
The Demographics of United States Facebook Engagement with the Alternative Media Ecosystem

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Abstract. It has been difficult to understand who interacts with alternative media, because researchers rarely have insight into the demographic characteristics of users who interact with content on large social media platforms. To address this gap, we combine insights from an anonymized estimated demographic dataset of Facebook data and a deeply researched dataset of user interactions from Twitter. We use as a case study the well-characterized influence operation revolving around the Syria Civil Defence, also known as the White Helmets, to understand how different audiences in the United States interact with “ecosystems” of mainstream and alternative web domains according to age, gender, and Facebook’s political affinity score. We find that while alternative media audiences in the aggregate lean older, more male, and more right-wing, they lean uncharacteristically more left-wing when discussing the Syrian War. We also reaffirm prior findings that older users (classified as age 55+) in general share a disproportionate number of URLs for their URL viewing rates. We reflect on this left-leaning tilt in our dataset in light of historical public deception in United States military interventions. We also discuss the ethical considerations of using an anonymized demographic dataset provided by a private company.

1 Introduction

Contemporary scholarship on influence operations in the United States (US) has mainly focused on the country’s right-wing movements (Informed Public et al. 2021; Benkler, Faris, and Roberts 2018). They typically describe an alternative right-wing media ecosystem that is either susceptible to foreign manipulation (typically by Russian state actors [Hjorth and Adler-Nissen 2019]) or domestic manipulation (typically by Republican party operatives [Benkler et al. 2020]) in the realms of elections (Kennedy et al. 2022), COVID-19 misinformation (Gallagher et al. 2021), and conspiracy theory groups such as QAnon (Marwick and Partin 2022). Historically, however, alternative media has not been confined to the US right, but has also been represented in vibrant left-wing media ecosystems (Downing 2001), which like their right counterparts have sometimes been susceptible to foreign influence operations (Wilson and Starbird

2021). Scholars have referred to the broader collection of right and left alternative media as the *alternative media ecosystem* (Starbird 2017), or rather the network of media sources that contest narratives advanced by mainstream media sources (Holt, Ustad Figenschou, and Frischlich 2019). Particularly fundamental to research on the alternative media ecosystem has been the case study of Russian-backed influence operations related to the Syrian Civil War, where state actors in knowing or unknowing collaboration with left-leaning journalists and social media users advance counter-mainstream and often misleading narratives friendly to Russian and Syrian government interests (Starbird, Arif, and Wilson 2019).

Influence operations such as the one described above have been called active measures, borrowing a term originating in Russian intelligence services, but ironically they are quite difficult to measure (Rid 2020). For example, do influence operations in the alternative media ecosystem actually reach the political groups they purport to target, or are they simply constructed to give that impression? It is perfectly feasible that the apparent targets of influence operations are rarely reached in practice. Rather, their mere presence may make US audiences perceive they are effective, and thus create the illusion of dissent or foreign influence on issues that in reality have broad consensus. It has been difficult to address this ambiguity due to the principal difficulty, common to all media manipulation efforts from advertising to propaganda (Hwang 2020), of measuring who is reached by what information.

We attempt to answer the question of who such operations target by proposing a method to map a unique dataset of aggregated user demographic information from Facebook onto a disaggregated dataset of user URL interaction data from Twitter. We perform a case study on the well-characterized information operation surrounding the Syria Civil Defence, or White Helmets, which researchers have broadly characterized as being transmitted via a left-oriented alternative media ecosystem targeted at the US and Europe (Horawalavithana, Ng, and Iamnitchi 2020; Choudhury, Ng, and Iamnitchi 2020; Starbird et al. 2018). Specifically, we attempt to measure the estimated demographic characteristics of users who engage with external web domains that have previously been identified as part of an influence operation discrediting the White Helmets. These demographic characteristics include the estimated political lean of US audiences who engaged with these domains, from which we seek to understand: what types of users, across age, gender, and political alignment, are engaging with the alternative media ecosystem around the White Helmets?

Though our task is complicated by the addition of privacy-preserving dataset noise (Messing et al. 2021), we find evidence that URL sharing within an alternative media ecosystem whose audience normally leans rightward begins to lean left when discussing topics related to Syria, and limited evidence of the same in the context of the White Helmets. In general, we find that URL engagement in the mainstream ecosystem leans younger, more female, and more left than the alternative ecosystem across all subject areas, and that these political divisions deepen when moving from URL views to shares to use of the charged “anger” emoji. We reaffirm previous findings that older users are responsible for a disproportionate amount of URL sharing on Facebook across all URLs, and show evidence that while users with no classifiable left-right political alignment are responsible for most of the URL viewing and clicking on Facebook, they use platform affordances like shares, comments, and emoji reactions far less. In addition to our empirical findings, we show that insights gleaned from one platform (Twitter) can be mapped productively onto another platform (Facebook) with different data affordances, and that single event-based studies can be productively researched even when data is obscured via differential privacy practices.

In our discussion, we reflect on the meaning of this leftward tilt in the historical context

of propaganda aimed towards the US left. As researchers have previously discussed (Rid 2020), US audiences are vulnerable to false conspiracies implicating the US government because, indeed, the US government actually does deploy intentionally covert and deceptive practices in the realm of international warfare. This continued distrust sheds light on the apparent success of left-targeted influence operations that support the Russian invasion of Ukraine (Ross and Dobson 2022), or mask the ongoing Uyghur genocide in China (Gilbert 2022). We also discuss how the dataset we analyze here is also provisioned under unique circumstances, namely with the collaboration of a private industry group that has been a favored vector for foreign disinformation campaigns in the US (Cadwalladr and Graham-Harrison 2018) and has proven reluctant to share internal findings relevant to their perpetuation of online harms (Silverman, Mac, and Dixit 2020; Timberg 2021b). This paper accordingly concludes with an extended ethical considerations section about using such data in the future, even in the context of academic research.

2 Background

2.1 Influence Operations, Disinformation, and Online Activism

Manipulation of online audiences has become a popular topic in journalism, research, and industry in recent years—as society begins to attend to the inherent vulnerabilities of ubiquitous connection. Advertising firms have long attempted to manipulate online media, even as recent industry critiques have underscored the difficulty of effectively targeting or even conceptualizing online audiences (Hwang 2020; Neumann, Tucker, and Whitfield 2019). In non-industrial contexts, researchers have examined how political entities employ automated accounts or “bots” and inauthentic, human-controlled accounts or “trolls” to shape discourses (e.g., Arif, Stewart, and Starbird 2018; Lukito 2020; Ong and Cabanes 2018; Nemer 2021)—often for political objectives. After the 2016 UK Brexit vote and US election, researchers investigated the activities of Russia’s Internet Research Agency that executed a coordinated campaign to manipulate sentiment in both democratic elections (Arif, Stewart, and Starbird 2018; Lukito 2020).

Researchers are still working to converge on the optimal vocabulary for describing the different strategies, tactics, and manifestations of manipulation (e.g., Jack 2017; Wanless and Berk 2019; Wanless and Pamment 2019; Wardle and Derakhshan 2017). We employ two terms here—*influence operations* and *disinformation*—that are useful for understanding the specific case of the White Helmets.

In 2017, Facebook researchers began to use the term “information operations” to describe coordinated efforts to manipulate discourse on their platform for geopolitical aims (Weedon, Nuland, and Stamos 2017). Information operations, initially a military term, seemed to locate the problem on the content rather than the behavior or the strategic outcomes (Wanless and Pamment 2019). Addressing those shortcomings, more recently, some—including Facebook researchers—have shifted to the term *influence operations*, which they define as “coordinated efforts to manipulate or corrupt public debate for a strategic goal” (Weedon, Nuland, and Stamos 2017). The term is useful here because it can be applied, to some extent, to look at “both sides” of the White Helmet discourse, both the efforts by the group and its supporters to publicize their work and garner solidarity for their cause, as well as the efforts to counter that messaging.

In this paper, we also use the term disinformation—which has been employed by both

researchers and journalists to the case of the White Helmets, in particular to the efforts to denigrate and discredit them. Disinformation can be defined as false or misleading information that is intentionally seeded or spread for political, financial, or reputational gain (Starbird, Arif, and Wilson 2019). Disinformation functions intentionally to deceive, often blending fact and fiction to distort perceptions toward a preferred reality (Bittman 1985). It is often productive to view disinformation not as a single piece of content but as a campaign (Starbird, Arif, and Wilson 2019). Disinformation campaigns often work not by convincing someone of something, but by sowing doubt and undermining trust (Pomerantsev and Weiss 2014), and incorporate the help of “unwitting agents” who may be “sincere believers” of the content they spread and do not fully understand their role (Bittman 1985).

Disinformation is one tactic within a larger toolbox of “active measures”—a term coined within Soviet intelligence to describe how agents could shape political outcomes by actively manipulating information spaces, rather than just passively surveilling them (Bittman 1985; Rid 2020). In his book on the subject, Rid describes how activism and active measures can become entangled—with the work of activist groups being secretly shaped by manipulators (Rid 2020). Social computing researchers have noted this phenomenon in the online world—and in the case of the White Helmets specifically—as online political activists are unwittingly drawn into disinformation campaigns (Starbird, Arif, and Wilson 2019). However, there is very little research about the people who are drawn into these campaigns, a gap that this research seeks to address.

2.2 Influence Operations and the Syrian Civil War: The Case of the White Helmets

The Syrian Civil War is a multisided conflict that emerged from “Arab Spring” protests in 2012 and has continued for over a decade. The conflict features (1) the current Syrian government, led by Bashar al-Assad, and supported by allies including Russian and Iran; (2) opposition groups, including some supported by Western governments, including the US and UK; and (3) forces representing the Islamic State of Iraq and Syria (ISIS). It has led to, conservatively, 350,000 deaths (“Syria: 10 years of war has left at least 350,000 dead” 2021) and the displacement of more than six million civilians (“Syria emergency” 2021). Within that context, this research looks specifically at the online discourse around the “White Helmets” (more formally known as the Syria Civil Defence), a humanitarian response organization that works in opposition-controlled areas of Syria.

The White Helmets emerged as a volunteer humanitarian response group in 2012, working to provide emergency medical care, search and rescue, evacuation, and recovery (of remains) for civilians in opposition-held areas who were affected by the violence—including airstrikes by the Syrian government and their Russian allies (Chulov 2020). As the conflict progressed, the White Helmets received training and financial support from nonprofit organizations (including the Mayday Rescue Foundation) and governments in Western Europe, the US and Japan (Chulov 2020). The White Helmets got their name from their distinctive helmets, upon which they attached cameras to document their work. With help from supporting nonprofits, they also began to publicize their work and their cause, through social media and other channels. In 2016, the White Helmets were the subject of an award-winning documentary that functioned both to garner solidarity from global audiences and to attract the attention of political adversaries who sought to undermine that support and justify violence against the group (Lewis 2017).

By 2017, a collaborative network of activists, conspiracy websites, and state-sponsored

propaganda outlets (from Syria, Russia, and Iran) had activated to counter pro-White Helmets messaging in the “mainstream” media (Starbird et al. 2018). This influence operation—characterized by several journalists (Ellis 2017; Giovanni 2018; Solon 2017), academic researchers (Choudhury, Ng, and Iamnitchi 2020; Horawalavithana, Ng, and Iamnitchi 2020), think tanks (Lamensch 2022; *#SyriaHoax, Part Two: Kremlin Targets White Helmets* 2018), and advocacy groups (*Deadly Disinformation* 2022) as a “disinformation campaign”—functioned to denigrate the White Helmets, claiming, among other things, that they are “crisis actors,” enemy combatants, a propaganda tool of Western imperialism, and human organ-traffickers, and that they staged chemical weapons attacks (Wilson and Starbird 2021).

