

**The Public Sphere in Private Spaces: Quantifying Political
Computer-Mediated Communication in Personal Messaging**

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Abstract

Personal messaging apps have become widespread platforms for online communication, yet their role in spreading information is still not well understood due to encryption and privacy concerns. Using SIREN (Supporting Interdisciplinary Research in Encrypted Networks), a new mobile-phone-based data collection approach, we gathered 88,606 messages from 349 American adults during the 2024 U.S. Presidential Election. We characterize personal messaging as private interpersonal channels where relationships, rather than algorithms, shape information flow and credibility assessment. The results show that while 67.3% of participants received political content, only 1.1% received links to misinformation websites, raising questions about assumptions that misinformation easily spreads to private channels. Political messaging has two main functions: personal discussions (51.6% of participants) and elite political communication (48.1%). Message sharing follows power-law patterns, where a small number of senders account for most of the content. These findings suggest personal messaging platforms are important spaces for political conversation while maintaining relatively high information quality. They also suggest that claims about widespread misinformation in private digital spaces may be overstated. While some empirical findings are similar to that of past work on the open web, other findings diverge, showing how these private interpersonal channels are similar and different as a platform for computer-mediated communication.

Keywords: personal messaging, misinformation, political communication, private spaces, public sphere

Introduction

Personal messaging platforms have become central to human communication, influencing news consumption (Ilan, 2024; Kligler-Vilenchik & Tenenboim, 2020), managing relationships (Church & De Oliveira, 2013; Matassi, Boczkowski, & Mitchelstein, 2019), and coordinating collective action (Martin, Riedl, & Woolley, 2023; Milan & Barbosa, 2020). Although these platforms enhance privacy through end-to-end encryption (Ermoshina, Musiani, & Halpin, 2016; Zarouali, Brosius, Helberger, & De Vreese, 2021), self-reports suggest people encounter diverse political content within these platforms (Boulianne, Hoffmann, & Bossetta, 2024; Kalogeropoulos & Rossini, 2023; Valeriani & Vaccari, 2018). However, scholars have become concerned about misinformation in these spaces—false, misleading, or unsubstantiated information (Nyhan & Reifler, 2010)—which global leaders identify as a top societal threat (WEF, 2024) due to limited monitoring capabilities (Reis, Melo, Garimella, & Benevenuto, 2020). Declining misinformation exposure on the open web (Moore, Dahlke, & Hancock, 2023) has led scholars to hypothesize that problematic content may be migrating to private messaging channels (Reis et al., 2020; Rossini, Mont’Alverne, & Kalogeropoulos, 2023). Some characterize these platforms as the “wild, wild west” of misinformation (Tubman, 2024) or the “future of propaganda” (Woolley, 2020). Yet little empirical work has documented the *actual* prevalence and characteristics of political communication broadly, or misinformation specifically, within these private environments.

Examining exposure to political information within these encrypted environments is especially difficult for quantitative research—challenges Rossini (2023) summarized by asking “Farewell to Big Data?” End-to-end encryption guarantees that only intended recipients can access message content, making traditional research methods ineffective (Abelson et al., 2015). Personal messaging infrastructure lacks researcher-accessible APIs, and data donation solutions have limitations (Boeschoten, Ausloos, Moeller, Araujo, & Oberski, 2020; van Driel et al., 2022). While studies have analyzed public WhatsApp

groups (Bursztyrn & Birnbaum, 2019; Garimella & Eckles, 2020), the actual content users receive in private messaging—where most engagement occurs (Rossini, 2023)—remains largely unstudied.

Descriptive research provides the empirical foundation needed to understand emerging communication phenomena before developing theories, especially in fast-changing digital environments where assumptions quickly become outdated (Gerring, 2012; Karpf, 2024). Such documentation is even more critical in private contexts where traditional methods fail and user behaviors remain hidden (Reeves et al., 2021). Yet methodological barriers have limited quantitative descriptive work on computer-mediated communication within personal messaging apps (Rossini, 2023). In the absence of robust insights into baseline exposure patterns, demographic correlates, and content sharing, theoretical explanations risk becoming speculative and disconnected from actual user actions (Munger, Guess, & Hargittai, 2021). High-quality description can close this gap by bridging measurement and causal explanation, keeping subsequent theorizing anchored in observable reality (de Kadt & Grzymala-Busse, 2025).

To address this gap, we developed SIREN (Supporting Interdisciplinary Research in Encrypted Networks), a new Android-based data collection approach that captures messages participants receive across personal messaging platforms. We collected 88,606 messages from 349 American adults during the 2024 U.S. Presidential Election period. The analysis shows that while political content is common in personal messaging apps, misinformation is surprisingly rare, with only 1.1% of participants receiving misinformation links. Political messaging serves two main roles: personal discussions within trusted networks and sharing of elite political messages. These findings challenge assumptions that misinformation flourishes in private channels and suggest that personal messaging platforms’ role in spreading false information may be less significant than often thought.

Literature Review

Comparing the Open Web and Private Messaging

The modern digital information ecosystem includes two separate communicative domains: the open web and private messaging channels (Papacharissi, 2010; Pierson, 2021; Thorson & Wells, 2016). Personal messaging apps are analytically distinct from the open web, with unique technological structures and communicative features that influence information exposure patterns.

The open web functions on protocols that promote interoperability and accessibility, such as HTTP and HTML (Dahlke, Kumar, Durumeric, & Hancock, 2023), allowing widespread information sharing through publicly accessible platforms indexed by search engines (Berners-Lee, 2010). Its affordances—visibility, persistence, and searchability (boyd, 2010; boyd & Ellison, 2007; Treem & Leonardi, 2013)—create conditions where algorithmic curation and platform design influence exposure patterns, leading to “filter bubbles” or “echo chambers” (Pariser, 2011; Sunstein, 2018). Conversely, private messaging channels use end-to-end encryption and closed architectures (Church & De Oliveira, 2013; Ermoshina et al., 2016), providing privacy, intimacy, and bounded group memberships (Church & De Oliveira, 2013; O’Hara, Massimi, Harper, Rubens, & Morris, 2014; Waterloo, Baumgartner, Peter, & Valkenburg, 2018). These architectural differences fundamentally change how information flows and how users encounter political content (Hutchby, 2001; Ronzhyn, Cardenal, & Batlle Rubio, 2023).

