Title

From Online Feeds to Hostile Beliefs: The Effect of Social Media on Ideological Intolerance

Author

Ohler, Ellen

Publication Date

2025-05-06

The University of California, Los Angeles

From Online Feeds to Hostile Beliefs:
The Effect of Social Media on Ideological Intolerance

Ellen Ohler

Faculty Advisor: Professor Susanne Lohmann

Political Science Departmental Honors Thesis

Winter 2025

The author wishes to thank Professors Susanne Lohmann and Scott James

for their invaluable support on this project.

Abstract

Recent years have seen parallel rises in social media usage and ideological intolerance, leading public commentators and scholars alike to infer a causal relationship between the two. However, this relationship remains empirically untested, and the mechanisms connecting them are poorly understood. I enumerate five potential mechanisms and identify echo chamber intensity as the one most strongly supported by existing literature. Then, I conduct a survey on 120 UCLA undergraduate students testing both the overall relationship and the specific role of echo chamber intensity. The results show no correlation between consumption of political content on social media and ideological intolerance. They also show that echo chamber intensity is correlated with neither consumption of political content on social media nor ideological intolerance. These findings challenge prevailing assumptions and demonstrate the necessity of further research in this area.

I. Introduction

The past fifteen years have seen the emergence of social media as a form of interpersonal and mass communication. In the same time period, there has been a decline in ideological tolerance in the United States. This trend is evidenced by an increase in the number of attempts to sanction scholars for constitutionally protected speech (Foundation for Individual Rights and Expression, 2023) and the ubiquity of the term "cancel culture," a phenomenon in which individuals face professional repercussions or social ostracism for speech or actions that are deemed socially unacceptable. Many political observers have suggested that the parallelism of these phenomena implies causation; that is, social media has led to the erosion of ideological tolerance. However, this hypothesized relationship has yet to be empirically tested.

Moreover, Haidt and Lukianoff (2019) outline two mechanisms by which social media usage influences levels of ideological intolerance. Firstly, they suggest that social media contributed to political polarization, which in turn led to a rise in ideologically-motivated threats and crimes. Secondly, they argue that social media instigated a mental health crisis among young adults, which in turn motivated university administrators to place restrictions on allegedly harmful speech. Despite their theoretical appeal, evidence for these proposed mechanisms is relatively weak (Valenzuela et al., 2019; Beam et al., 2018; Kaufmann, 2023). Additionally, given the technological complexity and the pervasiveness of social media, it is unlikely that there are only two mechanisms by which social media affects ideological intolerance.

This paper further examines the relationship between social media and ideological intolerance in two ways. Firstly, arguments for a causal relationship between these two variables have thus far been rooted in their parallel increases over time (within the past fifteen years). If a causal relationship truly exists, then correlations between social media usage and ideological intolerance should exist both across time and across individuals. That is, just as societies should

exhibit higher levels of intolerance in time periods with greater social media prevalence, intolerance individuals should exhibit higher social media usage. Thus, in order to evaluate the robustness of the relationship and thereby establish grounds for causation, I examine social media usage and ideological intolerance in a cross-sectional context. Specifically, I conduct a survey in which I ask UCLA undergraduate students about their consumption of political content on social media and their attitudes towards individuals whose views they oppose.

Secondly, in order to understand the process by which social media usage may influence levels of ideological intolerance, I lay out a number of potential mechanisms and identify echo chamber intensity as the one most strongly supported by the literature. In order to evaluate the empirical validity of the mechanism, I then measure correlations between echo chamber intensity and both the proposed explanatory and outcome variables (consumption of political content on social media and ideological intolerance, respectively).

II. Literature Review

In order to highlight the lack of research relating social media to ideological intolerance, I first examine scholarship connecting the internet, and subsequently social media, to other political outcomes. I then review the separate body of literature on ideological intolerance before explicitly addressing the research gap.

The second part of my literature review explores the limitations of existing literature on the mechanisms mediating the relationship between social media and ideological intolerance, thereby establishing the need for alternative mechanisms.

The Internet, Social Media, and Democratic Outcomes

Since the advent of the internet in the 1990s, scholars have debated its effects on a range of democratic outcomes. Among those adopting an optimistic perspective, Abramson et al. (1988) argued that the internet would expedite the dissemination of political information and facilitate political participation through online polling and voting. Additionally, numerous scholars asserted that the internet would promote democratic deliberation (Paparachirissi, 2002). Innovations such as online discussion groups would lower the practical costs of political discussion, allowing greater participation (Hauben and Hauben, 1997; Iyengar et al., 2003). Moreover, the internet would increase not only the number but also the diversity of opinions offered in discussion forums (McKenna and Bargh, 2000). Anonymity would empower those with unorthodox views to speak up (Blader and Tyler, 2003), leading to greater understanding of minority perspectives (Moscovici, 1980). Exposure to a diverse and geographically global set of views would enable people across the world to overcome divides and achieve a "diasporic utopia" (Pavlik, 1994).

Taking a more pessimistic view, some scholars argued that exposure to a diversity of views would lead to negative, rather than positive, democratic outcomes. Mutz (2002a) showed that individuals embedded in diverse networks tended to be more politically ambivalent, which was associated with less political participation. Moreover, far from ideals of rational discourse and mutual understanding, Mitra (1997) noted the hostile nature of online political forums, which often deterred participation, while Hill and Hughes (1998) remarked on the frequency of cross-cultural miscommunication.

Other scholars rejected the premise that the internet would diversify political discussion, instead arguing that the internet would lead individuals to fragment into increasingly

homogenous groups. Van Alstyne and Brynjolfsson (1996) claimed that in a process of "balkanization," the proliferation of ideas and interests on the internet would enable individuals to more easily satisfy their preferences and sort into groups accordingly. Similarly, Sunstein (2006) argued that in contrast to the ideal of an information commons, the internet would create echo chambers by enabling individuals to narrow their informational and ideological influences precisely to match their own views.

Empirical evidence on the ideological homogeneity of the internet was mixed. Gentzkow and Shapiro (2011) found that ideological segregation of online news consumption was significantly lower than that of face-to-face interactions. In contrast, Wojcieszak and Mutz (2009) found that high levels of political agreement in online chat rooms. This result is meaningful when contrasted with Huckfeldt et al. (2004), who find that most individuals encounter at least some political disagreement in face-to-face interactions.