This case has been the subject of considerable research (e.g., Choudhury, Ng, and Iamnitchi 2020; Horawalavithana, Ng, and Iamnitchi 2020; Pacheco, Flammini, and Menczer 2020; Starbird, Arif, and Wilson 2019; Wilson and Starbird 2020, 2021; Wilson, Zhou, and Starbird 2018), resulting in a number of significant empirical and conceptual findings about the specific case of the White Helmets and information operations more generally. One salient finding is the integration of state-controlled media—such as RT (formerly Russia Today) and Sputnik—into the “alternative media ecosystem” (Starbird et al. 2018) that pushed narratives that functioned to criticize and delegitimize the White Helmets. A second insight is that, contrary to some depictions of disinformation campaigns as tightly coordinated, top-down efforts, the efforts to delegitimize the White Helmets took shape as a loose collaboration between activists, bloggers and journalists, political operatives, and state-controlled media outlets (Starbird, Arif, and Wilson 2019; Wilson 2021). This dynamic looks a lot more like the “participatory disinformation” of the US 2020 election (Informed Public et al. 2021) than the coordinated campaigns of 2016 (e.g., Arif, Stewart, and Starbird 2018; Lukito 2020; Freelon et al. 2020), and may better reflect what the future of online disinformation looks like. Additionally, this participatory disinformation campaign was intensely cross-platform, with participants using diverse platforms—including both “big” and “alt” tech—in complementary ways to produce and spread strategic narratives and to make their efforts resilient to platform moderation (Wilson and Starbird 2021, 2020).

Though the phenomenon is clearly cross-platform, most research on the White Helmets has focused on Twitter. Even cross-platform research has often used Twitter data as its starting point (e.g., Horawalavithana, Ng, and Iamnitchi 2020; Wilson and Starbird 2020, 2021). Facebook has been understudied in this context, likely due to the difficulty in accessing that data (in part due to privacy protections). Is the conversation about the White Helmets on Facebook similar to that on Twitter? Or are there meaningful differences? And could analyses on Twitter be usefully mapped onto Facebook despite these differences? Additionally, we do not know much about the people participating in these online efforts—beyond the most visible “influencers.” This research addresses these gaps by investigating the discourse around the White Helmets from a Facebook-centric perspective, identifying the most-cited domains in that discourse and analyzing the demographics of users who engaged with those domains.

2.3 The Facebook URLs Dataset, Differential Privacy, and “Medium Data”

The Facebook URLs dataset is a historically large social dataset of interaction tallies for over 57M URLs shared publicly on Facebook at least 100 times (Messing et al. 2021). Interaction tallies are provided for Facebook’s estimates of users’ gender, age bracket, political affinity, home country, and month of sharing, resulting in more than 40T individual tallies across the full dataset. Each URL also included a tally for how many times it was reported by users as spam, misinformation, or hate speech, and whether it was flagged as misinformation by Facebook. As described in this paper’s methods

section, noise is applied to each of these tallies via a process called differential privacy, which if implemented properly guarantees the privacy of individual users contained within these tallies (Dwork 2006). Access to this dataset is given to researchers selected by the Social Science One project, which aims to fund social science research derived from these URL tallies.

The addition of noise to demographic tallies can make it difficult to draw conclusions, and can create unexpected biases in seemingly simple measurements (Evans and King 2021). Researchers have previously overcome this problem by using large datasets whose size minimizes the impact of the added noise and their resulting biases. These include two separate analyses of 9M and 1M US-facing URLs respectively, which found that right-leaning users are more likely to view and share but not click on URLs marked as misinformation, and older users are more likely to click and share but not view misinformation (Bailey, Gregersen, and Roesner 2021; Guess et al. 2021). Another analysis uses this dataset’s URL-level political page score to estimate the political leaning of the top 1% most-shared web domains on Facebook during the time period of this dataset (Buntain et al. 2021). All of these analyses were done before Facebook revealed that they had accidentally left out nearly half of the total interaction tallies associated with users with no political page score, and so their findings may change (Timberg 2021a).

The analysis conducted in this paper uses a far smaller dataset relating to a single disinformation narrative, which in certain parts of the analysis reduces to fewer than 100 URLs. The relatively small size of this data implies that the noise added by differential privacy may make certain analyses impossible, which we verify in practice. Previous research on this dataset has also noted that its restriction to URLs shared only 100 times or more can significantly alter dataset metrics—a problem that is no doubt exacerbated in small, relatively low-volume URL samples (Allen et al. 2021). Thus, our analysis here today is novel in that it is an attempt to use a social media dataset obscured by differential privacy to analyze behavior around a single narrative, rather than behavior in general.

3 Methods

This work has three practical objectives: (1) identify domains that were cited in the White Helmets (WH) discourse on Facebook; (2) compare the frequency of Facebook sharing of these domains to that within the WH discourse on Twitter, which is better understood; and (3) explore the demographics of engagement with those domains across all topics, across URLs related to Syria, and then across URLs related to the White Helmets specifically.

3.1 White Helmets Twitter Dataset

We begin with a dataset of 1,023,547 English-language tweets related to the White Helmets. This dataset was collected using the Twitter Streaming API, tracking on the terms “white helmets” and “whitehelmets” from May 2017 to June 2018. We term this our *Twitter White Helmets* dataset. Previous research on this dataset reveals that the conversation is highly polarized into two network clusters, a cluster that was primarily supportive of the White Helmets and a cluster that was primarily critical of the group—and that each “side” of that conversation seems to primarily cite its own set of domains (Wilson 2021).

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Previous work has described these two sides as corresponding to a mainstream media ecosystem and an alternative media ecosystem. The mainstream ecosystem broadly consists of websites linking to and from a core of long-standing journalism websites associated with consistent (if not perfect) fact-based reporting, such as the *New York Times*, the *Washington Post*, the *Guardian*, and the *Wall Street Journal*. Relatively newer journalism websites, such as BuzzFeed News or the Huffington Post, may be considered part of the mainstream media ecosystem if they regularly cite or are cited by such core news sites. The concept of alternative media has alternately been defined as media whose form is broadly opposed to the mainstream capitalist mode of media production (Sandoval and Fuchs 2010), and media of any form whose aims and content are meant to be “correctives” to mainstream narratives (Holt, Ustad Figenschou, and Frischlich 2019). Using the latter definition, we define the alternative media ecosystem as those media websites that self-consciously provide an alternative narrative to those provided in the mainstream ecosystem. The alternative media ecosystem here can include the much-studied US right-wing media ecosystem, which includes websites such as Breitbart and The Gateway Pundit (Benkler, Faris, and Roberts 2018). However, it also includes far-left sites in the US and elsewhere, such as MintPress News, that produce alternative narratives from a mainstream media they find too biased toward right-wing and pro-US views. While what is considered “mainstream” and “alternative” is culturally relevant and continuously contested, we believe our labelling choices here are relatively uncontroversial in the present moment.

To visualize the presence of the mainstream and alternative ecosystems in this Twitter data, we identify tweets that contain links to external web domains and generate a network of domains shared by similar groups of users (see Figure 2). We define a network where each node is a web domain linked in a post, and each edge represents at least ten users posting at least one unique tweet linking to each of the two domains. Edges are linearly weighted by how many users tweet both domains, such that domains with large shared posting audiences of users are weighted more strongly. We exclude domains associated with large social platforms (Facebook, Instagram, Twitter, and YouTube) from the clustering process due to their tendency to host content from radically different perspectives, although we note that YouTube was mostly used to host anti-WH content (Wilson 2021). We are also missing domains that were routed through some less common link shorteners that we were unable to unwind, including trib.al and ya.disk, and these link shorteners are removed from this dataset. We determine the mainstream and alternative clusters by running the Louvain clustering algorithm as implemented in the network analysis software Gephi, due to its ability to process weighted undirected graphs and its reproducibility across several software packages and languages (Bastian, Heymann, and Jacomy 2009).

Clustering algorithms can struggle to assign consistent classifications to nodes that are on the boundaries of two communities or have small sharing samples in this dataset. For example, some borderline web domains appear in the alternative media ecosystem in the *Twitter White Helmets* dataset because of the way they were framed by users, rather than by the intended meaning of their content. These web domains could be shared critically, for example, with users disavowing their content and stance, or

they could be willfully misinterpreted. To naively apply these cluster classifications to comparison datasets on topics outside of the White Helmets could generate misleading findings, as domains that correspond to websites widely agreed to represent the mainstream would here be considered part of the alternative. To account for this, we manually review domains that overlap between Twitter and subsequent White Helmets Facebook datasets, and change some classifications from alternative to unclassified. These include web domains associated with the British Broadcasting Center (BBC), the *Washington Post*, the Canadian Broadcasting Corporation (CBC), and websites for the US State Department and the UK Parliament. These removals are informed by prior qualitative research into the content and framing of these domains with respect to the White Helmets on Twitter (Wilson 2021). We did not observe the same criticizing and framing behavior in the opposite direction, i.e., articles classified as mainstream that were in most other contexts alternative.

3.2 White Helmets Facebook Dataset

We then compile a comparison dataset of White Helmets URLs shared on Facebook, using the Facebook URLs dataset. At its core, the Facebook URL Shares dataset consists of hyperlinks shared by users to either their Facebook friends or the broader public. For this research, we generate a subset of URLs shared on Facebook related to the White Helmets—similar to our *Twitter White Helmets* dataset above. This dataset, which we refer to as the *FB White Helmets* dataset, consists of URLs containing the phrase “white helmet” in their URLs, their website titles as portrayed on Facebook, or their short website descriptions as displayed on Facebook. We only consider URLs first posted and shared in the time period of the Twitter dataset, May 2017 to June 2018, resulting in 305 URLs.

Every URL we collect contains information about how many users viewed that URL, and how many users engaged with that URL via a Facebook post. Engagements can include clicking, sharing, liking, leaving a graphic emoji reaction, or leaving a comment. These view and engagement tallies are broken down by users’ inferred demographic information including gender, age range, user country, and political page score (Messing et al. 2021). Political page scores are evaluated by the amount of right-leaning or left-leaning pages each user likes, and are given as a null value for users who liked none of the pages used to make these estimations. These are Facebook pages for US politicians and media, and page scores are not given for users outside of the US. We only consider tallies for users with the country bracket “United States” for all URLs.

3.3 Comparison Facebook Datasets

To contextualize our findings from the *FB White Helmets* dataset, we generate four comparison datasets from the same time period (Figure 1), described as follows:

- The first is a sample of 11,662,920 links that were shared and published from May 2017 to June 2018. We title this the *FB Random* dataset, and it is meant to simply compare our findings to ordinary US-based user behavior in this time period.
- The second is a sample of 250,596 links that were published and shared within the given time period and were associated with web domains classified as “mainstream” in our earlier Twitter web domain cluster analysis. We title this *FB Mainstream*, and use it to set a baseline for mainstream domains.
- The third is a sample of 107,997 links that were published and shared within the given time period and were associated with web domains classified as

“alternative” in our earlier Twitter web domain cluster analysis. We title this sample *FB Alternative*, and use it to set a baseline of alternative domains.

- The fourth is a sample of 36,287 links mentioning the terms “syria,” “bashar,” “assad,” “aleppo,” “douma,” or “white helmet” and published and shared within the given time period. We title this *FB Syria*, and is meant to compare our findings toward viewers of Syrian War-related content in the US broadly.

In the Findings section, we also analyze intersections of the *FB Mainstream* and *FB Alternative* datasets with the *FB Syria* and *FB White Helmets* datasets.

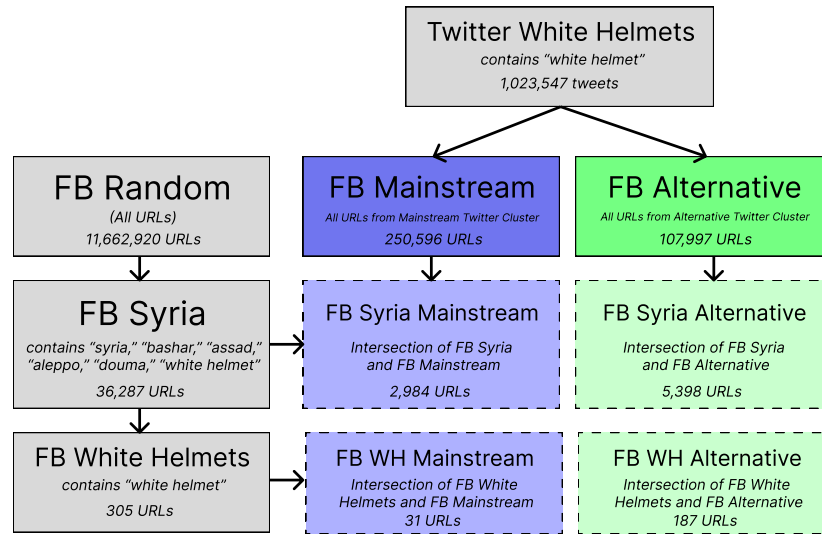


Figure 1: A description of Twitter and Facebook URL datasets used in this collection. For Twitter data, search terms are retrieved via the Streaming API, and for Facebook data, they are retrieved via the Facebook URLs dataset. Mainstream and alternative media ecosystem domains are described more thoroughly in the Methods and Findings sections.