Messaging apps exist primarily for interpersonal communication. They organize day-to-day life through micro-coordination and relationship maintenance (Church & De Oliveira, 2013; Ling & Lai, 2016; O’Hara et al., 2014), creating small trusted groups where social norms of intimacy and reciprocity prevail (Waterloo et al., 2018). Within these settings, political content typically surfaces incidentally, shared by friends or family during routine exchanges rather than sought deliberately (Valeriani & Vaccari, 2018). Such peer-driven encounters encourage reflection and spill over into offline discussion, activism,

and conventional participation (Gil de Zúñiga, Ardèvol-Abreu, & Casero-Ripollés, 2021; Gil de Zúñiga & Goyanes, 2023; Vermeer, Kruikemeier, Trilling, & De Vreese, 2021).

Although these channels revolve around intimate peer-to-peer interaction, they can also serve as conduits for elite messaging. Penetrating such networks is difficult for outsiders because access requires navigating technical barriers, like non-public group memberships, and social filters, where unknown senders are easily dismissed. However, documented cases show this elite entry can happen. For example, coordinated campaign content circulated widely in Brazilian WhatsApp groups during the 2018 election (Resende et al., 2019; Soares, Recuero, Volcan, Fagundes, & Sodré, 2021), and news organizations experiment with closed broadcast lists that bypass platform algorithms (da Silva, 2022). When elites gain entry, the relational credibility that governs these spaces grants their messages a journalist- and algorithm-free path to individuals and may amplify persuasive power by lending elite messages a halo of interpersonal credibility. Information control may have thus shifted from institutional editors (Shoemaker, Vos, & Reese, 2009) to algorithmic curation (Diakopoulos & Koliska, 2017) and now to interpersonal networks that offer elites a more direct line to citizens via personal messaging applications.

Empirically tracing these dynamics has proven difficult, yet such evidence is crucial for understanding how private interpersonal channels function. End-to-end encryption blocks platform-side data access, and most computational approaches cannot observe private messaging traffic, creating an analytical blind spot highlighted by Rossini (2023). While scholars have hypothesized that private messaging might serve as refuges for misinformation escaping increased scrutiny on public platforms (Woolley, 2023), we lack empirical evidence about the content people actually receive. Our SIREN methodology addresses this gap by capturing real-time, participant-consented message data. Before formulating theories about democratic effects or testing complex predictions, we need basic empirical understanding: How common is political content in personal messaging? What is the balance between elite and interpersonal political communication? Who receives this

content, and through which platforms? To build this foundation, we examine existing self-reported research on political content exposure in messaging apps.

Self-Reported Exposure to Politics, Journalism, and Misinformation in Personal Messaging Applications

Researchers have examined exposure to politics, journalism, and misinformation on personal messaging platforms via self-reported data. Although self-reported data have limitations, understanding how people perceive their exposure remains important for three reasons. First, these platforms have become key spaces for consuming information, making it vital to understand how users interact with content (Valeriani & Vaccari, 2018). Second, self-reported data offer insights into users' subjective experiences, which can guide efforts to reduce misinformation. Third, knowing perceived exposure patterns helps identify vulnerable groups and develop targeted strategies to improve digital literacy and resilience against misinformation (Lee, Moore, & Hancock, 2023).

Most self-reported studies on personal messaging apps focus on WhatsApp. About a quarter of American adults use WhatsApp (Boulianne et al., 2024), with higher adoption among non-white, younger, and college-educated individuals; there is conflicting evidence regarding its partisan skew (Boulianne et al., 2024; Perrin, 2015) and usage appears similar across socioeconomic levels (Matassi et al., 2019). Among American users, 22% report getting news from the platform (Shearer & Grieco, 2019), and self-reported exposure to political content is higher among men, partisans, and those who are younger and college-educated (Boulianne et al., 2024). Globally, self-reported exposure to misinformation is common (Rossini, Baptista, de Oliveira, & Stromer-Galley, 2021) and platform use is linked to belief in misinformation (Kalogeropoulos & Rossini, 2023; Rossini et al., 2023; Yamamoto, Kushin, & Dalisay, 2018; Yoo, Oh, & Choi, 2023). Despite this, users report finding it easier to identify trustworthy news on WhatsApp than on platforms like TikTok or X (Fletcher & Nielsen, 2024; Newman, 2024). Furthermore, experimental research by Ventura, Majumdar, Nagler, and Tucker (2023) shows that even when

interventions successfully reduce exposure to false rumors, this does not necessarily change underlying beliefs or political polarization.

Understanding how people consume information in personal messaging apps is important because these spaces show unique patterns of democratic engagement that differ from traditional media and public social platforms (Mukerjee, Jaidka, & Lelkes, 2022). Political discussions and news sharing in personal messaging apps generate spillover effects, positively linked to offline political conversations (Gil de Zúñiga et al., 2021; Gil de Zúñiga & Goyanes, 2023; Valeriani & Vaccari, 2018), political expression on social media (Cheng, Zhang, & Gil de Zuniga, 2023), and political consumer behavior (Cheng et al., 2023). However, the relationship between personal messaging exposure and political knowledge shows conflicting patterns. While some studies find exposure linked to lower political knowledge (Gil de Zúñiga & Goyanes, 2023; Valenzuela, Bachmann, & Bargsted, 2023), experimental research reveals more complex effects. Altay, Hoes, and Wojcieszak (2025) found that following news accounts on WhatsApp increased trust in news and news knowledge but did not significantly affect belief in false news or political polarization.

These self-report studies provide a valuable portrait of perceived exposure, but they cannot capture the precise composition and distribution of content within messaging apps due to inherent limitations like recall bias and social desirability. To overcome these challenges, we turn to digital trace data. The extensive literature on information exposure on the open web provides an established methodological template for our study, offering a core set of research questions and measures that can be adapted to the unique context of private messaging.

Exposure to Politics, Journalism, and Misinformation on the Open Web

What People Receive: Top-Line Metrics

The first question from the literature concerns the percentage of people exposed to a specific type of content. Previous research on news and political information exposure indicates that a large majority of Americans visit news websites (Moore et al., 2023;

Wojcieszak et al., 2023). Studies on misinformation reveal that tens of millions of American adults have visited at least one misinformation website during the weeks surrounding US presidential elections (Guess, Nyhan, & Reifler, 2020; Moore et al., 2023). However, the percentage of American adults exposed to at least one misinformation website dropped significantly from 44.3% during the 2016 US presidential election to 26.2% in the 2020 election (Moore et al., 2023). This decline in misinformation exposure on the open web has led scholars to ask whether this information is shifting to private communication channels (Tubman, 2024; Woolley, 2020). Based on this literature, and the crucial theoretical distinction between elite and interpersonal political communication (Farhall, Carson, Wright, Gibbons, & Lukamto, 2019; Settle, 2024; Shah et al., 2017), we ask (RQ1): What percentage of participants receive at least one message containing political communication overall (RQ1a), elite political communication (RQ1b), interpersonal political communication (RQ1c), journalism (RQ1d), and misinformation (RQ1e)? How do these patterns vary across different personal messaging platforms (RQ1f)?