A related literature has since emerged discussing the effects of social media in particular on democratic outcomes. Social media appears to increase purposeful and incidental exposure to political news, thereby increasing political knowledge (Fletcher and Nielson, 2017; Guess et al., 2023). Additionally, social media lowers costs to mobilization, thus increasing political participation (Tufekci and Wilson, 2012; Jost et al., 2018; Zhuravskaya et al., 2020).

The literature generally supports the conclusion that social media networks are characterized by echo chambers, although some caveats exist. In particular, political discourse on Twitter and Facebook has been shown to exhibit ideological segregation (Himmelboim et al., 2013; Barbera et al., 2015; Garimella et al., 2018; Cinelli et al., 2021). Echo chambers on social media exist due to human psychology, social network effects, and recommender algorithms (Alatawi et al., 2019). The psychological tendency to prefer information that confirms

preexisting beliefs (known as confirmation bias) leads social media users with similar beliefs to seek out similar content and thus to cluster together in digital space. Furthermore, the human desire to avoid internal contradictions between beliefs (i.e. to reduce cognitive dissonance) leads users to seek out ideologically consistent content, further consolidating echo chambers. Guess et al. (2018) contend that the role cognitive dissonance plays in tendencies towards selective exposure is overstated. In terms of network effects, social media communities form primarily amongst users with similar beliefs or interests due to homophily (Zafarani et al., 2014). Additionally, as social media platforms are by definition spaces for interaction between users, social media facilitates further belief confirmation by incentivizing users to concretize their beliefs in written messages to public audiences (Cho et al., 2018) and by providing avenues for peer validation (Bright et al., 2020). Such belief confirmation discourages users from seeking information outside of their echo chamber. Finally, due to attention and profit-seeking incentives, social media algorithms use past behavior on the platform to recommend personalized content to users (Rastegarpanah et al., 2019). This mechanism, commonly referred to as a filter bubble, amplifies existing human tendencies towards ideological homogeneity. As social network effects and recommender algorithms play a larger role on social media than on the non-social media internet, echo chambers may be more intense on social media than on the internet writ large.

Finally, there is disagreement in the literature on the extent to which social media usage predicts political polarization, if at all. Cho et al. (2018) find that social media usage is associated with polarization through self-reinforcement, while Chang and Park (2020) suggest a reciprocal relationship between the two. Johnson et al. (2017) find a weak but positive effect of selective exposure. Valenzuela et al. (2019) find no relationship between social media usage and polarization, although they do not specifically examine platforms where individuals typically

consume political content. Finally, Beam et al. (2018) find that social media usage decreases polarization due to exposure by exposing users to diverse information.

Ideological Intolerance

Research on ideological intolerance in the political science literature begins with Stouffer (1954) and continues through the early 2000s. Perception of threat from the target group predicts intolerance (Gibson and Duch, 1993; Marcus et al., 1995). In the Soviet Union, level of education predicts support for general democratic values but not political intolerance (Gibson and Duch, 1993). Notably, Davis (2007) observes a decline in political intolerance (i.e. an increase in political tolerance) from 1972 to 2004, although such a trend may be a false conclusion based on erroneous measurement (Sullivan et al., 1979).

Ideological intolerance is also explored in the psychological literature, which examines motivations and descriptive characteristics of intolerant individuals. Gibson and Gouws (2000) and Halperin et al. (2009) point to the primacy of group-based identity and hatred, even when compared with perceived threat, as an antecedent to political intolerance. Additionally, while earlier literature suggests that political conservatism is a stronger predictor of political intolerance than political liberalism (Sniderman et al., 1989; Altemeyer, 1996; Fisher et al., 1999; Davis and Silver, 2004, Lindner and Nosek, 2009), more recent findings suggest that intolerance exists both on the left and the right (Crawford and Pilanski, 2012; Brandt et al., 2014).

The Research Gap: Social Media Usage and Ideological Intolerance

Although ample research has examined the effects of social media usage on outcomes such as political participation, echo chamber intensity, and ideological polarization, literature exploring the relationship between social media and ideological intolerance is almost

nonexistent. This gap in the literature persists despite a large body of popular discourse asserting the role of social media in the rise of so-called cancel culture (Bromwich, 2020; Romeo, 2022; Nierman, 2022; Hunt, 2024). It also persists in spite of preliminary evidence; as mentioned in the Introduction, the recent increase in ideological intolerance (as measured by professional sanctions of academics) has tracked closely with the rise of social media. Research that does examine this relationship (notably, Lim 2017 and Haidt and Lukianoff 2019) fails to empirically substantiate causation. Moreover, these studies do not appear to include even correlational tests. This gap in the literature prompts my first research question:

RQ1: Does social media usage cause ideological intolerance?

Weaknesses of Existing Mechanisms

Haidt and Lukianoff (2019) allude to two mechanisms by which social media usage may lead to intolerance. Firstly, they mention that social media results in political polarization, which in extreme forms manifests in threats, hate crimes, and other forms of intolerance. Secondly, they suggest that social media instigated a mental health crisis among young adults, which in turn motivated university administrators to place restrictions on allegedly harmful speech. These proposed mechanisms have two key limitations. Firstly, neither causal pathway is clearly outlined, as both are interwoven with other themes in the book. Secondly, there are empirical weaknesses to both mechanisms. As suggested earlier in the Literature Review, evidence linking social media to ideological polarization is somewhat mixed. Indeed, in a review of the literature, Tucker et al. (2018) conclude that elite behavior, rather than communication, is primarily responsible for ideological polarization. Additionally, Kaufmann (2023) finds that mental health status does not significantly predict viewpoint intolerance. Overall, a review of Haidt and Lukianoff (2019) reveals the necessity for a more systematic examination of the proposed

(existing) mechanisms and the generation of alternative (new) mechanisms. It thus prompts a second research question:

> RQ2: What mechanism(s) mediate the relationship between social media usage and ideological intolerance?

III. Conceptual Framework

Definitions

Before enumerating the mechanisms mediating the relationship between social media usage and ideological intolerance, it is helpful to first establish definitions for the three primary concepts of interest: social media, echo chamber intensity, and ideological intolerance.

Social Media

I define social media as internet-based, disentrained, and persistent channels of masspersonal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content (Carr and Hayes, 2015). "Disentrainment" implies the potential for asynchronous communication, while "persistence" suggests the continuous existence of the platform even when individual users are inactive. This definition is derived from a highly cited paper and is broadly aligned with other proposed definitions. For the purposes of this paper, thorough justification of this definition is unnecessary, as the platforms referenced in my survey fit well within the bounds of most widely-accepted definitions of social media.