3.4 Differential Privacy Calculations

We briefly summarize the noise added to the Facebook URLs dataset, which is fully described in [Messing et al. 2021](#). Each count demographic subset of an engagement with a given URL has noise from a Gaussian distribution with mean zero applied. The variances of these distributions vary between engagements, with higher volume engagements such as views having higher variances, and lower volume engagements such as comments having lower variances. In our dataset, each demographic subset is categorized by age bracket (7 categories), gender (3 categories), political page score (6 categories), and months in which that URL was shared, which in our dataset ranges between 2 and 15 months. This means that any given URL can be composed of 252 to 1,890 rows, and because noise is applied at the row level, this means that different URLs will have different levels of noise added. We also note that because the noise is centered at zero, count values in this data can appear negative.

We compute 95% confidence intervals for our findings according to the systematic noise added in the differential privacy process. We use bootstrapping with 10,000 iterations to retrieve 95% confidence intervals for demographic percentages, and coerce negative values to zero. While this latter heuristic adds some bias to the percentage statistics, it is usually small relative to the magnitude of the differences we describe.

3.5 Methods Limitations

Our original Twitter dataset is focused on English-language content, whereas the subsequent Facebook analysis is focused on content shared by users classified as being in the US. Accordingly, our definition of media ecosystems includes domains that may be less popular in the US than in, for example, the UK. This may be seen with the relative Twitter popularity of some media outlets based in the UK, such as the BBC. We note that the Facebook demographic counts shown here are only from users classified by Facebook as being in the US, hopefully minimizing this bias.

4 Findings

Our findings have three parts. We first characterize mainstream and alternative White Helmets media ecosystems as they have appeared on Twitter, where they are well understood by previous researchers. We find that our network of co-shared web domains replicates previous findings with respect to media ecosystems of the White Helmets. We second compare the most-shared WH links on Twitter to the most-shared WH links on Facebook, and establish that the WH media environment is similar between these two platforms. Third, having established this similarity, we carry over the mainstream and alternative domain clusters from our *Twitter WH* dataset to our *Facebook WH* dataset and derive demographic statistics for the users that engage with each cluster on Facebook. We use comparison datasets to aid this demographic analysis, and generate several findings that are applicable to the demographics of Facebook users as a whole.

4.1 Network Analysis of WH Twitter Data to Identify & Cluster Salient Domains

In the Twitter domain clustering analysis, we find two clusters of domains shared by similar users, which we term the *mainstream media ecosystem* and the *alternative media ecosystem*. We represent them in a network visualization in Figure 2. The mainstream media ecosystem, which emerged from tweeting in support of the White Helmets, contains popular news websites typically shared in English-speaking, Western countries, such as the *Guardian*, CBS, and *Al Jazeera English*. It also includes websites run by the White Helmets themselves, such as WhiteHelmets.org, sites related to humanitarian aid and fundraising, and the blogging website Medium. The alternative media ecosystem, which emerged from tweeting criticisms of the White Helmets, corresponds to pro-Russian news outlets such as RT.com and SputnikNews.com, conspiracy websites such as ZeroHedge and Clarity of Signal, the social media site Steemit, and a variety of personal blogs associated with right-wing and conspiracy commentators. These groups have been extensively described in previous research (e.g., Wilson 2021).

There are two salient structural differences between the alternative and mainstream media ecosystems as we have characterized in this co-sharing network. First, domains from the alternative media ecosystem were in aggregate shared more than three times as often as domains from the mainstream media ecosystem, aligning with previous findings that, between 2017 and 2018, efforts to undermine the White Helmets on Twitter are more active and prolific than similar efforts defending them (Wilson and Starbird 2020). Second, domains from the mainstream ecosystem, despite being shared less often than those from the alternative ecosystem, often have a relatively higher ratio of node degree to tweet count, signifying a wider audience of retweeting users. This can be observed visually in Figure 2, where many of the most popular

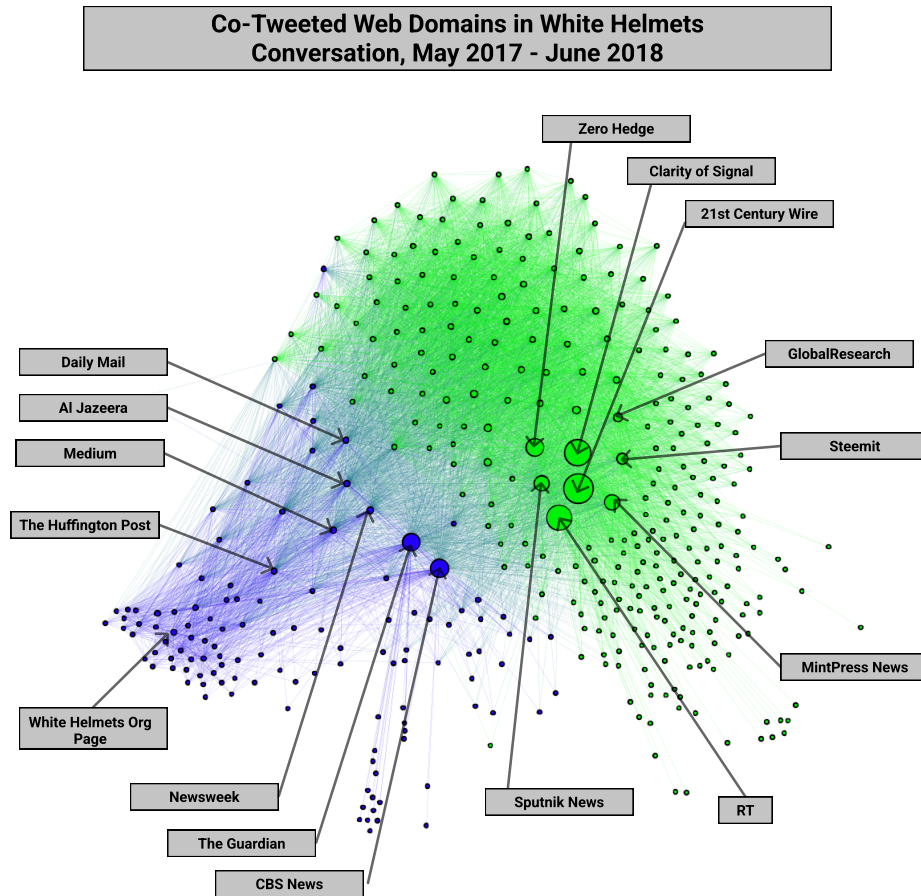


Figure 2: A network visualization of web domains frequently shared together on Twitter when publishing about the White Helmets. Each node is a domain, and a link between domains signifies at least 10 users retweeting both domains. Domains tweeted together by more users are more tightly linked, reflected by a stronger attractive force between those nodes. Domains are sized by how many times they are retweeted in this dataset, and colors represent node clusters, determined by the Louvain clustering algorithm. The top eight most-shared domains from each cluster are labeled. The blue cluster represents White Helmets-aligned domains, which consist of some mainstream news sources, the social media site Medium, and the White Helmets' own website. The green cluster consists of White Helmets-opposed domains, which consist of conspiracy websites, Russia-aligned news sources, and the social media site Steemit.

mainstream domains are positioned at the boundary between the clusters because they are frequently co-shared with domains from the alternative ecosystem. In practical terms, readers of the alternative ecosystem will opportunistically cite links from the mainstream ecosystem, but less so vice versa.

4.2 Comparison Between Twitter and Facebook URLs

We next seek to characterize the level of similarity between our *Twitter White Helmets* dataset and our *FB White Helmets* dataset, and whether the hierarchy of White Helmets web domains is preserved across platforms. Analyzing the extent of overlap between these datasets, we find that 80/104 (77%) of domains in the Facebook dataset are also found in the Twitter dataset. This overlap intensifies for the most shared links, with 19/20 (95%) of the most shared domains on Facebook also found in the Twitter dataset. So, our research finds that the media ecosystem surrounding the White Helmets discourse is broadly similar across both Facebook and Twitter.

To contextualize this similarity, we compare the relative ranking of domains in the Twitter and Facebook datasets according to retweets and public shares respectively, and find some differences (see Table 1). For example, while the Russia state-sponsored news outlet RT was the most shared domain in *FB White Helmets*, it was only the fourth most retweeted in *Twitter White Helmets*, after video-sharing platform YouTube and conspiracy websites 21st Century Wire and Clarity of Signal. By contrast, YouTube is the most dominant information source in *Twitter White Helmets*, with more than twice the number of retweets than the second-most shared domain, despite being only the third-most shared domain in *Facebook White Helmets*. Though many domains are highly shared on both platforms, it is striking how many domains are highly shared on one platform and not the other. For example, conspiracy website Global Research was the 11th most-shared domain in our Twitter dataset, but only the 36th most-shared in the Facebook dataset, albeit with some noise in measurement. Similarly, while conspiracy website The Free Thought Project was the second most-shared domain in our Facebook dataset, it was the 48th most-retweeted link in our Twitter dataset. Twitter had several domains authored by the White Helmets themselves (e.g., whitehelmets.org), but these are entirely absent from Facebook's dataset. A notable omission from the Facebook dataset is the presence of Facebook itself as a shareable domain, when it is the 10th most-retweeted link on Twitter. This suggests that our data cannot characterize Facebook-native White Helmets content on Facebook relative to external links.

Though there are clear differences in the hierarchy of certain web domains, we conclude this subsection by noting that the predominance of the alternative media ecosystem is clear in both. As previously stated, alternative media ecosystem domains outperformed mainstream media ecosystem domains on Twitter by more than a factor of three (53K vs 171K shares). While we cannot compute a similar ratio in the Facebook data due to the presence of negative values generated by differential privacy noise, we note that the mainstream media ecosystem is similarly underrepresented on Facebook (16K–24K vs 42K–64K estimated shares, 95% CI). On both platforms, we are likely undercounting the relative spread of anti-White Helmets content, as YouTube, one of the most-shared links on both platforms, has been shown in previous scholarly research on this case to be mostly composed of anti-White Helmets content (Wilson and Starbird 2021).