Beyond overall exposure, the literature examines exposure intensity. Previous research on news and political exposure on the open web has found a skewed power law distribution, where few people are most exposed, while most encounter such content only occasionally (Wojcieszak et al., 2023). Studies of misinformation have examined the average number of exposures among those who encountered this content (Dahlke, Moore, Bengani, & Hancock, 2023; Moore, Dahlke, Forberg, & Hancock, 2024; Moore et al., 2023). A key finding from Moore et al. (2023) indicates that, even among people who visited at least one misinformation website during U.S. presidential elections, the average number of exposures decreased from 2016 to 2020. This suggests misinformation exposure declined both in the number of people exposed and in exposure frequency among those exposed. Turning to private communication channels, we ask (RQ2): What is the average number of messages received by participants who received at least one message containing political communication generally (RQ2a), elite political communication (RQ2b), interpersonal

political communication (RQ2c), journalism (RQ2d), and misinformation (RQ2e)? How do these results vary across different personal messaging platforms (RQ2f)?

Another metric used in the literature is the percentage of content that falls into specific categories. Previous research consistently shows that misinformation makes up a small percentage of media diets (Allen, Howland, Mobius, Rothschild, & Watts, 2020; Dahlke, Moore, et al., 2023; Moore et al., 2024, 2023). Building on this, we ask (RQ3): What percentage of messages people receive include political communication in general (RQ3a), elite political communication (RQ3b), interpersonal political communication (RQ3c), journalism (RQ3d), and misinformation (RQ3e)? How does this vary across different messaging platforms (RQ3f)?

Who Receives It: Demographic Correlates

The next step is identifying who is exposed. Knowing who encounters politics, journalism, and misinformation is crucial because it helps scholars and policymakers recognize vulnerable groups and understand exposure gaps, allowing for targeted efforts to promote informed engagement (e.g., Brashier, 2024; B. Lyons, Montgomery, & Refiler, 2024; B. A. Lyons, 2023; Moore & Hancock, 2022; Pennycook et al., 2021). A key finding is that older adults are most likely to encounter misinformation on the open web, leading scholars to develop media literacy interventions specifically for older adults (e.g., Altay, De Angelis, & Hoes, 2023; Moore & Hancock, 2022). Therefore, we pose (RQ4): What are the demographic and political traits of those more likely to receive at least one message involving political communication generally (RQ4a), elite political communication (RQ4b), interpersonal political communication (RQ4c), journalism (RQ4d), and misinformation (RQ4e)? How do these patterns vary across different personal messaging platforms (RQ4f)?

Past research has identified two key groups most likely to be exposed to and engage with misinformation on the open web: older adults and conservatives (Allen et al., 2020; Guess et al., 2020; Moore et al., 2023). Given these findings, we hypothesize that (H1a) older adults are more likely than younger adults to receive misinformation containing

personal messages. Additionally, we hypothesize that (H1b) Republicans are more likely to encounter at least one instance of misinformation that contains a personal message.

How It Arrives: Platform and Sender Dynamics

Previous research has focused heavily on the role of social media in exposing people to politics, journalism, and misinformation on the open web (e.g., Aslett et al., 2024; Cardenal, Aguilar-Paredes, Galais, & Pérez-Montoro, 2019; Dahlke, Moore, et al., 2023; Flaxman, Goel, & Rao, 2016; Guess et al., 2020; Moore et al., 2024, 2023; Scharkow, Mangold, Stier, & Breuer, 2020; Stier, Mangold, Scharkow, & Breuer, 2022). However, individuals do not navigate private messaging channels in the same way. The open web allows for deliberate behaviors, such as selective exposure via choosing which web pages to visit. In contrast, private messaging involves receiving messages directly from other people. While we cannot conduct identical analyses as on the open web (e.g., referral analyses Dahlke, Moore, Adib-Azpeitia, Ugander, & Hancock, 2022), we can examine the senders of misinformation-containing messages.

A key finding from the misinformation literature is that misinformation is primarily spread online by "superspreaders"—individuals who share a disproportionate amount of misinformation on the open web (Baribi-Bartov, Swire-Thompson, & Grinberg, 2024). In interpersonal deception literature, these individuals are referred to as prolific liars (Serota, Levine, & Docan-Morgan, 2022) and have been documented in text messaging (Smith, Hancock, Reynolds, & Birnholtz, 2014). Both misinformation superspreaders and prolific liars follow power law distributions, where few individuals account for most sharing and lying. Therefore, we hypothesize that (H2) when examining the senders of misinformation-containing messages that participants received, the number of messages sent by senders will follow a power law distribution.

Method

Participants

We recruited participants through YouGov, which maintains a list of panelists who participate in research for financial compensation. Of participants with demographic data as provided by YouGov: 44 (13.7%) were over 65, 134 (41.7%) were 45-64, 95 (29.6%) were 30-44, and 39 (12.1%) were 18-29; 225 (70.1%) were white, 54 (16.8%) were black, and 17 (5.3%) were Hispanic; 170 (53.0%) were male, 151 (47.0%) were female; 166 (51.7%) had college education or higher; 132 (41.1%) identified as Democrats, 113 (35.2%) as political independents, and 54 (16.8%) as Republicans.

Procedure

Participants provided informed consent and installed SIREN (Supporting Interdisciplinary Research in Encrypted Networks), a research tool implementing our Android-based data collection approach, on their mobile devices. The study ran from October 23 to November 9, 2024, overlapping with the 2024 U.S. Presidential Election on November 5. SIREN uses Android's notification system to intercept and analyze messages from selected personal messaging apps, including text messaging, WhatsApp, Facebook Messenger, Telegram, Signal, and others. The data collection tool runs discreetly in the background, recording incoming messages and metadata while protecting user privacy through end-to-end encryption. Full technical details are available in Supplemental Materials Section B.

Using this approach, we collected 88,606 messages in real-time across 12 personal messaging platforms. All messages were anonymized to remove potentially identifiable information, and URLs were extracted and expanded when shortened. Complete technical procedures appear in Supplemental Materials Section B.

Measures

We operationalized five primary content categories: political communication, elite political communication, interpersonal political communication, journalism, and misinformation. These were measured using manual content analysis for message text and URL-based detection for links to external sites.