Echo Chamber Intensity

I adopt the definition of an echo chamber provided by Cinelli et al. (2021): an environment in which the opinion, political leaning, or belief of an individual about a certain topic is reinforced due to repeated interaction with peers who share similar points of view. Echo chamber intensity, then, is the degree to which an environment exhibits such tendencies. There is

some ambiguity in the literature concerning whether an echo chamber must require ideological polarization. Indeed, despite a definition of echo chambers that centers around ideological homophily, Cinelli et al. (2021) incorporate both homophily and polarization in their operationalization of the concept. In accordance with Colleoni et al. (2014), Hobolt et al. (2023), and others, I choose to characterize echo chambers solely in terms of the former. Doing so allows me to delineate the effects of each phenomenon separately on my outcome of interest (ideological intolerance). Indeed, including polarization in my conceptualization of echo chambers muddles the distinction between my second and third mechanisms (see the Mechanisms subsection below).

Using this broader definition for echo chambers does not preclude me from drawing on literature using the alternative definition for evidence. Any phenomenon that qualifies as an echo chamber under the alternative definition necessarily qualifies under mine (although the reverse cannot be said).

Ideological Intolerance

I define ideological tolerance as "the willingness to permit the expression of those ideas or interests that one opposes" (Gibson and Bingham, 1982). Ideological intolerance, then, implies an unwillingness to permit such expression. Although the literature refers to this concept generally as political rather than ideological intolerance (Stouffer, 1955; Sullivan et al., 1981; Gibson and Bingham, 1982), I favor the latter term as it avoids association with institutionalized political organizations, such as political parties. Even as conceptualized and operationalized by the aforementioned scholars, "political tolerance" does not refer narrowly to an attitude that a member of one political party (a Democrat, for example) holds towards a member of another (a Republican, for example). Rather, it refers broadly to an attitude that an individual holds towards

another individual subscribing to an opposing belief system. This concept includes the former case (of the Democrat and the Republican) but is not limited to it. It is for this reason that I use the term "ideological intolerance" hereafter.[1]

Moreover, I favor this definition over another whose variants are more common in the literature: "a willingness to extend the rights of citizenship to all members of the polity – that is, to allow political freedoms to those who are politically different" (Gibson and Bingham, 1982). Notably, under this definition, tolerance is restricted to those domains in which individuals have a legal right to expression; prohibiting an individual from holding a public rally is intolerant, while firing an individual for his political beliefs is not. I oppose this definition on two grounds. Firstly, even scholars who adopt this definition deviate from strictly rights-based survey questions in their measurement of ideological intolerance. For example, a 2004 survey administered by National Opinion Research Center at UChicago asks whether an individual teaching in a college should be fired or not, while Crawford and Pilanski (2012) ask survey participants whether an individual should "be allowed to distribute pamphlets and buttons on local college campuses." Neither action is strictly governed by law in the United States. Nevertheless (and here is my second point), it is critical that such questions be included in a measure of ideological intolerance. Measuring tolerance of offensive beliefs solely in contexts where such expression is legally protected is arbitrary, as tolerance outside such contexts is also necessary for the preservation of the fabric of democracy. If, for example, private employers fired all workers who held opposing political beliefs, firms would be unable to operate and opportunities for cross-cutting political discussion would dramatically decrease. Therefore, both

[1] Despite using the broader term of "ideological intolerance," in subsequent sections I discuss and operationalize the concept as it pertains to political perspectives or topics. As previously discussed, political intolerance is a subset of ideological intolerance whose specificity renders it simpler to measure.

from the perspective of internal consistency and external validity, it is reasonable to expand the definition of "ideological intolerance" beyond a mere extension of rights.

Mechanisms

In this section, I lay out five mechanisms by which social media usage may influence levels of ideological intolerance. These mechanisms draw on academic literature (including Haidt and Lukianoff, 2018) as well as popular discourse. I then enumerate my reasons for testing Mechanism B (Echo Chamber Intensity).

Mechanism A: Diverse Exposure

Social media increases both purposeful (selective) and incidental exposure to political news (Bode, 2016; Fletcher and Nielson, 2017). Moreover, compared with other forms of political communication, social media allows for greater proliferation of diverse political information by providing a global platform for user-generated content. Such proliferation increases the probability that an individual encounters ideas that they strongly oppose and towards which they are intolerant. Notably, under this mechanism, social media does not change political attitudes but nevertheless increases the expression of intolerance by facilitating matching between individuals and targets towards whom they are hostile.

An examination of the Overton window helps to shed light on the differences between these mechanisms. Figure 1 illustrates a baseline scenario without social media where the line segment represents an ideological spectrum, the circles represent the ideological positions of individuals within a society, and the box represents the realm of acceptable (tolerable) belief (the Overton window). Intolerance increases if (1) the proportion of circles outside the box (as opposed to inside the box) increases or (2) if the lines of the box become thicker, indicating greater rigidity of the boundaries on social acceptance. Figure 2 represents the scenario under

Mechanism A. Although the Overton window has not changed, social media introduces a number of new, more diverse ideological positions (shown as triangles). It is the increase in the proportion of points (ideological positions) outside the Overton window that induces the society to be more intolerant.

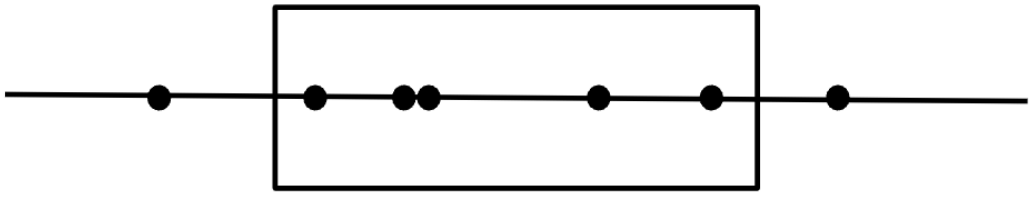


Figure 1: Overton Window (No Social Media).