Twitter WH	Retweets	FB White Helmets	Shares	+/-	FB Syria	Shares	+/-	FB Random	Shares	+/-
youtube.com	48,287	rt.com	15,732	3,303	youtube.com	368,525	38,566	youtube.com	156,600,618	1,007,442
21stcenturywire.com	21,411	thefreethoughtproject.com	14,265	2,502	cnn.com	361,906	16,509	nytimes.com	44,979,839	142,096
clarityofsignal.com	18,580	youtube.com	9,021	4,526	foxnews.com	355,659	12,118	tenor.co	40,948,925	182,249
rt.com	17,929	vice.com	8,589	814	nytimes.com	353,394	14,188	cnn.com	39,402,088	147,210
cbsnews.com	11,733	zerohedge.com	7,945	1,110	washingtonpost.com	297,996	11,748	foxnews.com	37,009,569	115,490
zerohedge.com	11,425	mintpressnews.com	4,510	2,889	yahoo.com	278,449	11,704	washingtonpost.com	36,206,189	127,680
theguardian.com	11,271	cbsnews.com	3,173	533	rt.com	201,051	28,063	huffingtonpost.com	33,322,644	124,357
mintpressnews.com	9,396	21stcenturywire.com	2,736	4,661	npr.org	192,038	7,282	boredpanda.com	27,169,734	59,854
sputniknews.com	9,127	aljazeera.com	2,593	1,848	americanmilitarynews.com	185,162	8,224	thehill.com	26,972,948	111,789
facebook.com	5,805	anewkindofhuman.com	2,519	1,152	thehill.com	179,609	10,754	dailywire.com	24,984,732	82,960
steemit.com	5,601	dailyemail.co.uk	2,299	1,377	dailywire.com	161,221	7,249	giphy.com	24,501,986	247,446
globalresearch.ca	3,720	anonevs.co	1,740	1,152	reuters.com	144,976	14,064	buzzfeed.com	21,343,767	121,135
theduran.com	2,871	ronpaulinstitute.org	1,721	1,306	newsweek.com	129,919	7,366	breitbart.com	20,986,010	110,758
alternet.org	2,655	southfront.org	1,510	1,477	msn.com	127,362	10,308	npr.org	20,633,342	84,697
independent.co.uk	2,632	truthinmedia.com	1,451	974	independent.co.uk	125,217	13,908	yahoo.com	19,125,490	143,051
grayzoneproject.com	2,380	theguardian.com	1,432	1,687	usatoday.com	114,385	5,620	abcnews.com	15,121,779	82,435
newsweek.com	2,173	dailykos.com	1,190	533	huffingtonpost.com	112,963	8,067	simplemost.com	14,571,424	42,690
syrianews.cc	1,916	cnn.com	1,054	1,066	breitbart.com	110,797	10,638	usatoday.com	13,905,379	84,070
medium.com	1,790	activistpost.com	1,034	1,600	abcnews.com	93,006	7,954	msn.com	13,108,381	124,590
bbc.co.uk	1,787	anonymous-news.com	873	1,629	bbc.com	91,248	13,969	high5casino.net	13,075,864	175,038

Table 1: The top 20 most-shared web domains across four datasets containing, from left to right (1) posts from Twitter about the White Helmets, (2) tallies from Facebook about the White Helmets, (3) tallies from Facebook about Syria, and (4) tallies from Facebook about any URL. All Facebook tallies are for links primarily shared in the US, and standard errors represent noise added via differential privacy.

4.3 Demographic Analysis of Facebook SS1 URLs Data

4.3.1 Trends Consistent Across All US-Based Facebook URLs, 2017–2018

Having established that the *FB White Helmets* domain dataset is similar to the better-characterized *Twitter White Helmets* dataset, we use Facebook’s demographic information to understand the demographics of White Helmets discourse on Facebook. We begin by describing demographic trends common across all URLs shared primarily by US audiences, to set a baseline against which the White Helmets conversation can be compared (Figures 3, 4). Across all datasets, views are concentrated in the middle age brackets (24–55). The platform’s youngest age category (18–24) is particularly underrepresented, and has consistently fewer views and all forms of engagements than other age brackets. While URL views are concentrated in the younger age brackets, the older age brackets (55–64, 65+) are more likely to click and share URLs than other age brackets. For example, these older age groups are responsible for 24% of URL views in *FB Random*, but 42% of all shares, and similar patterns hold or intensify across all subsequent datasets. These older users similarly generate an even more disproportionate amount of comments (44%) and the “angry” emoji (53%). A small portion of users did not provide an age and thus have no age bracket, but they never amounted to more than 3% of any engagement category.

Users classified as women tend to use the sorry, anger, love, and wow emojis more than men, but few other gender classification differences are consistent or detectable across all comparison datasets. While all metrics are biased female in *FB Random*, comparison datasets could lean male on many metrics, indicating that gender distribution is sensitive to media ecosystem and URL topic. Older women (55+) view URLs more than older men, and consequently engagement in the 55+ category is skewed female. The “other” gender category was marginal and in many cases difficult to quantify above added differential privacy noise, but it was consistently more left-leaning than other genders in *FB Random* across all engagements.

In general, views, clicks, and shares between right-leaning and left-leaning users were approximately even, leaning slightly left. Left-leaning women viewed URLs about twice as often as right-leaning women, while right-leaning and left-leaning men viewed in

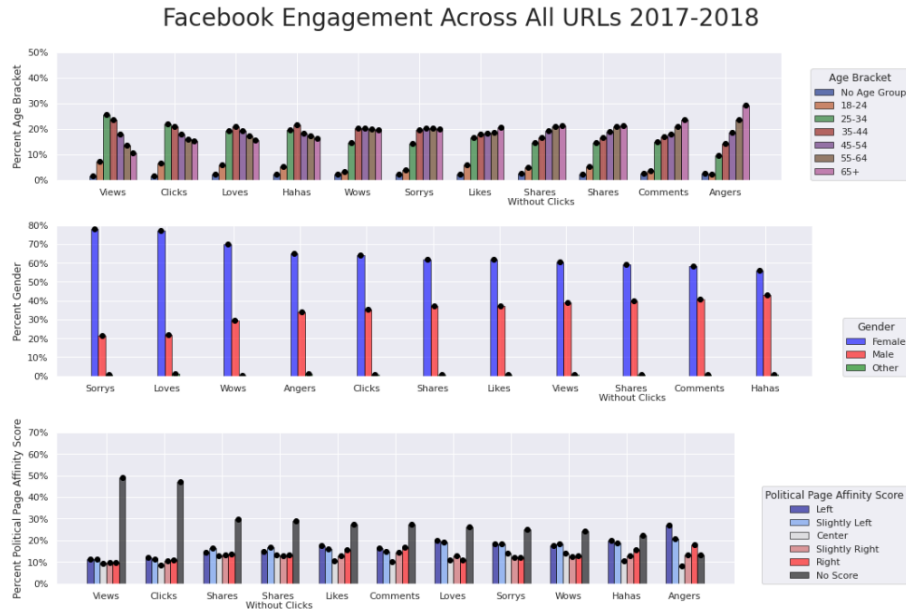


Figure 3: Bar charts depicting the relative percentages of URL views and engagement across Facebook’s age brackets, gender classifications, and political page scores. The top graph is sorted from least to oldest user (65+) engagement, the middle graph from most to least female engagement, and the bottom graph from most to least engagement from users with no political page score. Confidence intervals for differential privacy noise are depicted, but are in this case so small as to be barely visible.

relatively equal proportions. Younger left-leaning users viewed URLs more than younger right-leaning users, but right-leaning older users viewed more than left-leaning older users. However, while these subgroups may view content more than each other, they are not consistently more likely to engage in content via clicks, shares, and emojis. This suggests that downstream differences in engagement between left-leaning and right-leaning users in *FB Random* can mostly be attributed to the proportion of younger/older and female/male users viewing the original content. We note that this dataset cannot distinguish between a certain group viewing more content simply because there are more of those users on Facebook, or if those users are disproportionately shown URL content by Facebook.

Younger users without known political page scores are more likely to engage with URLs than older users without known political page scores, but there are no clear gender differences among users without page scores. Users who have no political page score in general display unique behavior. They constitute by far the largest group of users to whom content is shown, and they click on URLs at a similar rate to other score groups. However, they are much less likely to perform all other forms of engagement, meaning that URL shares, emoji reactions, and comments are all disproportionately composed of users who have page scores. Users who have no page scores are particularly and uniquely less likely to use the “angry” emoji. These trends may be an artifact of how the political page score is calculated, as users who engage with Facebook by, e.g., liking pages are more likely to have a political page score. It stands to reason that users who do not engage in page-liking behavior may also not engage in other Facebook features, such as sharing content or using emoji reactions.

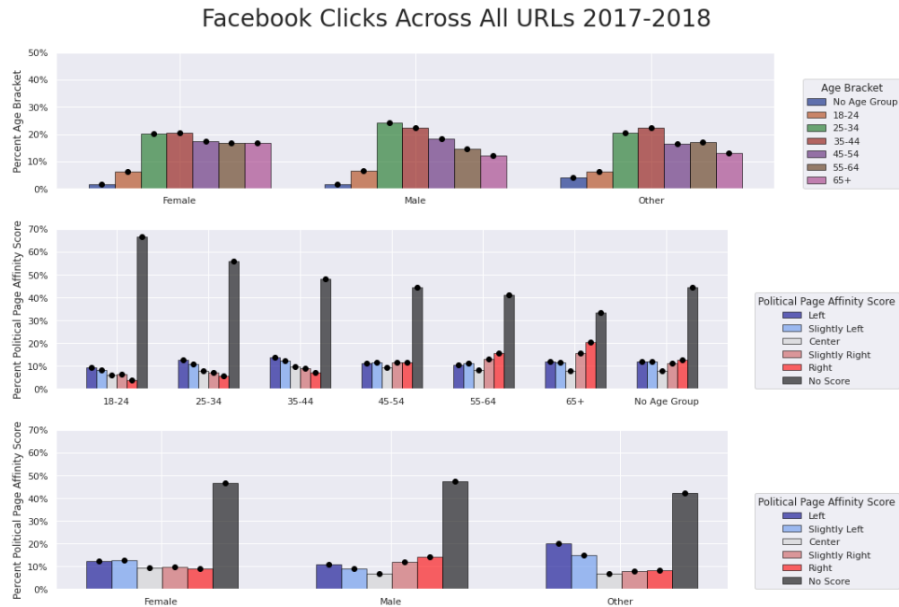


Figure 4: Facebook URL clicks broken down across pairs of demographic identifiers: (1) age bracket vs. gender, (2) age bracket vs. political page score, and (3) gender vs. political page score. Confidence intervals for differential privacy noise are depicted, but are in this case so small as to be barely visible.

4.3.2 Demographic Trends Specific To Mainstream and Alternative Ecosystems, 2017–2018

Having characterized baseline Facebook demographics behavior, we next investigate demographic trends specific to two comparison datasets cultivated around media ecosystems, *FB Mainstream* and *FB Alternative* (see Figure 5). *FB Mainstream* is similar in age and gender to *FB Random*, which is to say that it leans more female than male (60% vs. 39% views), leans younger in views, and then has disproportionate sharing from older users. *FB Alternative*, by contrast, is more male than female (58% vs. 40% URL views), skews relatively older than *FB Mainstream* in all metrics, and displays the same pattern where older users share more than they view. Overall, there were more URLs found in the mainstream ecosystem (251K vs 108K URLs), and they were viewed more often per URL (59.7B URL views vs. 6.1B URL views).

By political page score, both ecosystem datasets diverge from *FB Random*, which is mostly balanced between left-leaning and right-leaning users. The mainstream ecosystem is viewed approximately five times as much by left-leaning users as by right, while the alternative ecosystem is viewed five times as much by right-leaning users. URLs in both media ecosystems were less likely to be viewed by users with no political page score compared to *FB Random*. In both ecosystems, we confirm previous findings that neither left- nor right-leaning users are dramatically more likely to click or share URLs once they are viewed (Bailey, Gregersen, and Roesner 2021). Partisan differentials in views between ecosystems propagate across emoji engagements and comments, but some emoji engagements were disproportionately used by right- and left-leaning users. Specifically, the “angry” emoji was used relatively more often by left-leaning users in the mainstream ecosystem (115.4M left vs. 10.5M right), while the “angry” and “haha” emojis were used relatively more by right-leaning users in the alternative media ecosystem (3.6M left vs. 22.5M right “angry” emoji, 1.4M left vs. 15.3M right “haha” emoji).