Our measurement proceeded in two stages. First, two undergraduate research assistants and we hand-coded all 88,606 messages as either political or non-political, using a broad definition of political (Leftwich, 2015). Second, because political communication theory draws a crucial distinction between elite messages (from actors and institutions) and interpersonal discussions (between individuals) due to their different democratic effects (Broockman & Butler, 2017; Settle, 2024), we sub-categorized all political messages accordingly. "System" messages (e.g., "You were added to the Telegram group") constituted a trivial portion and were not analyzed as a group. Intercoder reliability was assessed on 773 pilot messages, achieving perfect agreement across all categories ($\kappa = 1.00$), reflecting our broad coding categories and extensive coder training (see Supplemental Materials Section C).

We identified messages containing links to journalism and misinformation websites using established domain lists. Journalism websites were those classified as containing hard news by Bakshy, Messing, and Adamic (2015) or labeled as credible by NewsGuard. Misinformation domains were those defined by Moore et al. (2023). We chose this URL-based detection method to enable direct comparison with established web-based misinformation research (Guess et al., 2020; Moore et al., 2023), allowing us to test the "migration hypothesis" consistently. Although this approach cannot identify non-link misinformation (e.g., screenshots or forwarded text), it offers the first methodologically consistent baseline for comparing misinformation exposure across platforms.

Data Analysis

We analyzed exposure patterns using several statistical approaches. RQ1 examined the percentage of participants receiving each message type using one-sample proportions tests. RQ2 assessed exposure intensity among exposed participants using one-sample t-tests to determine average message volumes by type. RQ3 calculated the proportion of all messages falling into each category using the same proportions test framework.

To test demographic hypotheses H1a and H1b, we employed chi-squared tests evaluating whether misinformation exposure rates differed between older versus younger adults and Republicans versus non-Republicans. For H2, which predicted power law distributions in message sending patterns, we used a two-step approach combining visual inspection through complementary cumulative distribution plots and formal statistical testing via maximum likelihood estimation with Kolmogorov-Smirnov goodness-of-fit tests. All analyses used $\alpha = 0.05$ significance levels and 95% confidence intervals. Complete statistical specifications appear in Supplemental Materials Section C.

Results

For RQ1, which examines the percentage of participants that received each message type, 67.3% (95% CI [62.1, 72.2]) of participants received at least one political message (RQ1a). Within this category, 48.1% (95% CI [42.8, 53.5]) received elite political messages (RQ1b), and 51.6% (95% CI [46.2, 56.9]) received interpersonal political messages (RQ1c). Journalism messages were less prevalent, with 21.2% (95% CI [17.1, 25.9]) receiving at least one journalism link (RQ1d). Misinformation links were much less common, with only 1.1% (95% CI [0.4, 3.1]) receiving such messages (RQ1e).

Examining differences by platform (RQ1f; see Figure 2), text messaging emerged as the primary medium for all message types, with 60.2% (95% CI [54.8, 65.3]) of participants receiving at least one political message. Facebook Messenger and WhatsApp had receiving rates of 23.2% (95% CI [19.0, 28.1]) and 15.8% (95% CI [12.2, 20.1]), respectively. Telegram was fourth, with 3.2% (95% CI [1.7, 5.7]) receiving at least one political message.

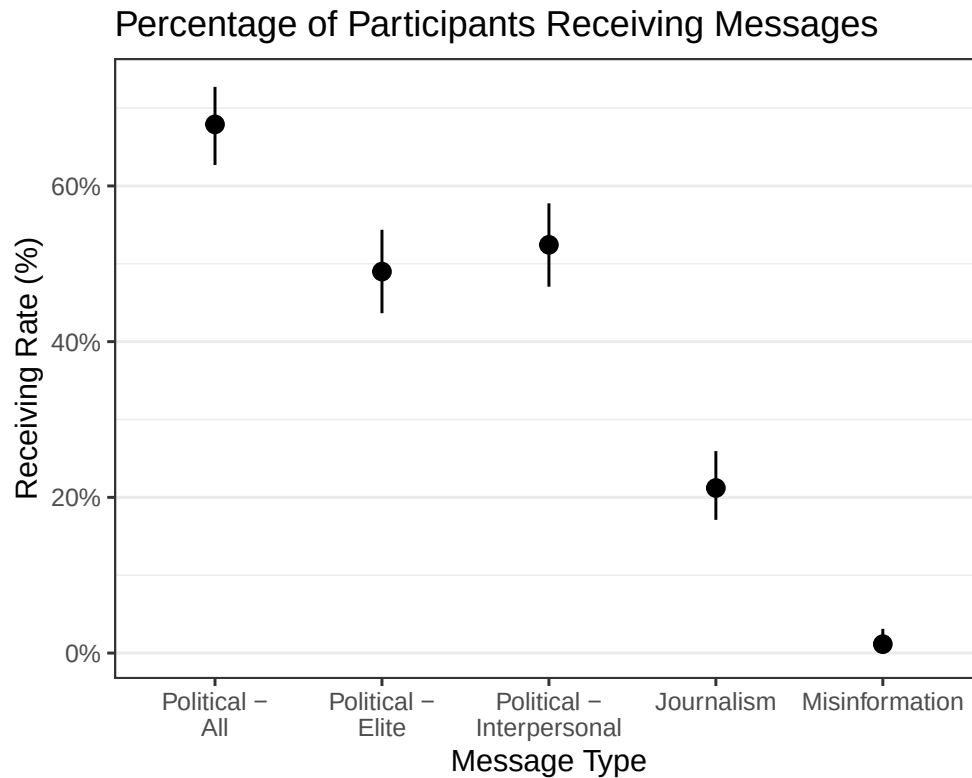


Figure 1

Percentage of participants who received at least one message of each type across all personal messaging platforms during the study period (October 23, 2024 to November 9, 2024). The x-axis displays five message categories: Political - All (any political content), Political - Elite (messages from political actors and organizations), Political - Interpersonal (informal political discussions between users), Journalism (messages containing links to established news sources), and Misinformation (messages containing links to known misinformation domains). The y-axis represents the receiving rate as a percentage of total participants ($N = 349$). Black points indicate the observed receiving rate for each message type, and vertical black lines represent the 95% confidence intervals calculated using a one-sample proportions test.

This rank order—text messaging, Facebook Messenger, WhatsApp, Telegram—persisted across all message types. However, differences between Facebook Messenger and WhatsApp were minimal for elite political messages. Participants received limited messages from Signal, GroupMe, KakaoTalk, and Kik. Therefore, we focus on text messaging, Facebook Messenger, WhatsApp, and Telegram for remaining analysis.

