. When we include other platforms (see Supplementary Material table 17), we find inconsistent relationships for different platforms and each wave. Given these different patterns, H3 is not confirmed.

It is worth underscoring that our results hold even when controlling for demographics and political attitudes, and their effects remain stable in the different models we estimated (see full results in Supplementary Material section G, table 15). Among political variables, support for now President Lula was associated with beliefs in the fewest number of electoral misinformation claims, which is expected in a context where then President Bolsonaro and his supporters were responsible for sharing and disseminating most of the misinformation examined in the study. In Supplementary Material table 18, we also include results controlling for support for Bolsonaro, which predicts increase in electoral misinformation belief over time. These effects are stronger in wave 4, which might be a consequence of a "loser effect" following the election outcome.

The Role of Trust in News for Belief in Electoral Misinformation

Next, we consider the role of trust in news as a moderator in the relationship between exposure to news and belief in electoral misinformation. In Model 7, we report results for the interaction between use of legacy media and trust in news in each wave, while in Model 8 we report results for use of digital-born brands (see Supplementary Material section F for full model outputs). More legacy media use and higher levels of trust in news in general predict belief in fewer claims of electoral misinformation, consistent with H4. See table 4.

Figures 3 and 4 more clearly illustrate these results. The effect of consuming legacy news on lowering beliefs in electoral misinformation is stronger among those with higher levels of trust in news. In other words, higher trust in news when combined with higher use of legacy news resulted in the lowest levels of belief in electoral misinformation by wave 4, reinforcing the

Table 4. Multilevel growth-curve models examining the effect of trust in news in general as a moderator of the relationship between news use and belief in electoral misinformation.

	Model 7	Model 8
Use of legacy media*Trust in news in general*Wave 2	−0.07 (SE = 0.03) ($p = 0.05$)	
Use of legacy media*Trust in news in general*Wave 3	0.02 (SE = 0.03) ($p = 0.62$)	
Use of legacy media*Trust in news in general*Wave 4	−0.04 (SE = 0.04) ($p = 0.39$)	
Use of digital-born media*Trust in news in general*Wave 2		−0.18 (SE = 0.10) ($p = 0.08$)
Use of digital-born media*Trust in news in general*Wave 3		−0.01 (SE = 0.10) ($p = 0.89$)
Use of digital-born media*Trust in news in general*Wave 4		−0.11 (SE = 0.15) ($p = 0.46$)
N	6,920	6,920
N (Panelists)	2,176	2,176
AIC	20,303.58	20,289.60
BIC	20,762.01	20,748.03
R2 (fixed)	0.15	0.15
R2 (total)	0.77	0.77

Note: Models are controlled for support for political leader (Lula), political interest, education, gender, age, religion, and ethnicity. All statistical tests conducted for the models are two-tailed.

positive effects of using legacy media. When it comes to the interaction between trust and usage of digital-born brands, there is no significant effect.

The Impact of Beliefs in Electoral Misinformation on Trust in Legacy News

As the previous section indicates, effects on beliefs in electoral misinformation associated with exposure to news (from legacy or digital-born organizations) vary depending on how trusting respondents are in news in general. However, trust in news may not be static over time and may be affected by

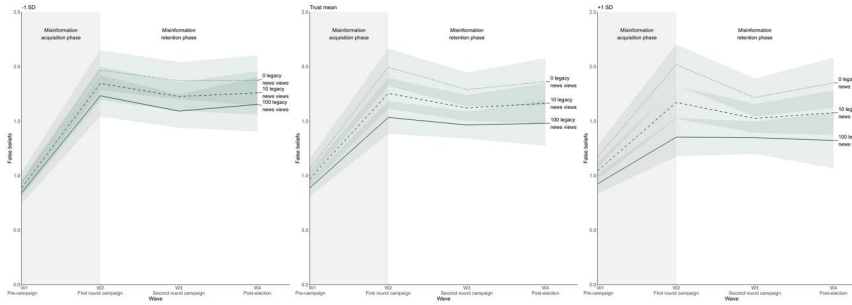

Figure 3. Predicted values of belief in misinformation according to trust in news and frequency of use of legacy brands.