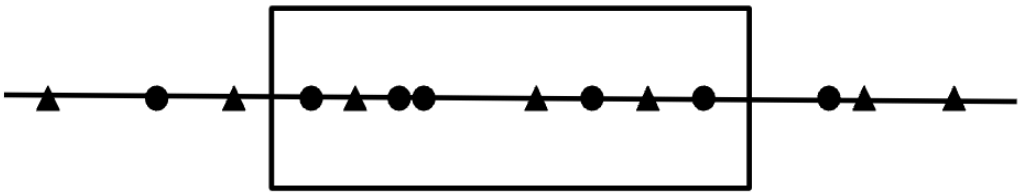


Figure 2: Overton Window (Mechanism A).

Mechanism B: Echo Chamber Intensification

As illustrated in the Literature Review, the claim that echo chambers are a feature of political discourse on social media is well-established both theoretically and empirically (Himmelboim et al., 2013; Barberá et al., 2015, Garimella et al., 2018, Cinelli et al., 2021). In turn, echo chambers could facilitate ideological intolerance in at least three ways. First, Mutz (2002b) finds that exposure to diverse viewpoints fosters political tolerance. This finding suggests that echo chambers, which decrease exposure to diverse viewpoints, would lead to the opposite. Such a relationship is also supported by Levendusky (2013), which finds that exposure to like-minded media leads to greater dislike and decreased trust for non-copartisans. Secondly, echo chambers increase confidence in beliefs through self-reinforcement and feedback loops.

This may decrease openness and even generate hostility towards opposing perspectives. Thirdly, echo chambers are communities of individuals who share a common belief or interest. Accordingly, echo chamber intensification may strengthen in-group identity. In such a context, a differing perspective may be perceived as a threat to in-group identity and therefore produce an intolerant response.

Figure 3 displays two changes compared to the baseline scenario. First, the original Overton window splits into two, smaller Overton windows, as social media users engage with a smaller set of ideological beliefs that align with their own. Secondly, the lines of the Overton window become thicker, indicating more rigid boundaries on the range of acceptable beliefs. This corresponds with stronger in-group identity and confidence in beliefs. As both the percentage of points (ideological positions) outside a given Overton window and the barriers to crossing the Overton window increase, so do levels of intolerance.

It is additionally worth noting that while social media technically introduces a number of new ideological positions (represented as triangles), Mechanism B provides no information on their distribution. Thus, in order to avoid false conclusions, triangles are excluded from this diagram.

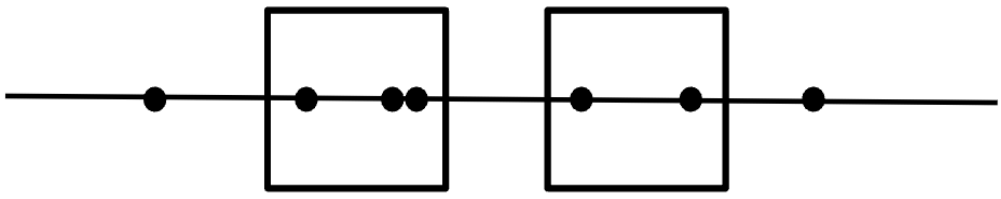


Figure 3: Overton Window (Mechanism B).

Mechanism C: Polarization

As discussed in the Literature Review, there is evidence suggesting that social media usage is associated with ideological polarization (Barberá, 2015; Cho et al., 2018). This relationship is driven by at least two mechanisms. Firstly, ideologically homogeneous groups tend to become more extreme over time (Sunstein, 1999). Thus, to the extent that networks among social media users tend to resemble echo chambers (and evidence suggests that they do), social media engagement will lead users to adopt more extreme ideological positions over time. Secondly, social media posts that have strong emotional cues are more likely to go viral (Berger, 2011; Bail, 2016; Brady et al., 2017), motivating users to post highly emotional content. If ideological extremity is more likely to induce emotional responses, virality may also incentivize users to post ideologically extreme content. Users may then become convinced of their own exaggerated posts through a self-reinforcement mechanism (Cho et al., 2018). In turn, emotionally-charged content induces defensive, partisan reactions driven by motivated reasoning, thereby polarizing viewers (Weeks, 2015). Thus, virality incentives may drive ideological polarization in both content creators and viewers.

In succession, polarization may induce ideological intolerance; Luttig (2017) and Conway III et al. (2018) find a relationship between authoritarianism – which is conceptually related to ideological intolerance – and polarization.

Figure 4 displays three changes compared to the baseline scenario. Firstly, for the reasons described above, social media induces polarization in the ideological positions of the existing individuals (circles). This feature is unique to this mechanism. Secondly, the single Overton window cleaves into two, narrower windows as individuals diverge into more extreme, homogeneous clusters. Thirdly, the barriers to crossing the window increase due to reinforcement effects. As the percentage of points (ideological positions) outside a given Overton window and

the barriers to crossing the Overton window increase, so do levels of intolerance. Again, while triangles technically exist in this scenario, they are excluded from the diagram because their distribution is unknown.

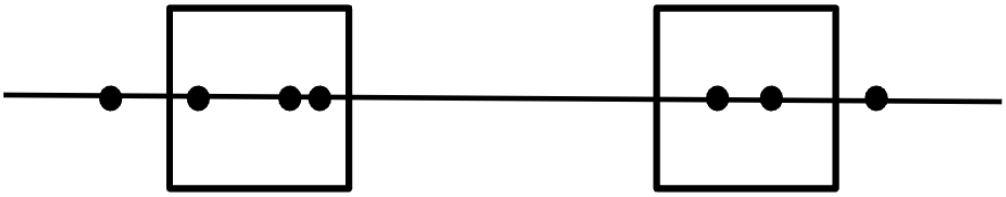


Figure 4: Overton Window (Mechanism C).

Mechanism D: Mental Disorder

Social media is linked to poor mental health outcomes, such as depression and anxiety, due to its facilitation of social comparison (Braghieri et al., 2022; Twenge et al., 2022). In turn, Haidt and Lukianoff (2019) argue that poor mental health results in a culture of "safetyism," in which ideas causing emotional discomfort are treated as physical threats that must be removed from the environment. This philosophy is inherently ideologically intolerant, as exposure to opposing views inevitably leads to emotional discomfort.

In contrast to the previous proposed mechanisms, this mechanism links ideological intolerance not specifically to the consumption of political content on social media, but to social media usage in general. Accordingly, the mechanism has no bearing on ideological positions or the range of acceptable beliefs. However, psychological fragility does exacerbate the rigidity of the Overton window boundaries, leading to greater intolerance towards beliefs that fall outside of it. Triangles are again excluded from the diagram because their distribution is unknown.