Among participants who received at least one message of each type (RQ2), political messages averaged 17.2 (95% CI [13.5, 20.9]), elite political messages averaged 12.1 (95%

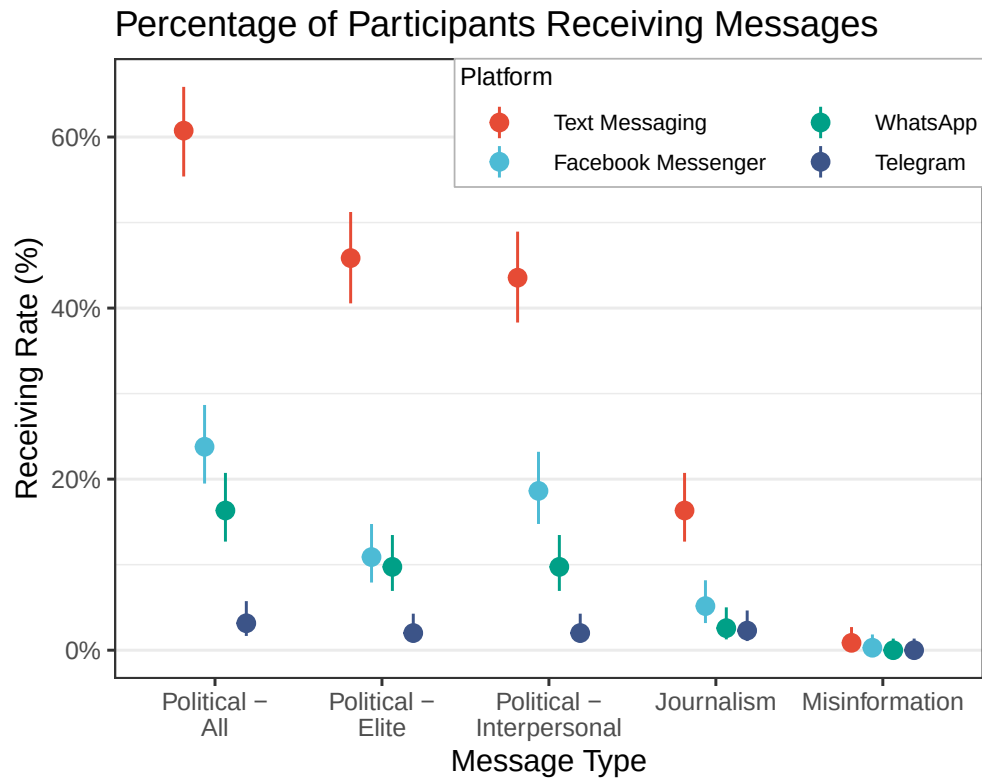
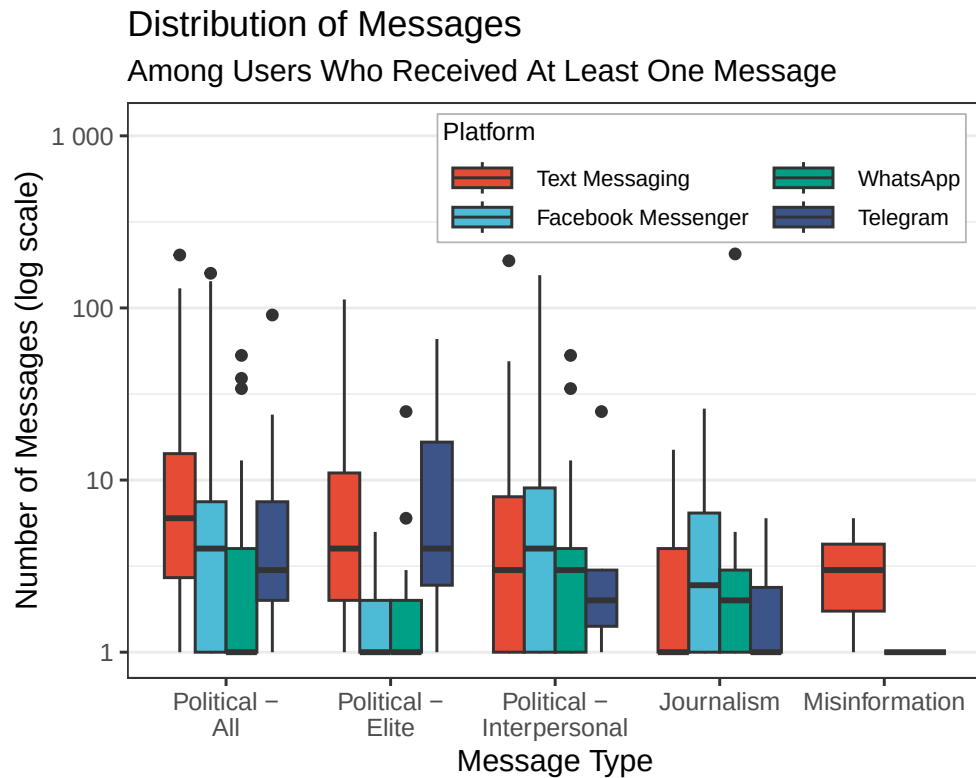


Figure 2

Percentage of participants who received at least one message of each type across different personal messaging platforms during the study period (October 23, 2024 to November 9, 2024). The x-axis displays five message categories: Political - All (any political content), Political - Elite (messages from political actors and organizations), Political - Interpersonal (informal political discussions between users), Journalism (messages containing links to established news sources), and Misinformation (messages containing links to known misinformation domains). The y-axis represents the receiving rate as a percentage of total participants ($N = 349$). Points indicate the observed receiving rate for each message type by platform, and vertical lines represent the 95% confidence intervals calculated using a one-sample proportions test. Colors indicate different platforms: Text Messaging (red), Facebook Messenger (light blue), WhatsApp (green), and Telegram (dark blue).

CI [8.2, 13.8]), interpersonal political messages averaged 12.1 (95% CI [8.5, 15.7]), journalism messages averaged 6.7 (95% CI [1.2, 12.2]), and misinformation messages averaged 2.8 (95% CI [0.4, 5.1]). Platform differences emerged (see Supplemental Materials Section D). Figure 3 shows the underlying distributions.