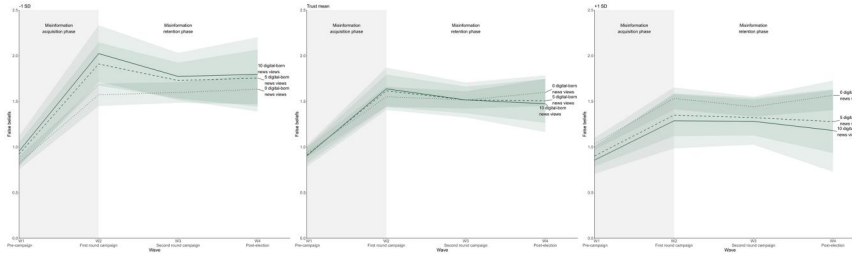

Figure 4. Predicted values of belief in misinformation according to trust in news and frequency of use of digital-born brands.

the electoral process itself. Therefore, in H5 we investigate whether beliefs in electoral misinformation over time predict declines in trust in news toward legacy news organizations. Here we use our composite measure of trust in the 16 legacy news organizations as a dependent variable. We find a consistent pattern: belief in more claims of electoral misinformation is associated with lower levels of trust toward legacy news organizations over time, consistent with our last hypothesis (H5). See table 5. These results are significant only for the interaction between beliefs in misinformation and wave 3, however (see Supplementary Material section G for full model output), which was at the stage of the second round of the electoral process when the dispute became particularly heated. As a robustness check, we also examined trust in news in general and trust in individual legacy news organizations, all of which produce similar results.[8] These findings suggest, at least

8. We looked at the effect of belief in electoral misinformation for trust in the five most accessed legacy brands in our data (see Supplementary Material Section G). The impact of misinformation on trust changes according to the brand, but when there is an impact, it is negative, reinforcing the deleterious effect of misinformation on traditional news. Globo is the brand whose trust levels are most consistently affected by belief in misinformation claims.

to some degree, that while trust in news may be a moderator when it comes to the relationship between exposure to news and belief in misinformation, respondents who believe such claims may also become less trusting toward news organizations over time—a dynamic feedback loop that can reduce the effectiveness of journalistic efforts to debunk such claims.

Discussion

This study combined large-scale tracking data with a four-wave panel survey over the course of the Brazilian presidential elections to investigate the relationship between news consumption, media use, trust, and beliefs in claims about electoral misinformation. Consistent with a growing number of studies (Vaccari, Chadwick, and Kaiser 2022; Altay, Nielsen, and Fletcher 2023), our findings add to evidence indicating how professionally produced news from legacy media organizations may be helpful in countering misinformation during a contentious election cycle. This stands in contrast to concerns about the news media's role in increasing belief in misinformation (Tsfati et al. 2020). Instead, we find a significant negative association between accessing more news from legacy media organizations and acquiring electoral misinformation—with no effects associated with consumption of digital-born news brands. (The null result for the latter may be because such news media organizations are generally not widely used.)

When considering the role of digital platforms, we found a mix of no and small inconsistent effects depending on the platform used. This suggests that while there clearly are numerous examples of electoral misinformation spreading on digital platforms—and often lax or inconsistent content moderation and enforcement of community standards, including against prominent politicians—there is, in our data, no evidence of a more general link between digital platform use and belief in electoral misinformation. Instead, our results suggest that platforms must be considered separately, also via deep, qualitative, and contextual studies that scholars are increasingly calling for (e.g., Kuo and Marwick 2021), in the contexts where they are widely adopted. Our results have implications for understanding how news media, and changing information diets, may shape public understandings about the outcome of elections, considering how previous studies demonstrated a connection between belief in misinformation and electoral trust. If belief in misinformation is associated with lower electoral trust (Rossini, Mont'Alverne, and Kalogeropoulos 2023), our findings demonstrate how certain kinds of news consumption may be helpful in curtailing beliefs in misinformation about the voting system, which may be crucial for averting potentially violent consequences of distrust in the electoral process.

Another central piece of the puzzle is the role of trust in news. Our analysis shows that trust in information in the news media in general moderates

Table 5. Multilevel growth-curve models examining the effect of beliefs in electoral misinformation on trust in traditional brands over time.