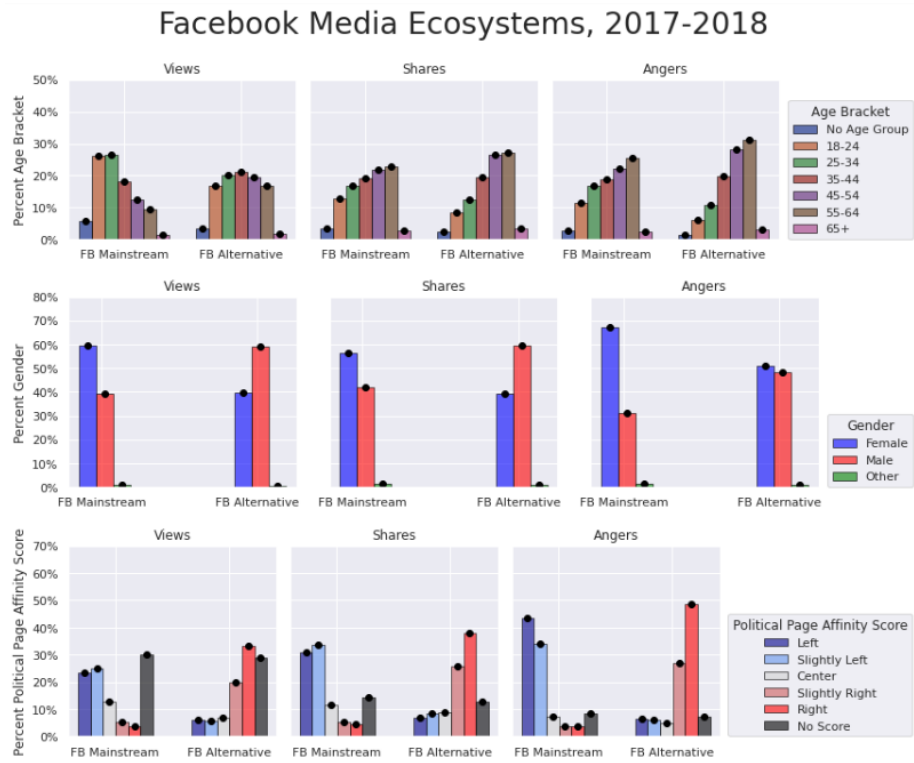


Figure 5: Facebook URL views, clicks, and shares broken down by Facebook’s age brackets, gender classifications, and political page scores, and then further broken down by URLs from the mainstream and alternative media ecosystems. Confidence intervals for differential privacy noise are depicted, but are in this case so small as to be barely visible.

4.3.3 Demographic Trends around URLs Related to the Syrian War, 2017–2018

We next analyze the demographics of US-based users interacting with Syria (see Figure 6). However, given that both the mainstream and alternative media ecosystems have shown to be very different demographically across all measures, we analyze them separately in the *FB Syria* dataset. Specifically, we split the *FB Syria* dataset into mainstream (2,984 URLs), alternative (5,398 URLs), and unclassified (27,905 URLs) components, and analyze their behavior with respect to their top-agnostic counterparts in *FB Mainstream* and *FB Alternative*. While there are more URLs in the alternative Syria cluster, there are far more URL views in the mainstream cluster (460.7M views of mainstream Syria URLs, 99.5M of alternative Syria URLs).

We find some broad patterns with respect to gender and age in *FB Syria*. Across all media ecosystems and the unclassified URLs, views in *FB Syria* lean relatively more male. URLs in the unclassified group lean older in views, clicks, and shares, but these same patterns are not found in the alternative and mainstream Syria clusters. All URLs are viewed relatively less by users with no political page score, likely due to Syria's highly politicized nature in US media. The unclassified cluster leans slightly right across views and other engagements compared to *FB Random*.

Facebook Media Ecosystems Discussing Syria, 2017-2018

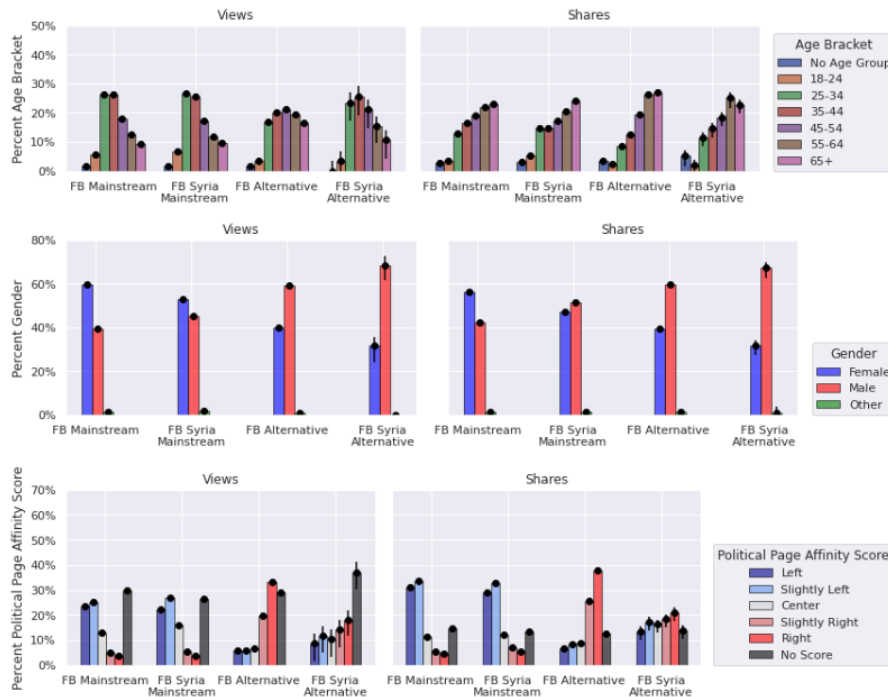


Figure 6: Bar charts comparing the mainstream and alternative ecosystems broadly to those ecosystems in the context of Syria across URL views and shares. Confidence intervals for differential privacy noise are depicted, but are in some cases so small as to be barely visible.

Political page score trends in the mainstream and alternative Syria media ecosystems are similar to trends in those ecosystems in general, with one significant exception. Whereas the alternative media ecosystem's user engagement leans strongly right across all topics, its left-leaning views are relatively much higher in the context of Syria, as are

its URL shares (left-leaning: 337–409K shares, right-leaning: 443–515K shares, 95% CI). A similar relationship is not found in the mainstream media ecosystem, where users' views, likes, and shares all lean strongly left both generally and when discussing Syria (left-leaning: 1.39M–1.44M shares, right-leaning: 0.26–0.31M shares, 95% CI).

We contextualize this finding that the alternative *FB Syria* media ecosystem is more ideologically balanced in the context of Syria. As we observed in previous work, websites participating in disinformation campaigns around the White Helmets often take advantage of anti-imperialist narratives that traditionally appeal to left-wing audiences. By looking at the links disproportionately shared by left-leaning users in the alternative *FB Syria* media ecosystem, we can see this process in action. For example, a URL from MintPress News shared relatively more by left-leaning users reads "Polls: US Is 'The Greatest Threat To Peace In The World Today,'" with the blurb "Perhaps people around the world are noticing that, at least since 2001, the US is wrecking one country after another: Iraq, Afghanistan, Libya, Syria, and Ukraine. Which is next? Maybe Iran? Maybe Russia? Maybe Venezuela? Who knows?" Another article shared by left-leaning users from The Anti-Media reads "There's a Good Chance We're Being Lied to About the Chemical Attack in Syria," with the blurb "A large new war could be once again started over lies." This is a clear allusion to the US invasion of Iraq, which was initiated under false claims around weapons of mass destruction and retrospectively opposed by much of the US left (Heimlich 2011). ZeroHedge shares a URL shared by more left-leaning users that reads "1983 CIA Document Reveals Plan To Destroy Syria, Foreshadows Current Crisis," alluding to previous secret military interventions in foreign countries by the US government.

The relative strength of anti-imperialist narratives in the Syria context can affect the partisan distribution of the Syria alternative ecosystem in three ways. The first is that domains typically shared by left-leaning users across all topics are shared relatively more in the context of Syria. This occurs with MintPress News, GlobalResearch, and The Anti-Media, all of which were shared more by left-leaning users throughout the time period of this study. The second is that some domains generally shared by right-leaning users correspondingly become less shared; this occurs with the highly popular right-leaning websites Breitbart, and Infowars. The third is that domains that ordinarily lean right in users are relatively more left-leaning when discussing Syria. This occurs for ZeroHedge and YourNewsWire, and to a lesser extent for RT.

4.3.4 Demographic Trends in the White Helmets Mainstream / Alternative Media Ecosystems

We conclude this analysis by once again narrowing down our dataset, this time to URLs that specifically reference the White Helmets (see Figure 7). Given previous discrepancies across the mainstream and alternative ecosystems, we also divide *FB White Helmets* into mainstream (31 URLs), alternative (187 URLs), and unclassified (87 URLs) components. Unlike in the broader Syria context, alternative URLs are collectively viewed more than mainstream URLs (7.1M alternative URL views, 2.4M mainstream URL views).

With respect to gender, *FB White Helmets* inherits qualities seen in *FB Mainstream*, *FB Alternative*, and *FB Syria*, in that the alternative ecosystem is more male than the mainstream ecosystem, but both are more male than non-Syria datasets. Similarly, URL views are concentrated in the <55 age brackets, but the older age brackets appear to share more, although this relationship is not detectable in the alternative ecosystem. The mainstream *FB White Helmets* ecosystem leans left in users' views, clicks, and shares, and right-leaning engagement is almost entirely suppressed by

Facebook Media Ecosystems Discussing White Helmets, 2017-2018

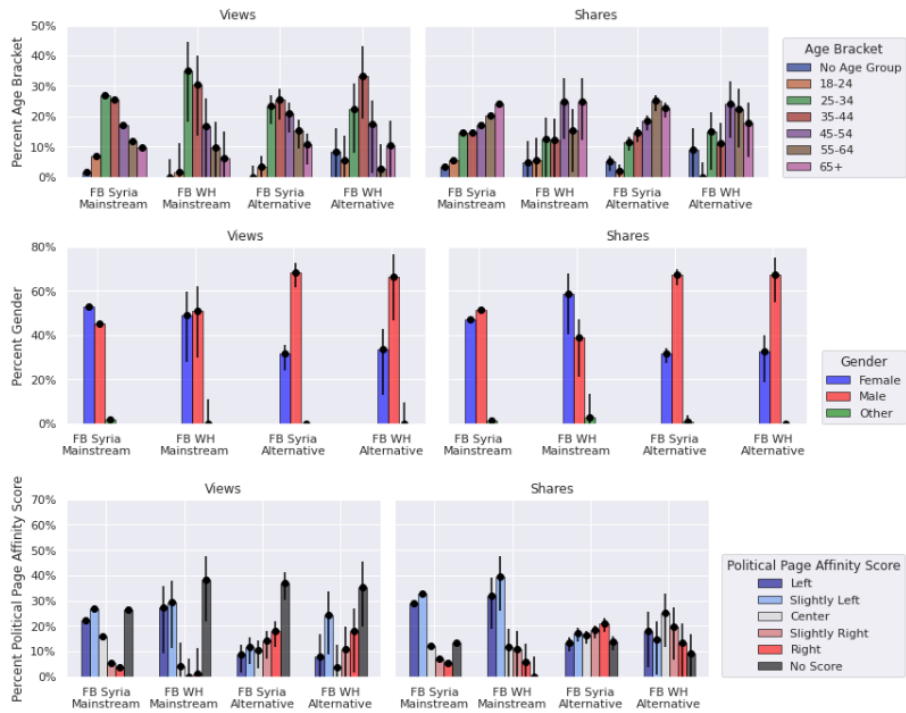


Figure 7: Bar charts comparing URLs relating to the White Helmets (WH) in the mainstream and alternative ecosystems to URLs relating to Syria more generally across views and shares. Confidence intervals for differential privacy noise are depicted.

noise (left-leaning: 12–17K shares, right-leaning: 1–6K shares, 95% CI). In the alternative *FB White Helmets* ecosystem, right- and left-leaning views and engagements are approximately equal, or rather it is not statistically significant to distinguish them (left-leaning: 11–24K shares, right-leaning: 12–24K shares, 95% CI).

URLs that are highly shared on the left in the White Helmets conversation appear similar to left-shared URLs in the Syria conversation. For example, a left-leaning URL from *The Free Thought Project*, which generally leans right, quotes anti-war singer Roger Waters: “What we should do is go and persuade our governments not to go and drop bombs on people.” This URL primarily focuses on false claims that chemical weapons attacks perpetrated by the Syrian government were staged, but also highlights Waters’s views that the White Helmets are “fake.”