Political messages comprised 4.6% (95% CI [4.4, 4.7]) of all messages (RQ3), with elite political messages at 2.1% (95% CI [2.0, 2.2]) and interpersonal political messages at

**Figure 3**

Distribution of the number of messages received by participants who received at least one message, broken down by message type and platform during the study period (October 23, 2024 to November 9, 2024). The x-axis shows five message categories: Political - All, Political - Elite, Political - Interpersonal, Journalism, and Misinformation. The y-axis shows the number of messages on a logarithmic scale. Box plots display the median (horizontal line), interquartile range (box), and outliers (points) for each platform-message type combination. Colors indicate different platforms: Text Messaging (red), Facebook Messenger (light blue), WhatsApp (green), and Telegram (dark blue).

2.5% (95% CI [2.4, 2.6]). Journalism messages comprised 0.6% (95% CI [0.5, 0.6]) and misinformation < 0.1% (95% CI [< 0.1, < 0.1]). Facebook Messenger had the highest interpersonal political message percentage (4.6%, 95% CI [4.3, 5.0]) and WhatsApp had the highest journalism message percentage (1.3%, 95% CI [1.2, 1.5]) (Figure 4).

College graduates ($\beta = 0.126$, $p = 0.022$) and women ($\beta = 0.144$, $p = 0.009$) were more likely to receive political messages overall (RQ4, Supplemental Materials Section D). Women were more likely to receive elite political messages ($\beta = 0.121$, $p = 0.044$). College graduates ($\beta = 0.162$, $p = 0.006$) and women ($\beta = 0.128$, $p = 0.032$) were more likely to

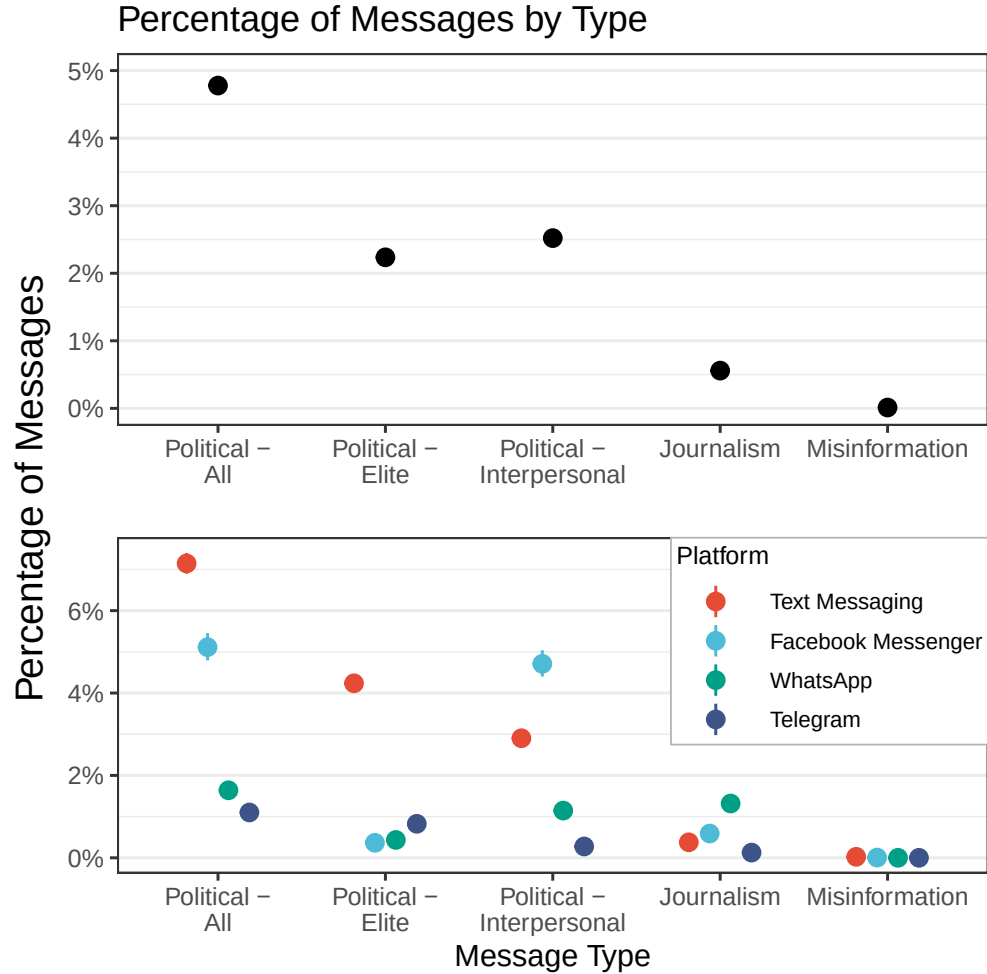


Figure 4

Percentage of total messages by message type during the study period (October 23, 2024 to November 9, 2024) with 95% confidence intervals. The top panel shows the overall distribution across all platforms combined, while the bottom panel breaks down the distribution by platform. The x-axis displays five message categories: Political - All, Political - Elite, Political - Interpersonal, Journalism, and Misinformation. The y-axis shows the percentage of total messages. Points in the bottom panel are color-coded by platform: Text Messaging (red), Facebook Messenger (light blue), WhatsApp (green), and Telegram (dark blue).

receive interpersonal political messages. Republicans were more likely to receive misinformation messages ($\beta = 0.065$, $p = 0.001$).

H1 tested whether older adults (H1a) and Republicans (H1b) would encounter more misinformation. Age differences were not significant ($\chi^2(1) = .004$, $p = .953$; Fisher's exact test $p = .471$), though small cell sizes limited statistical power. Republicans (7.0%) were

more likely to receive misinformation messages than non-Republicans (0.4%) ($\chi^2(1) = 7.1$, $p = .012$), supporting H1b.

Due to limited misinformation messages, H2 could not be evaluated (Figure 5 Panel A). However, other message types showed clearer distribution patterns.