	Model 9
Belief in electoral misinformation*Wave 2	−0.02 (SE = 0.01) ($p = 0.25$)
Belief in electoral misinformation*Wave 3	−0.03 (SE = 0.01) ($p = 0.04$)
Belief in electoral misinformation*Wave 4	−0.02 (SE = 0.02) ($p = 0.25$)
N	6,903
N (Panelists)	2,175
AIC	11,734.88
BIC	12,165.78
R2 (fixed)	0.06
R2 (total)	0.78

Note: Models are controlled for support for political leader (Lula), political interest, education, gender, age, religion, and ethnicity. All statistical tests conducted for the models are two-tailed.

effects of electoral misinformation beliefs associated with accessing legacy news—reinforcing effects due to exposure itself, and underscoring the importance of considering not only exposure but also how audiences perceive the news environment.

Given the content of the misinformation claims respondents were exposed to in our study—claims involving electoral fraud—our findings point to the potentially pivotal role played by journalistic institutions, and trust in those institutions, in countering some politicians' efforts to contest election outcomes by perpetuating falsehoods, which in this instance in Brazil led to an outbreak of violence. Independent news organizations, particularly widely used legacy organizations, appear to play an important role in helping the public accept even those results they may be motivated not to accept. However, it is possible that politicians who advance these electoral misinformation claims effectively are pushing people "with me or against me" vis-à-vis media that challenge their misleading claims. As trust in news continues to erode, aided by a steady stream of criticism from political leaders including in Brazil (Newman et al. 2022), there may be an increasing willingness on the part of the public to reject information that does not align with their preferred outcomes in favor of "alternative facts" advanced by leaders they are more apt to trust instead.

Indeed, as our analysis also shows, respondents were somewhat less trusting toward news in response to contentious electoral events at precisely the moment when attacks between candidates became most personal.[9] In short, our findings suggest an electoral misinformation nexus, in which accessing news from established legacy brands and having higher levels of trust limits how much people acquire belief in electoral misinformation, but belief in those claims can also erode trust. We hope future research will investigate whether a similar nexus exists in other contexts than Brazil, and would suggest that the finding is generalizable at least to other countries characterized by a combination of high reliance on digital platforms, declining trust in news, and polarized politics, features of media and politics in many parts of the world. Future studies could also directly examine the connection between news consumption and electoral trust, considering the potential mediator role played by other media-related variables, such as trust in news or in information found on digital platforms, and how this relates with confidence in vital democratic institutions.

Our study comes with some limitations. First, we have not analyzed the content of the links participants in our panel clicked on, so we are unable to directly measure exposure to misinformation or debunking by any of the news organizations examined. We can only make inferences based on the patterns we observed with our measures, which means we cannot say for sure if the effects we find here are caused by the coverage made by legacy news organizations or if they are enhanced due to a trust nexus between trusting in the media and other institutions and democratic processes. We are limited, therefore, in speculating how much the content itself offered by legacy media is the central element to explain our findings. Second, in examining respondents' use of digital platforms, we are unable to differentiate in our tracking data the specific news and information consumed on these platforms, and this limits conclusions we can draw about their importance in contributing to beliefs in misinformation. Third, it is possible that some of the patterns we found could be explained by other variables that are not included in our models, although it is worth repeating that we have controlled for many political and demographic predictors. Fourth, our sample is not entirely representative of the Brazilian population, including fewer people from lower socioeconomic strata who may have different patterns of news consumption. Despite these limitations, this study offers much needed empirical evidence around the relationship between news use, trust, and belief in electoral misinformation during a consequential and contentious election,

9. For example, one of the main topics during the second round was about who, among Lula and Bolsonaro, was a Satanist: https://www.bloomberg.com/news/articles/2022-10-08/satanism-freemasonry-become-election-topics-in-religious-brazil?leadSource=uverify%20wall (accessed June 4, 2023).

underscoring the significant role that journalism potentially plays in countering attacks to the electoral process.

Supplementary Material

Supplementary Material may be found in the online version of this article: https://doi.org/10.1093/poq/nfae019.

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Data Availability

Replication data and documentation are available at https://osf.io/63crf/.

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