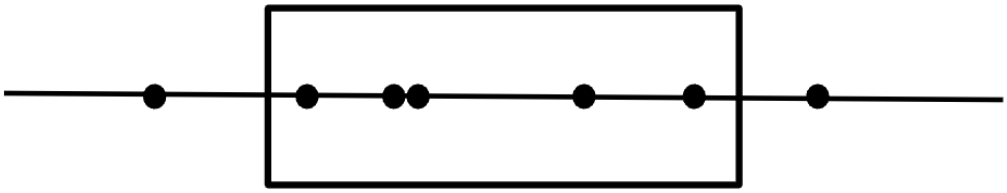


Figure 5: Overton Window (Mechanism D).

Mechanism E: Mobilization

Social media has long been thought to mobilize people (Tufekci and Wilson, 2012; Jost et al., 2018; Zhuravskaya et al., 2020). By connecting ordinary individuals with a wider audience, social media amplifies messages and allows individuals to organize around common beliefs. In the context of this paper, petitions and protests facilitated by social media may motivate intolerant actions such as employment terminations and speaker disinvitations. This argument is frequently advanced in popular discourse (Bromwich, 2020; Romeo, 2022; Nierman, 2022; Hunt, 2024).

Under this mechanism, social media changes neither ideological positions nor the Overton window; thus, levels of ideological intolerance do not increase. Rather, social media allows existing intolerance to be expressed to an unprecedented degree.

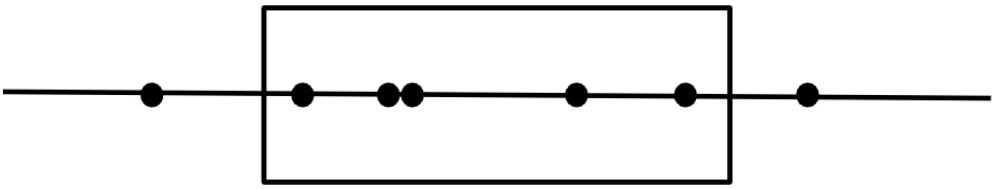


Figure 5: Overton Window (Mechanism E). This is identical to Figure 1.

Mechanism Selection

Given the infeasibility of testing all five of these mechanisms, I choose to focus on Mechanism B (Echo Chamber Intensity). Firstly, the empirical evidence in support of Mechanism B is stronger than that in support of Mechanisms 1 (Diverse Exposure), 3 (Polarization), or 4 (Mental Disorder). While social media does potentially allow for greater exposure to ideological heterogeneity than do offline friend networks, *actual* exposure appears to be driven by echo chamber dynamics (Bakshy et al., 2015). This suggests that if social media is indeed related to ideological intolerance, it is more likely to be through echo chamber intensity (Mechanism B) than through diverse exposure (Mechanism A). Additionally, as alluded to in the Literature Review, whereas evidence confirming the presence of echo chambers in political discourse on social media is strong, evidence indicating ideological polarization in similar venues is mixed. Indeed, in a review of the literature, Tucker et al. (2018) conclude that elite behavior, rather than communication, is primarily responsible for ideological polarization. This works in favor of testing Mechanism B rather than Mechanism C. Finally, as previously noted, the Mechanism E appears to be empirically tenuous, given that poor mental health does not significantly correlate with ideological intolerance (Kaufmann, 2023).

Although it is difficult to determine whether evidence in favor of Mechanism B is stronger than that in favor of Mechanism E (and indeed, both mechanisms could be true), testing Mechanism B is more feasible. In the context of a survey – the most accessible research method for this project – identifying reliable proxies for political action is challenging. In contrast, there is considerable precedent for using survey questions to measure echo chamber intensity (Bakshy et al., 2015; Dubois and Blank, 2018; Parmelee and Roman, 2020). Accordingly, I select Mechanism B over Mechanism E.

Hypotheses

In order to test the overall relationship between consumption of political content on social media and ideological intolerance, and therefore address RQ1, I posit the following hypothesis:

H1: Time spent consuming political content on social media[2] is positively correlated with ideological intolerance.

Then, in order to test the validity of Mechanism B and thus address RQ2, I posit two additional hypotheses:

H2A: Time spent consuming political content on social media is positively correlated with echo chamber intensity.

H2B: Echo chamber intensity is positively correlated with ideological intolerance.

IV. Survey Execution

In order to test the aforementioned hypotheses, I designed and administered a sixteen-question survey measuring (1) consumption of political content on social media, (2) echo chamber tendencies, (3) ideological intolerance, and (4) control variables. The survey was designed using Qualtrics and administered to students in two UCLA courses taught by Susanne Lohmann (titled "POL SCI 60: Ethics and Governance" and "POL SCI 115D: Diversity, Disagreement, and Democracy," respectively). The survey URL was posted to both course web pages. Upon completion of the survey, students were redirected back to the course website, at which point they entered their names to receive Bonus Point credit for their participation. The reward of Bonus Points, which are extra credit points for the courses, incentivized students to take the survey. The survey was open from Wednesday, February 19th, 2025 to Wednesday, February 26th, 2025, during which time 120 responses were recorded.

[2] I elaborate on my reasons for measuring time spent consuming political content on social media, rather than total time spent on social media, in the Survey Design section.

Students enrolled in POL SCI 60 and POL SCI 115D are typically third- and fourth-year political science majors at UCLA. 39% (47/120) of survey participants were male and 61% (73/120) were female. 54% (65/120) were liberal or leaned liberal, 27% (32/120) were conservative or leaned conservative, and 19% (23/120) were independent. Although this sample group introduces a number of potential biases (which I enumerate in the Analysis portion of this paper), other survey-administration alternatives considered yielded smaller sample sizes or were significantly more costly.

V. Survey Design

In this section, I specify and justify the choices behind my survey design. A full copy of my survey can be found in the Appendix.

Before providing rationales for each individual variable, I briefly reiterate the purpose for conducting a cross-sectional analysis. While prior literature has broadly examined the relationship between social media usage and ideological intolerance in a longitudinal context, noting the parallel increases in variables over time, establishing a more robust foundation for causal inference requires evidence of this relationship at the individual level. That is, if social media does indeed cause ideological intolerance, individuals with higher social media time should exhibit higher levels of intolerance. A cross-sectional analysis is therefore critical to establishing causality.

Measuring Consumption of Political Content on Social Media

In the first portion of my survey, I measure how much time participants spend consuming political content on eleven social media platforms. Specifically, I ask “On a given weekend day, how many hours do you spend consuming political content on:”. Participants subsequently move sliders for each platform.