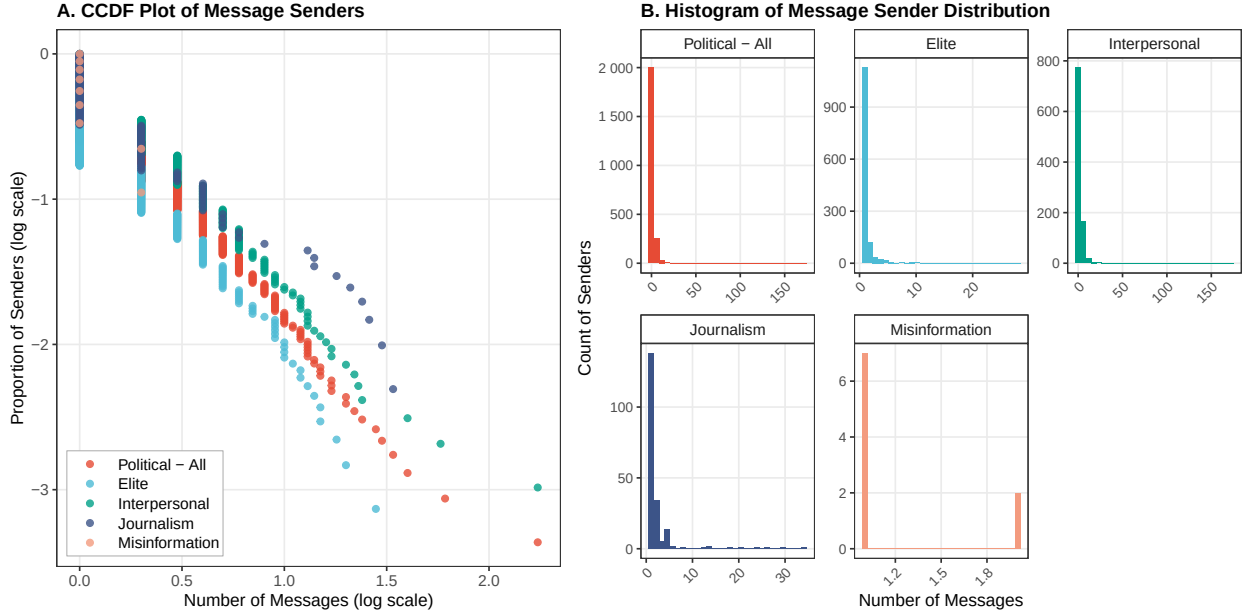


Figure 5

Distribution of messages by sender type during the study period (October 23, 2024 to November 9, 2024). Panel A shows the complementary cumulative distribution function (CCDF) plot on log-log scales, demonstrating the heavy-tailed nature of message distributions across different types. Panel B displays histograms of the number of messages sent per sender for each message type, highlighting that most senders contribute only a single message. Colors indicate different message types.

Our analysis of sender patterns reveals that most message types follow power-law-like distributions, where a few prolific senders account for a disproportionate volume of content, even as the median sender for all categories shared just one message. This pattern was visually apparent in the CCDF plots and statistically confirmed via Maximum Likelihood Estimation for both interpersonal political messages ($p = 0.677$, $\alpha = 2.546$) and journalism messages ($p = 0.485$, $\alpha = 2.236$). In contrast, elite political messages, while still unequally distributed, deviated from a strict power law model ($p = 0.002$), a pattern reflected visually by a truncated upper tail in the distribution. The

limited data for misinformation messages prevented a formal test of this hypothesis, a finding that itself highlights the rarity of misinformation sharing in our dataset.

Discussion

This study examined political, journalistic, and misinformation exposure through personal messaging apps during the 2024 election using a novel message-collection method. By gathering actual messages from 349 participants during the weeks around the 2024 U.S. Presidential Election, we contribute to understanding exposure patterns, platform-specific dynamics, demographic trends, and message-sharing behaviors.

First, political content was common, with 67.3% of participants receiving at least one political message. These messages fell into elite political communication (48.1%) and interpersonal political communication (51.6%). This shows that private messaging apps serve dual roles: as platforms for organic, trust-based political conversations and as channels for institutional actors to spread information. Meanwhile, journalism (21.2%) and misinformation (1.1%) were much less common. Contrary to the migration hypothesis, URL-based misinformation rarely appeared in these private spaces.

Second, platform-specific differences emerged. Text messaging was the dominant medium for political content, with 60.2% of participants receiving political messages through this channel. Facebook Messenger (23.2%) and WhatsApp (15.8%) had lower overall receiving rates but distinct content patterns. Facebook Messenger had higher interpersonal political messages, while WhatsApp had more journalism messages. These differences underscore how design and audience shape information flow. Text messaging’s universal reach explains its dominance, Facebook Messenger leverages existing social ties, and WhatsApp’s encrypted, internationally-connected user base attracts journalism links.

These platform-specific patterns indicate affordances may arise from dynamic interaction between technological features and social practices (Ronzhyn et al., 2023). Our findings suggest social-technical co-construction: WhatsApp’s higher journalism sharing may reflect encryption capabilities and trust norms around news sharing (Masip, Suau,

Ruiz-Caballero, Capilla, & Zilles, 2021). Facebook Messenger’s dominance in interpersonal political communication may stem from social graph integration and platform-specific expression norms (Waterloo et al., 2018). Text messaging’s role in elite political communication may leverage universal accessibility and institutional adoption by campaigns.

Third, our demographic analysis reveals mechanisms that can both mirror and diverge from those of the open web. Consistent with prior research on public platforms (Guess et al., 2020; Moore et al., 2023), partisanship remained a key predictor: Republicans (7.0%) were significantly more likely to receive misinformation than non-Republicans (0.4%). However, the prominent age effect documented in open web studies did not replicate. No participant over 65 received misinformation-containing messages, compared to 3.1% of participants under 30, though this difference was not statistically significant. This divergence suggests that platform architecture fundamentally shapes how demographics relate to information exposure. While partisanship may be a stable individual-level trait, exposure in personal messaging depends primarily on social networks rather than the active information seeking and algorithmic recommendations that drive exposure online. In this context, older adults may benefit from more established, trusted networks that filter out low-quality content, a social buffer not present on the open web.

Fourth, message-sharing behaviors followed power-law-like patterns, with few senders responsible for disproportionate message volumes. These "superspreaders" play pivotal roles in shaping discourse within private messaging networks. Interpersonal political messages demonstrate strongest adherence to power law distributions ($p = 0.677$, $\alpha = 2.546$), mirroring "superspreader" phenomena on the open web but operating through trust relationships rather than algorithmic amplification. Journalism messages also follow power law patterns ($p = 0.485$, $\alpha = 2.236$), with prolific senders playing particularly concentrated roles in news sharing. Conversely, elite political messages deviate from power law expectations ($p = 0.002$, $\alpha = 2.880$), suggesting more distributed dissemination

patterns. This distinction reveals how different political actors adapt communication strategies to personal messaging affordances: interpersonal communication operates through organic network effects where trusted individuals emerge as influential sources, while elite communication follows institutional patterns designed to penetrate trust networks. These patterns arise from trust-driven forwarding rather than algorithmic amplification, revealing new gatekeeping forms rooted in interpersonal networks.