5 Discussion

In this paper, we combine an analysis of two datasets from two large social media platforms to gain insight into who in the US sees Facebook content about the White Helmets, a humanitarian response group giving aid in the Syrian Civil War. The first dataset, from Twitter, contains user-level information that allows us to describe English-language “media ecosystems” of web domains that tend to be shared together by users posting about the White Helmets. The second dataset, from Facebook, contains anonymized demographic tallies of users who engage with White Helmets content on Facebook. By combining the descriptive insights of the first dataset with the demographic insights of the second, we begin to characterize what kinds of Facebook users—classified across age, gender, and political alignment—engage with the anti-White Helmets alternative media ecosystem, which has been implicated in a wider Russian-backed influence operation targeting users across the globe and particularly across the US ideological spectrum. We also contribute several secondary insights about URLs related to Syria, the alternative media ecosystem more broadly, and Facebook user demographics in general.

Our analysis of the Twitter dataset confirms previous research that, for the White Helmets, an “alternative” media ecosystem is shared and engaged with on Twitter far more than the traditional “mainstream” ecosystem of long-standing media outlets and organizations involved in humanitarian aid. This alternative ecosystem is opposed to the White Helmets, tends to represent views that support the geopolitical interests of Russia and their allies (e.g., the Assad regime in Syria), has been implicated in influence operations and disinformation campaigns, and otherwise shares conspiracy content on non-Syria related topics (Starbird et al. 2018). We show that the media ecosystems in the White Helmets conversation on Facebook are very similar—in terms of the presence and relative frequency of shared domains—to those found on Twitter. We also find that, as we see with Twitter in conversations about the White Helmets, domains within the Facebook anti-White Helmets alternative media ecosystem are shared much more than the mainstream ecosystem. This is true despite the fact that the alternative media ecosystem is shared far less often in other topics.

The hierarchy of these ecosystems is not precisely similar from Twitter to Facebook, with certain domains in both the mainstream and alternative media ecosystems being more or less prevalent on Facebook than they are on Twitter. Particularly, the pro-Russia news outlet RT and the conspiracy website *The Free Thought Project* appear to be shared much more frequently on Facebook than on Twitter, while organizational websites for the White Helmets themselves are not present at all in the Facebook dataset. This finding may have implications for content moderation, for which researchers are

increasingly recommending a cross-platform approach (Wilson and Starbird 2021). Malicious web domains that may appear relatively marginal on one platform could be relatively dominant on another. Conversely, relatively trusted web domains can spread far on one platform and not another.

Having established the predominance of these media ecosystems across two of the largest US social media platforms, we use Facebook’s demographic data to understand who interacts with White Helmets content across these ecosystems. To ground our analysis of White Helmets content, we first describe baseline demographic behavior with respect to US engagement with all Facebook URLs. We find that middle-aged users view more, but older users share (relatively) more, confirming previous findings on this dataset (Bailey, Gregersen, and Roesner 2021; Guess et al. 2021) and separate survey data (Guess, Nagler, and Tucker 2019). Users classified as male and female view and share content relatively equally, but women use the full range of emoji reactions more often. Older women perform all engagements more than older men. Users whose political stance Facebook cannot detect are responsible for most of the views and clicks on Facebook, but they perform shares, emojis, and comments far less often. These tendencies may reflect different amounts of users on Facebook, or different content-targeting strategies used by Facebook on certain groups.

Using insights from our Twitter data, we then characterize the demographics of the mainstream and alternative Facebook media ecosystems generally, and find that they are mirror opposites. The mainstream ecosystem leans younger, more female, and left-wing. Correspondingly, the alternative ecosystem leans older, more male, and right-wing. Political divisions in these ecosystems deepen for certain engagements, with URL shares being more partisan than views and clicks, and use of the “angry” emoji being even more partisan than shares. This latter finding is particularly relevant given reports that Facebook prioritizes showing users URLs with “angry” emojis (Merrill and Oremus 2021). Given that partisan users generate more angry emojis, they are likely also driving URL visibility for other users more broadly when that feature is active.

We conclude by characterizing the demographics of the alternative and mainstream ecosystems in the context of Syria, and then specifically the White Helmets. In general and across both ecosystems, the Syria and White Helmets conversations are viewed and engaged with relatively more by men than women, but few other differences are consistent. The demographics of the mainstream ecosystem discussing Syria and the White Helmets are otherwise similar to mainstream demographics generally, with left-leaning users dominating views and engagement. By contrast, the alternative media ecosystem displays unusual behavior when discussing Syria and the White Helmets, with views and sharing relatively more balanced between left- and right-leaning users, if still leaning slightly right in the case of Syria. We caution that due to differential privacy noise, we cannot draw conclusions about whether the White Helmets alternative ecosystem leans slightly right or left. We attribute this uncharacteristic decrease in right-leaning partisanship to three factors: (1) the lesser influence of right-leaning websites like Breitbart, (2) the greater influence of left-leaning websites like MintPress News, and (3) changes in the effective political alignment of ordinarily right-leaning websites like ZeroHedge.

The finding that the alternative media ecosystem is unusually more left-wing in the context of Syria than in the context of other topics supports previous research describing how anti-White Helmets sources—and Russian propaganda more broadly—often use anti-imperialist arguments associated with the US left. This argument reflects a long history of foreign influence operations that exploit genuine conspiracies by the US government to suggest further, false conspiracies by the US government or its allies (Bittman 1985; Rid 2020). To wit, the US’s recent history of secretly funding foreign

combatants for geopolitical advantage (Adam Augustyn et al. 2022; Zeidan 2021; “The CIA’s first Latin American coup” 2019) and justifying foreign invasions based on false claims (Schwarz 2018; Shane 2005), and mainstream US media credulously repeating those false claims (Gordon and Miller 2002) have created a vulnerability that dishonest actors can exploit. False claims that the White Helmets are a covert military operation, and that war crimes in Syria are an invented pretext for US invasion, are framed and surely interpreted in light of these past events. We can understand this campaign in the greater context of contemporary foreign influence operations exploiting US government misdeeds to target left-leaning Americans, such as Russian-backed information operations targeting Black Americans via true narratives of racist behavior by the US government (Freelon and Lokot 2020). We can also understand this campaign in the context of other contemporary left-targeted influence operations containing many similar social media influencers and web domains, including those supporting the Russian invasion of Ukraine (Gilbert 2022) and masking the Uyghur genocide in China (Ross and Dobson 2022). Whereas previously it was difficult to discern whether these influence operations actually succeeded in reaching the left-wing audiences they appeared to target, we provide some evidence of their success via the unusual left-wing tilt of the alternative media ecosystem on the topic of Syria.

The existence of influence operations targeting social movements that have historic reasons to distrust government information provides a challenge for these movements, as governments typically have a significant informational advantage over their citizens, particularly in the realm of international conflict (Baum and Potter 2008). The informational void created by distrust in government information requires that social movements build alternative media that is resilient to disingenuous influence operations launched by foreign governments with conveniently aligned interests. Social movements themselves have historically represented groups otherwise ignored or undervalued by the formal representational institutions of US government (Weldon 2011), and thus their targeting by foreign influence operations constitutes a critical risk to the basic functioning of US democracy. We recommend that researchers continue to analyze the alternative media infrastructure of online social movements and to what extent they are, or are not, resilient to influence operations from foreign governments who have no stake in those movements’ goals or successes.

5.1 Limitations

We faced some challenges working with a dataset that is historically large—244,314 tallies of demographic data related to user engagement with a political topic on Facebook—and yet has become small in the face of necessary user privacy protections. We have attempted very little detailed statistical analyses of these datasets besides counts and ratios, which are themselves biased due to differential privacy noise (Evans and King 2021). This is because though differential privacy is conceptually simple, adding a known noise distribution to numeric data, it in practice requires the development of an entirely new suite of academic tools for performing reliable, validated statistical analyses. Few existing tools are calibrated for, e.g., count data with negative values, or more generally any data with a precisely known measurement error. While progress has been made on this front in both nonparametric significance testing (Couch et al. 2019) and linear regression (Evans and King 2021), these academic insights have yet to be translated into trusted, reliable, and open-source tools. This lack has limited our ability to make strong statistical claims about the White Helmets incident, and by implication limits researchers’ abilities to make strong claims about any similarly sized events or contexts using this dataset.

Our interpretations are also limited by Facebook’s political page score being limited

to “right” and “left” when there is evidence that online political communities in the US are more diverse with less coherent ideologies than these labels might suggest. Indeed, some of the flexibility in apparently right-wing media, and the flexibility in apparently left-wing users on Facebook, may instead represent that we are documenting engagement from a third political community that has behaviors unique from the traditional US right or left. For example, research on US socialist communities on Twitter shows that they are a distinct community from the US left, and selectively make connections between communities on the mainstream left and right (Beers et al. 2023). Some of the influential users in these pro-socialist communities are the same users who make false claims about the White Helmets in URLs described in this paper. Interpreting US media engagement through the lens of a right-left metric, rather than through the true variety of political communities active in the US, thus risks misunderstanding the nature of political communication and mobilization in online platforms.

5.2 Ethical Considerations

We conclude our paper by reflecting on two classes of ethical implications for this project. The first class concerns the implications for individual users’ privacy. The application of differential privacy to this URLs dataset has ensured that individual users cannot be uniquely identified from aggregate tallies. While this is a relevant concern for some users, previous research finds that users’ privacy requirements for research on social media are highly contextual and extend past merely the possibility of being identified (Fiesler and Proferes 2018). And while Facebook users sign agreements that authorize their data for use in research, prior research shows that few users understand the meaning of these agreements, or indeed read them at all (Fiesler, Lampe, and Bruckman 2016; Obar and Oeldorf-Hirsch 2018). Thus, the existence of differential privacy alone does not ameliorate all privacy concerns for users, and indeed may facilitate the violation of users’ privacy, as some of this dataset’s organizers describe in Kifer et al. (2020).

Additionally, this dataset does not protect against violations of group privacy, i.e., the right of groups to not be surveilled against their collective interests, and yet it also excludes some groups from the potential benefits of surveillance due their small sizes in the face of added noise (Milan and Treré 2020; Taylor, Floridi, and Van der Sloot 2016). We see these concepts represented in the relatively small “other” gender category in this dataset, which as “small data” (Welles 2014; Gieseking 2018) mostly cannot be analyzed in our case study due to added noise. This inability to be analyzed can sometimes be preferable, given the increased privacy risk that trans and gender-nonconforming people face from a growing transnational anti-transgender movement (Burns 2019), the associated mobilization of academic research in service of that movements’ goals (Sun 2019), and the inherent risks regardless of the academic/industrial application of methods based on gendered data (Bivens and Haimson 2016; Scheuerman, Paul, and Brubaker 2019). Yet, the very inclusion of “other” and other gender categories is the result of persistent work by activists to acknowledge the reality of these categories (Mendoza 2014), and consequently be able to productively use such data to research their communities (Harrison-Quintana, Grant, and Rivera 2015). The addition of differential privacy to this dataset thus does not completely address Facebook users’ privacy, and indeed also creates new difficulties for performing equitable research.

The second class of ethical considerations revolves around risks associated with performing research with data provided from private industry sources whose provenance, preparation, and provision cannot be externally verified due to differential privacy.

These risks manifested quite dramatically with the discovery that organizers had accidentally omitted nearly half of all US engagement data due to excluding the “No Score” political page category for over a year (Timberg 2021a). This error could and did affect our analysis, as users with no political page score showed persistently different patterns of engagement across age brackets, URL topic, and engagement type. (We were able to re-run the analyses with the corrected dataset before publication). Our concern is not that a data processing error occurred, which is inevitable in any suitably complex data infrastructure, but that academic researchers working with this data had relatively little ability to detect these errors. This is partly due to the restrictions put in place to maintain privacy: by having no access to the processes that generated this data and limited access to the derived dataset itself, we had no way to detect errors with the processing of the political page score.