I choose not to ask participants to report their time spent on social media as recorded in their phone settings. First, doing so would not allow me to ask specifically about time spent consuming political content. It is critical to measure time spent consuming political content on social media rather than total time spent on social media given that all but one of the mechanisms outlined in the Conceptual Framework section posit that it is specifically the former which drives ideological intolerance. A measurement of total time spent on social media would encompass many activities unrelated to ideological intolerance, introducing unnecessary noise into the analysis. Second, asking participants to undertake a time-intensive task without a method of enforcement would add unwanted heterogeneity to the responses, as only some participants would follow the prompt.

I specify social media platforms according to the Pew Research Center 2024 Social Media Fact Sheet and list them in order of decreasing prevalence among the relevant age cohort (ages 18-29). These platforms are (in the order that they appear on the survey) YouTube, Instagram, Facebook, Snapchat, Tiktok, Reddit, Pinterest, LinkedIn, X (Twitter), WhatsApp, and BeReal. Moreover, I opt to include the full set of platforms rather than narrowing down to top platforms in order to account for individual heterogeneity in both primary platform used and total number of platforms used.

Regarding the wording of the question, I specify "weekend day" for two reasons. First, given the considerable variation in students' weekday schedules, the weekend is likely the time period during which students have the most uniform amount of time available to spend on social media. This yields usage estimates that are representative of overall engagement with social media rather than day-specific anomalies. Second, I hypothesize that individuals can more easily conceptualize how much time they spend on social media over the course of a day than over an

alternative timespan (such as a weekend or a week). Thus, asking participants to record their usage on a twenty-four-hour slider facilitates accurate recall.

Measuring Echo Chambers

I measure the extent to which an individual is in an echo chamber (which I refer to as echo chamber intensity) through a series of six questions. Of these six questions, two are Likert-type questions:

> "People in my in-person community have the same political perspective as me"
> "People in my online community have the same political perspective as me"

One is a binary yes-no question:

> "Of the public figures and organizations you follow on social media, is there one that does not share your political perspective?"

The remaining three questions ask participants to select a temporal indicator ranging from "a week ago" to "never":

> "When was the last time you disagreed with a friend's political perspective?"
> "When was the last time you changed your opinion on a political issue?"
> "When was the last time you encountered a news source with a different political perspective than your own?"

Four of these echo chamber questions are adapted from the literature. The third question is derived from a question from Parmelee and Roman (2020), which asks whether participants follow "political leaders who I usually do not agree with politically" on Instagram. The fourth, fifth, and sixth are derived from Dubois and Blank (2018), whose corresponding survey questions read "how often do you read something you disagree with?", "how often have you discovered something that CHANGED your opinion on a political issue?" and "how often do you check a news source that's different from what you normally read", respectively. The fourth is significantly altered from Dubois and Blank (2018) in order to avoid redundancy and to

measure political homogeneity within the survey participant's closest social circles. The remaining two questions (the first and second) measure participants' general assessments of the political homogeneity of their in-person and online social circles.

Despite the relative imprecision of these questions, there are at least two reasons to believe that the responses they generate may still reflect echo chamber tendencies accurately. Firstly, given the relative homogeneity of the sample group (with all participants being UCLA political science students), it is reasonable to assume that the questions were interpreted in roughly the same way. Thus, differences in responses reflect relative differences in echo chamber tendencies between participants. Secondly, even if each question by itself may be a biased or incomplete indicator of echo chamber tendencies, question-specific deficiencies may offset one another across the set of six questions, yielding a reliable composite score.

In order to calculate a composite echo chamber score, I first recode responses for each question such that the response that indicates the greatest echo chamber intensity (for example, "agree" for the first question) is coded to the highest value. I then divide the value by the number of possible responses for that question to normalize to one. Finally, I add up the values for all six echo chamber questions and divide by the total number of echo chamber questions (six). This yields a composite echo chamber score wherein all questions are weighted equally. A high echo chamber score corresponds with high political homogeneity.

Measuring Ideological Intolerance

In order to measure ideological intolerance, I use a variation of the least-liked approach first pioneered by Sullivan et al. (1979). Specifically, I first ask participants to select the hypothetical federal law (from a set of ten extreme laws) they would most strongly oppose. Then, I present a hypothetical individual who supports (rather than opposes) that particular law

and ask participants whether or not they would tolerate him in a variety of modes using a Likert-type scale. For example, if a participant selected "allows gender-affirming survey for minors" as the federal law he/she most strongly opposed, the subsequent survey question vignette would read as follows: "A physics professor at Duke University publishes a book and posts on social media advocating for a federal law that allows gender-affirming surgery for minors."[3] Then, the survey participant would be asked, on a seven-point scale spanning from strongly disagree to strongly agree, their position on each of the following statements:

> "X (Twitter) should ban him"
> "Library staff should remove his book from the UCLA collection"
> "Duke administrators should fire him"
> "UCLA administrators should prohibit him from being a guest speaker on campus"
> "Public officials should prohibit him from holding a rally in Durham, North Carolina."

Within the survey vignette and statements, the only content that changes from participant to participant is the specific federal law.

The least-liked approach is in contrast to the earlier Stouffer approach (Stouffer, 1955), in which the researcher (rather than the survey participant) selects an identity-group or policy position that is generally unpopular with the survey population and then measures the degree of tolerance among participants accordingly. Such surveys feature questions such as "Should a communist be allowed to speak?", where the group "communist" has been pre-selected by the researcher (National Opinion Research Center, 1978). There is some disagreement in the literature over which approach to measuring intolerance is preferred, if indeed one approach is preferred at all; Gibson (1992) argues that both approaches are both empirically valid, while Stevens (2018) argues in favor of the least-liked approach. Ultimately, I choose to employ a least-liked approach in my measure of intolerance due to its greater conceptual validity. The

[3] This conditionality was implemented using display logic in Qualtrics.

principle of ideological intolerance is independent from any particular group or policy. Accordingly, the least-liked approach ensures that survey results reflect ideological intolerance by minimizing confounding that arises from variation in attitudes towards the policy itself.

I choose the content of the hypothetical federal laws in order to maximize the chance that each participant strongly opposes at least one law, regardless of their political priorities or leanings. Accordingly, I select five highly salient political issues (transgender rights, abortion, affirmative action, Israel-Palestine, and immigration) and generate hypothetical federal laws on both extremes of each issue. This yields ten federal laws in total, two of which correspond with each issue area.