These patterns gain further context when analyzed alongside cross-platform behavior. A subset of participants ($N = 74$) also provided web browsing data through YouGov Pulse, allowing for direct comparison across private messaging and open web contexts (see Supplemental Materials Section E). In this subset, partisan echo chambers were more pronounced in messaging than on the open web (Republicans $r = .72$, Democrats $r = .20$). Messaging apps accounted for only 0.03% of visits to journalism sites and none to misinformation domains, but the small subsample warrants caution.

Theoretical Implications

What are the theoretical implications of these empirical findings for communication in private interpersonal messaging? Three themes emerge.

First, credibility is relational and accountable. The nearly equal prevalence of elite (48.1%) and interpersonal (51.6%) political messages indicates that institutional content flows alongside peer-to-peer communication in settings where receivers evaluate messages through social ties. The low prevalence of URL-based misinformation exposure (1.1% of participants) is consistent with relational accountability that discourages forwarding questionable content to known contacts.

Second, platforms are stratified informational niches. We observe platform-specific content patterns, with Facebook Messenger favoring interpersonal political talk and WhatsApp showing more journalism links. These differences suggest socio-technical co-construction, where architectural features and audience composition interact to shape what kinds of political communication circulate across apps.

Third, diffusion is heavy tailed without algorithmic ranking. Power-law-like distributions in message sharing (Fig. 5) reveal low-friction forwarding effects in which a small set of prolific senders account for disproportionate content volume. This pattern implies gatekeeping rooted in interpersonal networks rather than algorithmic amplification and highlights the role of influential individuals embedded in trusted relationships.

Our findings also illustrate socio-technical co-construction (Hutchby, 2001), where platform affordances and user practices mutually shape the communication environment. The architectural affordances of messaging apps (e.g., encryption, bounded groups) are appropriated by users to satisfy social needs for privacy and trusted exchange, evidenced by high interpersonal political engagement (51.6%) amid very low misinformation exposure (1.1% of participants). This interaction produces the specific information ecosystems we observe; for example, content stratification where Facebook Messenger carries more interpersonal political talk while WhatsApp hosts more journalism may emerge from different social norms developing on platforms with distinct features (Waterloo et al., 2018). The technical affordances of these platforms enable actions like one-tap forwarding, but the resulting power-law distribution of senders is a social, not technical, outcome.

These mechanisms create a nuanced, double-edged environment for democratic discourse. On one hand, they enable "micro-publics" (Milan & Barbosa, 2020) where political discussion can thrive with relatively high information quality, as evidenced by high political engagement (67.3% of participants) but low misinformation exposure (1.1%). This "backstage activism" (Treré, 2020) within trusted networks allows authentic political expression away from performative pressures of public platforms. On the other hand, fragmentation into micro-publics limits cross-cutting exposure. Our cross-platform analysis (Supplemental Materials Section E) provides direct empirical evidence for this concern, revealing stronger partisan segregation in messaging than on the open web, where opposing viewpoints may be systematically marginalized.

These dynamics mark a departure from classic ideas of a unified public sphere.

While Habermas’s account emphasizes mass-mediated rational debate (Habermas, 1991), private interpersonal messaging uses social relationships as intentional filters that sustain intimacy within mediated connections. The outcome is not a single public sphere but numerous micro-publics, creating a complex landscape where democratic discourse operates through mechanisms different from those of the open web. This architecture highlights the need for theoretical models that explain how power and influence function when distributed trust networks and interpersonal gatekeeping replace traditional editors and platform algorithms. Future research should move beyond simple public versus private distinctions and develop models that show how platform features and trust dynamics interact to shape political communication in these increasingly important spaces.

Limitations

This study’s findings should be interpreted with important limitations regarding generalizability and scope. First, technical and platform restrictions limit sample representativeness. SIREN’s restriction to Android devices excludes iPhone users, who make up about 50% of U.S. smartphone users, potentially creating systematic demographic and socioeconomic biases. Requiring participants to manually install SIREN through side-loading, rather than official app stores, likely selected for individuals more comfortable with technology and willing to participate in research, further narrowing the sample beyond YouGov’s already selective panel (Guess et al., 2020). Additionally, small sample sizes for certain analyses limit statistical power. For instance, misinformation exposure analyses included only 4 participants, and no participants over 65 received such content, severely restricting demographic comparisons. Platform-specific analyses also face limited statistical power due to small sample sizes. These findings should be viewed as exploratory and hypothesis-generating, not definitive conclusions. Future research should focus on developing cross-platform data collection tools and achieving app store distribution.

Second, our data collection method introduces methodological limits that may reduce completeness of observed messaging patterns. SIREN captures only incoming

messages through Android’s notification system, excluding outgoing communications that could offer important insights into participants’ sharing behaviors and reciprocal political discussions. The notification-level access, while protecting privacy, offers less contextual information than full message thread access, potentially limiting our understanding of conversational dynamics and relationship contexts that influence information flow in trust networks. Additionally, the anonymization process necessary for participant privacy may have removed contextual cues vital for understanding trust relationships and social network structures. Future studies should adopt bidirectional data collection systems and develop privacy-preserving techniques that retain conversational context.

Third, temporal constraints significantly affect generalizability. Data collection occurred during the highly politicized period surrounding the 2024 U.S. Presidential Election, a time of exceptional political salience that may not reflect typical information sharing patterns in personal messaging applications. The heightened political context may have artificially inflated political content prevalence while potentially suppressing or altering misinformation sharing patterns due to increased scrutiny during election periods. This temporal specificity limits extent to which findings from one time period apply to others—particularly given documented changes in misinformation prevalence across different electoral cycles (Munger, 2023). Longitudinal studies tracking messaging patterns across different political contexts and cross-national comparative research would establish baseline patterns and identify context-specific variations.

Fourth, our misinformation detection methodology introduces systematic constraints that may underestimate exposure prevalence. Reliance on predefined misinformation domains captured only URL-based false information, excluding text-based misinformation, doctored images, or misleading content shared without external links. This approach may be particularly limiting in personal messaging contexts where misinformation might circulate through screenshots, forwarded text, or multimedia content rather than clickable links. The low base rate of detected misinformation (1.1% of participants) may reflect

genuine scarcity in private messaging applications or methodological under-detection due to these definitional constraints. Future research should integrate multiple detection approaches including natural language processing for text-based claims (Carrasco-Farré, 2022; Lucas et al., 2023), computer vision for manipulated images (Peng, Lu, & Shen, 2023; Yang, Davis, & Hindman, 2023), and wisdom of crowds methods (Allen, Arechar, Pennycook, & Rand, 2021; Jia et al., 2024; Martel, Allen, Pennycook, & Rand, 2024).

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