However, it is also due to a lack of documentation about the political page algorithms’ calculation. It was not clear from initial documentation that users could have no score, and thus the error became even harder to detect. This second problem illustrates the risk of researchers relying on industry platforms to curate datasets without enforceable regulations on process transparency. While this missing data problem was clearly unintentional, it remains true that academic researchers sacrifice some of their commitments to transparency and reproducibility in order to work with data prepared by private industries who are not required to guarantee those qualities. As textLazer et al. 2021 said on the challenge of answering social science questions using industry data:

“A duty of scholarship in these spaces is to inform public discourse on these important questions. A corollary to the question of what can be measured must be: is it possible to speak truth to power if the power in question controls access to the data used to construct that “truth”? And, if not, is it (ever) possible to trust any measures that are allowed to be extracted from a given system?”

We urge deliberation when interacting with datasets provided by private industry in the future.

References

- Adam Augustyn, Aakanksha Gaur, Maren Goldberg, Gloria Lotha, Emily Rodriguez, Amy Tikkanen, and Jeff Wallenfeldt. 2022. *Bay of Pigs invasion*, April. <https://doi.org/10.3133/ofr20151199>.
- Allen, Jennifer, Markus Mobius, David M. Rothschild, and Duncan J. Watts. 2021. "Research note: Examining potential bias in large-scale censored data." *Harvard Kennedy School Misinformation Review* (July). <https://doi.org/10.37016/mr-2020-74>.
- Arif, Ahmer, Leo Graiden Stewart, and Kate Starbird. 2018. "Acting the Part: Examining Information Operations Within #BlackLivesMatter Discourse." *Proceedings of the ACM on Human-Computer Interaction* 2, no. CSCW (November): 1–27. <https://doi.org/10.1145/3274289>.
- Bailey, Aydan, Theo Gregersen, and Franziska Roesner. 2021. "Interactions with Potential Mis/Disinformation URLs Among U.S. Users on Facebook, 2017-2019." In *Proceedings of the ACM SIGCOMM 2021 Workshop on Free and Open Communications on the Internet*, 16–26. FOCI '21. New York, NY, USA: Association for Computing Machinery, August. <https://doi.org/10.1145/3473604.3474561>.
- Bastian, Mathieu, Sebastien Heymann, and Mathieu Jacomy. 2009. "Gephi: an open source software for exploring and manipulating networks." In *Proceedings of the international AAAI conference on web and social media*, 3:361–62. 1.
- Baum, Matthew A., and Philip B.K. Potter. 2008. "The Relationships Between Mass Media, Public Opinion, and Foreign Policy: Toward a Theoretical Synthesis." *Annual Review of Political Science* 11 (1): 39–65. <https://doi.org/10.1146/annurev.polisci.11.060406.214132>.
- "The CIA's first Latin American coup." 2019. *BBC News* (June). <https://www.bbc.com/news/av/stories-48638209>.
- Beers, Andrew, Joseph S. Schafer, Ian Kennedy, Morgan Wack, Emma S. Spiro, and Kate Starbird. 2023. "Followback Clusters, Satellite Audiences, and Bridge Nodes: Coengagement Networks for the 2020 US Election (Under Review)." *Proceedings of the International AAAI Conference on Web and Social Media*.
- Benkler, Yochai, Robert Faris, and Hal Roberts. 2018. *Network propaganda: Manipulation, disinformation, and radicalization in American politics*. Oxford University Press, October. <https://doi.org/10.1093/oso/9780190923624.001.0001>.
- Benkler, Yochai, Casey Tilton, Bruce Etling, Hal Roberts, Justin Clark, Robert Faris, Jonas Kaiser, and Carolyn Schmitt. 2020. "Mail-in voter fraud: Anatomy of a disinformation campaign." *Berkman Center Research Publication*, nos. 2020-6.
- Bittman, Ladislav. 1985. *The KGB and Soviet Disinformation: An Insider's View*. Google-Books-ID: XH3fAAAAMAAJ. Pergamon-Brassey's.
- Bivens, Rena, and Oliver L. Haimson. 2016. "Baking Gender Into Social Media Design: How Platforms Shape Categories for Users and Advertisers." *Social Media + Society* 2, no. 4 (October). <https://doi.org/10.1177/2056305116672486>.
- Buntain, Cody, Richard Bonneau, Jonathan Nagler, and Joshua A. Tucker. 2021. *A Summary Statistic for Political Ideology of Web Domains Using Differentially Private Engagement Data with Applications to Social Science One*. SSRN Scholarly Paper ID 3765240. Rochester, NY: Social Science Research Network, January. <https://doi.org/10.2139/ssrn.3765240>.

- Burns, Katelyn. 2019. "The rise of anti-trans 'radical' feminists, explained." *Vox* (September). <https://www.vox.com/identities/2019/9/5/20840101/terfs-radical-feminists-gender-critical>.
- Cadwalladr, Carole, and Emma Graham-Harrison. 2018. "Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach." *The Guardian* 17:22.
- Choudhury, Nazim, Kin Wai Ng, and Adriana Iamnitchi. 2020. "Strategic Information Operation in YouTube: The Case of the White Helmets." In *International Conference on Social Computing, Behavioral-Cultural Modeling and Prediction and Behavior Representation in Modeling and Simulation*, 318–28. Springer.
- Chulov, Martin. 2020. "How Syria's disinformation wars destroyed the co-founder of the White Helmets." *The Guardian* (October). <https://www.theguardian.com/news/2020/oct/27/syria-disinformation-war-white-helmets-mayday-rescue-james-le-mesurier>.
- Couch, Simon, Zeki Kazan, Kaiyan Shi, Andrew Bray, and Adam Groce. 2019. "Differentially Private Nonparametric Hypothesis Testing." In *Proceedings of the 2019 ACM SIGSAC Conference on Computer and Communications Security*, 737–51. CCS '19. New York, NY, USA: Association for Computing Machinery, November. <https://doi.org/10.1145/3319535.3339821>.
- Deadly Disinformation*. 2022. Technical report. The Syria Campaign, June. <https://deadlydisinformation.org/>.
- #SyriaHoax, Part Two: Kremlin Targets White Helmets*. 2018, February. <https://medium.com/dfrlab/syriaHoax-part-two-kremlin-targets-white-helmets-c6ab692d4a21>.
- Downing, John DH. 2001. *Radical media: Rebellious communication and social movements*. Sage. <https://doi.org/10.4135/9781452204994>.
- Dwork, Cynthia. 2006. "Differential Privacy." In *Automata, Languages and Programming*, edited by Michele Bugliesi, Bart Preneel, Vladimiro Sassone, and Ingo Wegener, 1–12. Lecture Notes in Computer Science. Berlin, Heidelberg: Springer. https://doi.org/10.1007/11787006_1.
- Ellis, Emma Grey. 2017. "Inside the Conspiracy Theory That Turned Syria's First Responders Into Terrorists." *Wired* (April). <https://www.wired.com/2017/04/white-helmets-conspiracy-theory/>.
- Evans, Georgina, and Gary King. 2021. "Statistically Valid Inferences from Differentially Private Data Releases, with Application to the Facebook URLs Dataset." *Political Analysis* (September): 1–21. <https://doi.org/10.1017/pan.2022.1>.
- Fiesler, Casey, Cliff Lampe, and Amy S. Bruckman. 2016. "Reality and Perception of Copyright Terms of Service for Online Content Creation." In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, 1450–61. CSCW '16. San Francisco, California, USA: Association for Computing Machinery, February. <https://doi.org/10.1145/2818048.2819931>.
- Fiesler, Casey, and Nicholas Proferes. 2018. "'Participant' Perceptions of Twitter Research Ethics." *Social Media + Society* 4, no. 1 (January). <https://doi.org/10.1177/2056305118763366>.

- Freelon, Deen, Michael Bossetta, Chris Wells, Josephine Lukito, Yiping Xia, and Kirsten Adams. 2020. "Black Trolls Matter: Racial and Ideological Asymmetries in Social Media Disinformation." *Social Science Computer Review* (April). <https://doi.org/10.1177/0894439320914853>.
- Freelon, Deen, and Tetyana Lokot. 2020. "Russian Twitter disinformation campaigns reach across the American political spectrum." *Harvard Kennedy School Misinformation Review* 1, no. 1 (January). <https://doi.org/10.37016/mr-2020-003>.
- Gallagher, Ryan J, Larissa Doroshenko, Sarah Shugars, David Lazer, and Brooke Foucault Welles. 2021. "Sustained online amplification of COVID-19 elites in the United States." *Social Media+ Society* 7 (2).
- Giesecking, Jen Jack. 2018. "Size matters to lesbians, too: Queer feminist interventions into the scale of big data." *The Professional Geographer* 70, no. 1 (June): 150–56. <https://doi.org/10.1080/00330124.2017.1326084>.
- Gilbert, David. 2022. "Millions of Leftists Are Reposting Kremlin Misinformation by Mistake." *Vice* (March). <https://www.vice.com/en/article/wxdb5z/redfish-media-russia-propaganda-misinformation>.
- Giovanni, Janine di. 2018. "Why Assad and Russia Target the White Helmets." *The New York Review of Books* (October). <https://www.nybooks.com/daily/2018/10/16/why-assad-and-russia-target-the-white-helmets/>.
- Gordon, Michael R., and Judith Miller. 2002. "Threats And Responses: The Iraqis; U.S. Says Hussein Intensifies Quest For A-Bomb Parts." *The New York Times* (September). <https://www.nytimes.com/2002/09/08/world/threats-responses-iraqis-us-says-hussein-intensifies-quest-for-bomb-parts.html>.
- Guess, Andrew, Jonathan Nagler, and Joshua Tucker. 2019. "Less than you think: Prevalence and predictors of fake news dissemination on Facebook." *Science Advances* 5, no. 1 (January). <https://doi.org/10.1126/sciadv.aau4586>.
- Guess, Andy, Kevin Aslett, Joshua Tucker, Richard Bonneau, and Jonathan Nagler. 2021. "Cracking Open the News Feed: Exploring What U.S. Facebook Users See and Share with Large-Scale Platform Data: Exploring What U.S. Facebook Users See and Share with Large-Scale Platform Data." *Journal of Quantitative Description: Digital Media* 1 (October). <https://doi.org/10.51685/jqd.2021.006>.
- Harrison-Quintana, Jack, Jaime M. Grant, and Ignacio G. Rivera. 2015. "Boxes of Our Own Creation: A Trans Data Collection Wo/Manifesto." *TSQ: Transgender Studies Quarterly* 2, no. 1 (February): 166–74. <https://doi.org/10.1215/23289252-2848949>.
- Heimlich, Russell. 2011. *Views of the Iraq War*, November. <https://www.pewresearch.org/fact-tank/2011/11/23/views-of-the-iraq-war/>.
- Hjorth, Frederik, and Rebecca Adler-Nissen. 2019. "Ideological asymmetry in the reach of pro-Russian digital disinformation to United States audiences." *Journal of Communication* 69 (2): 168–92.
- Holt, Kristoffer, Tine Ustad Figenschou, and Lena Frischlich. 2019. "Key dimensions of alternative news media." *Digital Journalism* 7, no. 7 (June): 860–69. <https://doi.org/10.1080/21670811.2019.1625715>.