The vignettes feature hypothetical rather than actual individuals for two reasons. Firstly, in order to ask a uniform set of Likert-type questions about different individuals, such individuals must be similar in most respects (professions, modes of political action, etc.). Finding real individuals who support different federal laws but are similar in all other respects would be infeasible. Secondly, if real individuals were used in the vignettes, it is probable that some survey participants would already be familiar with them, adding an unwanted source of response heterogeneity.

Regarding the details included in the vignette, I specify "physics professor" as the profession of the hypothetical individual for two reasons. Firstly, as opposed to non-academic professions, choosing this profession enables me to subsequently ask questions (for example, about his prospects as a guest speaker) about which a student survey participant may reasonably have knowledge. Students live in the context of the university and thus have direct experience with professors and the various capacities in which they serve. Secondly, I choose physics as the professor's field of study because it is completely apolitical. As such, support for the professor's

dismissal in the context of the vignette can only be attributed to ideological intolerance and not to concerns regarding the influence of his political views on his job performance. Furthermore, I specify Duke University as the institution at which this hypothetical professor works in order to add dimension and plausibility to the vignette. Duke is a high-profile institution, signifying the relative importance and prestige of the professor's position and therefore raising the stakes of his employment. At the same time, I believe survey participants would find it conceivable that a Duke professor might openly support any of the presented federal laws – something that could not be said of professors at other high-profile institutions.

The intolerance statements themselves are primarily derived from the literature. Questions about library book removal, speaking privileges, teaching positions, and rallies are common across intolerance surveys, albeit with a greater degree of generality (Center for Political Studies, 1954; National Opinion Research Center, 1977; Sullivan et al., 1979, Crawford and Pilanski, 2012). While informed by this precedent, I add a greater level of detail to my survey questions (i.e. by mentioning specific locations, book collections, and administrators) to prompt survey participants to respond as they would in a real-life scenario rather than to draw on some abstract standard of proper behavior. I additionally include a question about X (Twitter) in order to compare intolerance toward online speech to intolerance toward in-person speech.

Finally, in order to measure an individual's overall level of ideological intolerance, I create a composite score. This is calculated first by coding survey responses from "strongly disagree" to "strongly agree" into numerical values from 1 to 7. These values are then divided by 7 in order to normalize to a scale between 0 and 1. Finally, all intolerance scores for a given individual are summed and divided by the total number of Likert-scale questions (5). This yields the composite intolerance score for the individual.

Measuring Control Variables

Finally, I include three control variables, which measure sex, political leaning, and a combination of political knowledge and political interest.

The first of these variables is measured through the question "What is your sex?", with male and female as the two response options. It is reasonable to include sex as a control variable, as some studies suggest that women use social media at higher rates (Perrin, 2015) and tend to score higher on measures related to intolerance (Moss and O'Connor, 2020).

Political leaning is measured through the question: "How would you describe your political perspective?" The five response options are "conservative," "lean conservative," "independent," "lean liberal," and "liberal." There are two potential ways that political leanings could confound the relationship between social media usage and ideological intolerance. First, liberals appear more likely to use social media (Vogels et al., 2021) and to support cancellations and other forms of intolerance (Stevens, 2018). Second, political extremists (those on the far ends of the political spectrum) tend to spend more time consuming political content on social media and also have higher levels of intolerance (van Prooijen et al., 2016).

Lastly, the question "When was the last time you encountered political news?" is a composite measure of political knowledge and political interest. The response options range from "an hour ago" to "more than a month ago." Those with high levels of political interest engage more with political content on social media (Bode, 2017) and are more likely to be polarized. To the extent that polarization correlates with intolerance, political interest will likewise be associated with ideological intolerance.

VI. Results

Descriptive Analysis

The below table displays a summary of social media times, echo chamber scores, and intolerance scores for all control variable groups. It is important to note that in all subsequent discussions of "social media time," I refer not literally to total time spent on social media, but to time spent consuming political content on social media, per the survey question. On average, survey participants reported spending an average of 12.3558 hours consuming political content on social media.[4] They had an average echo chamber score of 0.4886 and an average intolerance score of 0.4319.

Variable	Subcategory	Social Media Time		Echo Chamber Scores		Intolerance Scores	
		Mean	SE	Mean	SE	Mean	SE
Sex	Male	10.9234	2.54304	0.4141844	0.01817043	0.3367781	0.03328317
	Female	13.27808	2.711772	0.5365297	0.01898911	0.4931507	0.02390735
Political Ideology	Conservative	8.1	4.135764	0.4929293	0.03810237	0.3246753	0.05243924
	Lean Conservative	6.919048	2.259747	0.4039683	0.02447912	0.4965986	0.05386793
	Independent	12.3913	3.778355	0.3797101	0.0249447	0.3863354	0.05297839
	Lean Liberal	6.529032	2.445044	0.5016129	0.02501187	0.4193548	0.03856971
	Liberal	22.37941	5.230278	0.6013072	0.02782236	0.4689076	0.03607014
Political Knowledge/ Interest	4	9.277143	1.871072	0.4789683	0.01860066	0.4146939	0.02729316
	3	13.7881	3.49038	0.5178571	0.02665261	0.4272109	0.03370157
	2	36.28571	15.42832	0.4238095	0.03808146	0.5918367	0.079286
	1	0.2	NA	0.3888889	NA	0.7142857	NA
Overall		12.3558	1.922726	0.4886111	0.01458345	0.4319048	0.02066516

Figure 6: Summary Table by Control Variable.

[4] This statistic is unrealistic for reasons enumerated shortly.

The below figure shows the distributions for time spent consuming political content on social media, echo chamber scores, and intolerance scores. Echo chamber scores are relatively normally distributed, while intolerance scores exhibit a right-skew – a trend observed in individual distributions for all five intolerance questions.

The histogram displaying time spent consuming political content on social media on a typical weekend day exhibits a heavy right skew, with a median of 3.70 hours despite a range from 0.10 to 97.70 hours. This distribution is likely the result of measurement error. The time constraint of twenty-four hours per day, represented by the red line, rules out any true value above twenty-four. Moreover, even values above around ten (which comprise 28.33 percent of total observations) are improbable, given that the average amount of *total* time spent on social media is between two and three hours (Data Reportal, 2024; Coyne et al., 2020). I employ two approaches to account for such error in the following section.