- Horawalavithana, Sameera, Kin Wai Ng, and Adriana Iamnitchi. 2020. "Twitter Is the Megaphone of Cross-platform Messaging on the White Helmets." In *International Conference on Social Computing, Behavioral-Cultural Modeling and Prediction and Behavior Representation in Modeling and Simulation*, 235–44. Springer.
- Hwang, Tim. 2020. *Subprime attention crisis: Advertising and the time bomb at the heart of the Internet*. FSG originals.
- Informed Public, Center for an, Digital Forensic Research Lab, Graphika, and Stanford Internet Observatory. 2021. *The Long Fuse: Misinformation and the 2020 Election*. Technical report. <https://purl.stanford.edu/tr171zs0069>.
- Jack, Caroline. 2017. *Lexicon of Lies: Terms for Problematic Information*. Technical report. Data & Society, August.
- Kennedy, Ian, Morgan Wack, Andrew Beers, Joseph S Schafer, Isabella Garcia-Camargo, Emma S Spiro, and Kate Starbird. 2022. "Repeat Spreaders and Election Delegitimization: A Comprehensive Dataset of Misinformation Tweets from the 2020 U.S. Election." *Journal of Quantitative Description: Digital Media* 2 (June). <https://doi.org/10.51685/jqd.2022.013>.
- Kifer, Daniel, Solomon Messing, Aaron Roth, Abhradeep Thakurta, and Danfeng Zhang. 2020. "Guidelines for Implementing and Auditing Differentially Private Systems." ArXiv: 2002.04049, *ArXiv:2002.04049 [cs]* (May). <http://arxiv.org/abs/2002.04049>.
- Lamensch, Marie. 2022. *For Syria's White Helmets, the Ukraine War Is Déjà Vu*, May. <https://www.cigionline.org/articles/for-syrias-white-helmets-the-ukraine-war-is-d%C3%5C%A9j%C3%5C%A0-vu/>.
- Lazer, David, Eszter Hargittai, Deen Freelon, Sandra Gonzalez-Bailon, Kevin Munger, Katherine Ognyanova, and Jason Radford. 2021. "Meaningful measures of human society in the twenty-first century." *Bandiera_abtest: a Cg_type: Nature Research Journals Number: 7866 Primary_atype: Reviews, Nature* 595, no. 7866 (July): 189–96. <https://doi.org/10.1038/s41586-021-03660-7>.
- Lewis, Alexandra Larkin, Sophie. 2017. "Netflix's 'The White Helmets' takes home the company's first Oscar win." *CNN* (February). <https://www.cnn.com/2017/02/26/us/white-helmets-oscar/index.html>.
- Lukito, Josephine. 2020. "Coordinating a Multi-Platform Disinformation Campaign: Internet Research Agency Activity on Three U.S. Social Media Platforms, 2015 to 2017." *Political Communication* 37, no. 2 (March): 238–55. <https://doi.org/10.1080/10584609.2019.1661889>.
- Marwick, Alice E, and William Clyde Partin. 2022. "Constructing alternative facts: Populist expertise and the QAnon conspiracy." *New Media & Society* (May): 146144482210902. <https://doi.org/10.1177/14614448221090201>.
- Mendoza, Martha. 2014. "Facebook offers new gender options for users." *AP News* (February). <https://apnews.com/article/beaf554bed6d4df0ab57c628292fcc0b>.
- Merrill, Jeremy B., and Will Oremus. 2021. "Five points for anger, one for a 'like': How Facebook's formula fostered rage and misinformation." *Washington Post* (October). <https://www.washingtonpost.com/technology/2021/10/26/facebook-angry-emoji-algorithm/>.

- Messing, Solomon, Christina DeGregorio, Bennett Hillenbrand, Gary King, Saurav Mahanti, Zagreb Mukerjee, Chaya Nayak, Nate Persily, Bogdan State, and Arjun Wilkins. 2021. *Facebook Privacy-Protected Full URLs Data Set*. Dataset, July. <https://doi.org/10.7910/DVN/TDOAPG>.
- Milan, Stefania, and Emiliano Treré. 2020. "The Rise of the Data Poor: The COVID-19 Pandemic Seen From the Margins." *Social Media + Society* 6, no. 3 (July). <https://doi.org/10.1177/2056305120948233>.
- Nemer, David. 2021. "The Human Infrastructure of Fake News in Brazil." *Social Science Research Council: Items* (July). <https://items.ssrc.org/extremism-online/the-human-infrastructure-of-fake-news-in-brazil/>.
- Neumann, Nico, Catherine E Tucker, and Timothy Whitfield. 2019. "Frontiers: How effective is third-party consumer profiling? Evidence from field studies." *Marketing Science* 38 (6): 918–26.
- Obar, Jonathan A., and Anne Oeldorf-Hirsch. 2018. *The Biggest Lie on the Internet: Ignoring the Privacy Policies and Terms of Service Policies of Social Networking Services*. SSRN Scholarly Paper ID 2757465. Rochester, NY: Social Science Research Network, June. <https://doi.org/10.2139/ssrn.2757465>.
- Ong, Jonathan Corpus, and Jason Vincent A. Cabanes. 2018. "Architects of networked disinformation: Behind the scenes of troll accounts and fake news production in the Philippines." *Architects of Networked Disinformation: Behind the Scenes of Troll Accounts and Fake News Production in the Philippines*.
- Pacheco, Diogo, Alessandro Flammini, and Filippo Menczer. 2020. "Unveiling Coordinated Groups Behind White Helmets Disinformation." In *Companion Proceedings of the Web Conference 2020*, 611–16. New York, NY, USA: Association for Computing Machinery, April. <https://doi.org/10.1145/3366424.3385775>.
- Pomerantsev, Peter, and Michael Weiss. 2014. *The menace of unreality: How the Kremlin weaponizes information, culture and money*. Technical report. Institute of Modern Russia.
- Rid, Thomas. 2020. *Active measures: The secret history of disinformation and political warfare*. Farrar, Straus / Giroux.
- Ross, Alexander Reid, and Courtney Dobson. 2022. "The Big Business of Uyghur Genocide Denial." *New Lines Magazine* (January). <https://newlinesmag.com/reportage/the-big-business-of-uyghur-genocide-denial/>.
- Sandoval, Marisol, and Christian Fuchs. 2010. "Towards a critical theory of alternative media." *Telematics and Informatics*, Community media - the long march, 27, no. 2 (May): 141–50. <https://doi.org/10.1016/j.tele.2009.06.011>.
- Scheuerman, Morgan Klaus, Jacob M. Paul, and Jed R. Brubaker. 2019. "How Computers See Gender: An Evaluation of Gender Classification in Commercial Facial Analysis Services." *Proceedings of the ACM on Human-Computer Interaction* 3, no. CSCW (November): 144:1–144:33. <https://doi.org/10.1145/3359246>.
- Schwarz, Jon. 2018. "Lie After Lie: What Colin Powell Knew About Iraq 15 Years Ago and What He Told the U.N." *The Intercept* (February). <https://theintercept.com/2018/02/06/lie-after-lie-what-colin-powell-knew-about-iraq-fifteen-years-ago-and-what-he-told-the-un/>.

- Shane, Scott. 2005. "Vietnam War Intelligence 'Deliberately Skewed,' Secret Study Says." *The New York Times* (December). <https://www.nytimes.com/2005/12/02/politics/vietnam-war-intelligence-deliberately-skewed-secret-study-says.html>.
- Silverman, Craig, Ryan Mac, and Pranav Dixit. 2020. "'I Have Blood On My Hands': A Whistleblower Says Facebook Ignored Global Political Manipulation." *BuzzFeed News* (September). <https://www.buzzfeednews.com/article/craigsilverman/facebook-ignores-political-manipulation-whistleblower-memo>.
- Solon, Olivia. 2017. "How Syria's White Helmets became victims of an online propaganda machine." *The Guardian* (December). <https://www.theguardian.com/world/2017/dec/18/syria-white-helmets-conspiracy-theories>.
- Starbird, Kate. 2017. "Examining the alternative media ecosystem through the production of alternative narratives of mass shooting events on Twitter." In *Eleventh International AAAI Conference on Web and Social Media*.
- Starbird, Kate, Ahmer Arif, and Tom Wilson. 2019. "Disinformation as collaborative work: Surfacing the participatory nature of strategic information operations." *Proceedings of the ACM on Human-Computer Interaction* 3, no. CSCW (November): 1–26. <https://doi.org/10.1145/3359229>.
- Starbird, Kate, Ahmer Arif, Tom Wilson, Katherine Van Koeveering, Katya Yefimova, and Daniel Scarnecchia. 2018. "Ecosystem or Echo-System? Exploring Content Sharing across Alternative Media Domains." *Proceedings of the International AAAI Conference on Web and Social Media* 12, no. 1 (June). <https://ojs.aaai.org/index.php/ICWSM/article/view/15009>.
- Sun, Simón(e) D. 2019. "Stop Using Phony Science to Justify Transphobia." *Scientific American Blog Network* (June). <https://blogs.scientificamerican.com/voices/stop-using-phony-science-to-justify-transphobia/>.
- Taylor, Linnet, Luciano Floridi, and Bart Van der Sloot. 2016. *Group privacy: New challenges of data technologies*. Vol. 126. Springer.
- Timberg, Craig. 2021a. "Facebook made big mistake in data it provided to researchers, undermining academic work." *Washington Post* (September). <https://www.washingtonpost.com/technology/2021/09/10/facebook-error-data-social-scientists/>.
- . 2021b. "New whistleblower claims Facebook allowed hate, illegal activity to go unchecked." *Washington Post* (October). <https://www.washingtonpost.com/technology/2021/10/22/facebook-new-whistleblower-complaint/>.
- "Syria: 10 years of war has left at least 350,000 dead." 2021. *UN News* (September). <https://news.un.org/en/story/2021/09/1101162>.
- "Syria emergency." 2021. *UNHCR* (March). <https://www.unhcr.org/syria-emergency.html>.
- Wanless, A, and J Pamment. 2019. "How Do You Define a Problem Like Influence?" *Journal of Information Warfare* 18 (3): 1–14. <http://www.jstor.org/stable/26894679>.
- Wanless, Alicia, and Michael Berk. 2019. "The audience is the amplifier: Participatory propaganda." In *The Sage Handbook of Propaganda*. Sage.
- Wardle, Claire, and Hossein Derakhshan. 2017. *INFORMATION DISORDER : Toward an interdisciplinary framework for research and policy making Information Disorder Toward an interdisciplinary framework for research and policymaking*. Council of Europe, September.

- Weedon, Jen, W. Nuland, and Alex Stamos. 2017. *Information operations and Facebook*. Technical report. Facebook Security. <https://www.semanticscholar.org/paper/Information-operations-and-Facebook-Weedon-Nuland/f633771f0f586aaa89120a9003e2b24dddaf4d89>.
- Weldon, Laurel. 2011. *When protest makes policy: How social movements represent disadvantaged groups*. University of Michigan Press. <https://doi.org/10.3998/mpub.1285595>.
- Welles, Brooke Foucault. 2014. "On minorities and outliers: The case for making Big Data small." *Big Data & Society* 1, no. 1 (April). <https://doi.org/10.1177/2053951714540613>.
- Wilson, Tom. 2021. "Understanding the Structure and Dynamics of Multi-platform Information Operations." PhD diss., University of Washington.
- Wilson, Tom, and Kate Starbird. 2020. "Cross-platform disinformation campaigns: Lessons learned and next steps." *Harvard Kennedy School Misinformation Review* 1, no. 1 (January). <https://doi.org/10.37016/mr-2020-002>.
- . 2021. "Cross-platform Information Operations: Mobilizing Narratives & Building Resilience through both 'Big' & 'Alt' Tech." *Proceedings of the ACM on Human-Computer Interaction* 5, no. CSCW2 (October): 1–32. <https://doi.org/10.1145/3476086>.
- Wilson, Tom, Kaitlyn Zhou, and Kate Starbird. 2018. "Assembling Strategic Narratives: Information Operations as Collaborative Work within an Online Community." *Proceedings of the ACM on Human-Computer Interaction* 2, no. CSCW (November): 1–26. <https://doi.org/10.1145/3274452>.
- Zeidan, Adam. 2021. *mujahideen*, August. <https://www.britannica.com/topic/mujahideen-Afghani-rebels>.

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Data Availability Statement

Data and replicable code are not directly available due to data-sharing restrictions from the Social Science One project. Researchers authorized by the Social Science One project can contact the authors for replicable code.

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Ethical Standards

This research received approval from the University of Washington Institutional Review Board (STUDY00005474).

Keywords

alternative media; influence operations; demographics; syria.

Appendices

Appendix A consists of domains considered from our Twitter dataset, with number of retweets and applied clustering labels attached in the second and third columns. Appendix B consists of domains from our *Facebook White Helmets* dataset, with summed number of shares, a +/- 95% confidence interval on those share totals, and applied clusters derived from the Twitter analysis. Both can be separately downloaded in CSV format.