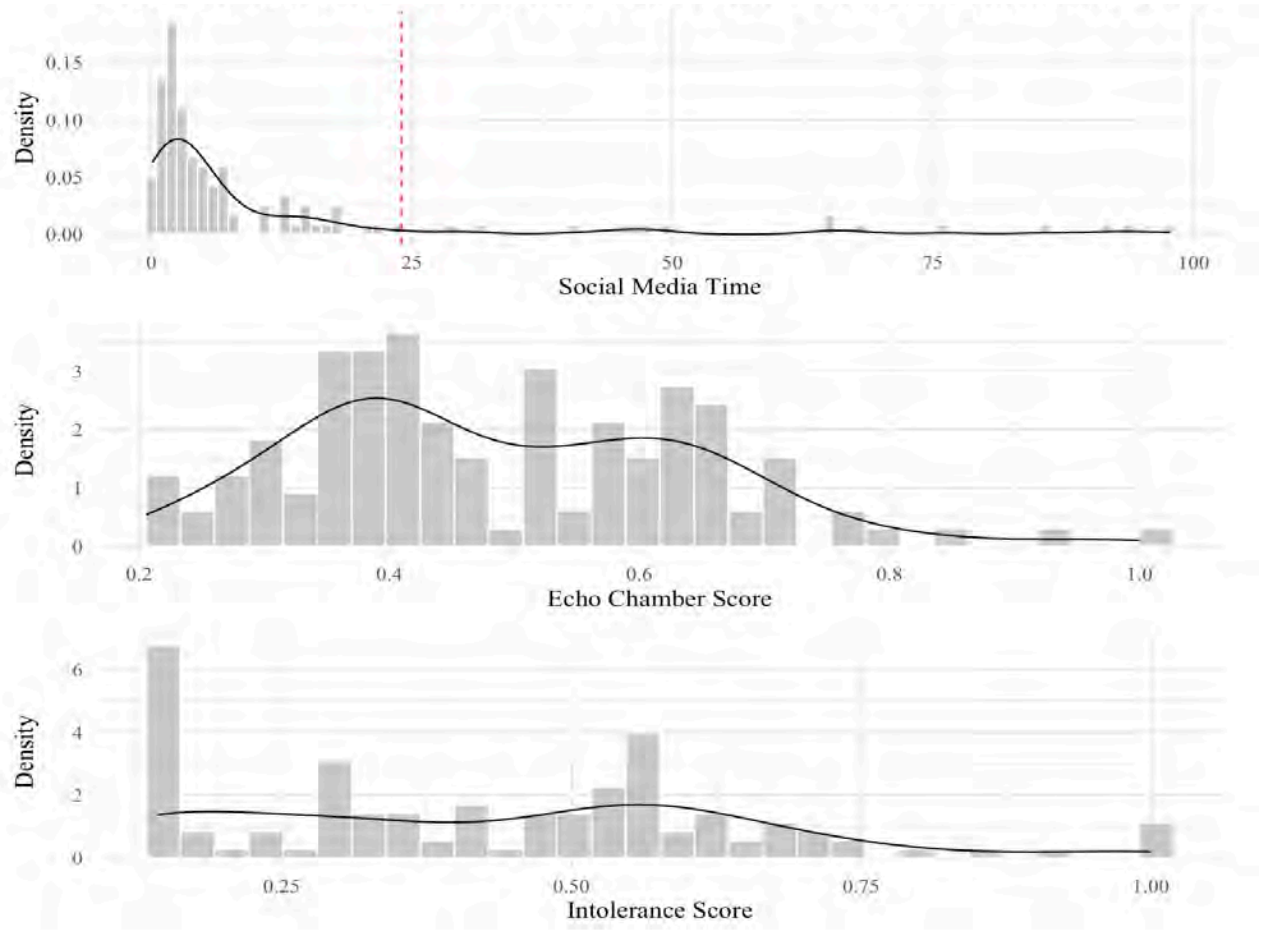


Figure 7: Distributions of Social Media Time, Echo Chamber Scores, and Intolerance Scores.

Correlational Analysis

H1: Consumption of Political Content on Social Media and Ideological Intolerance

I examine the relationship between social media times and intolerance scores under three separate assumptions to account for potential error in the reporting of social media times. Firstly, assuming equal validity of all observations, and therefore making no alterations to the original social media time values, I find no relationship between social media time and ideological intolerance (as displayed in Figures 8a and 8b). This result holds even when regressing intolerance scores on times for specific social media apps (see Appendix).

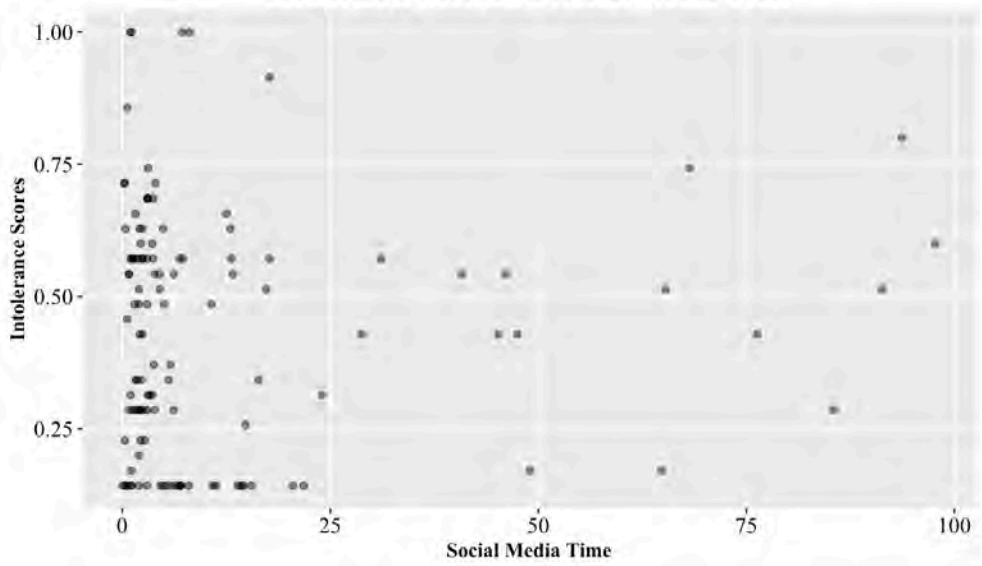


Figure 8a: Intolerance Scores vs. Social Media Time.

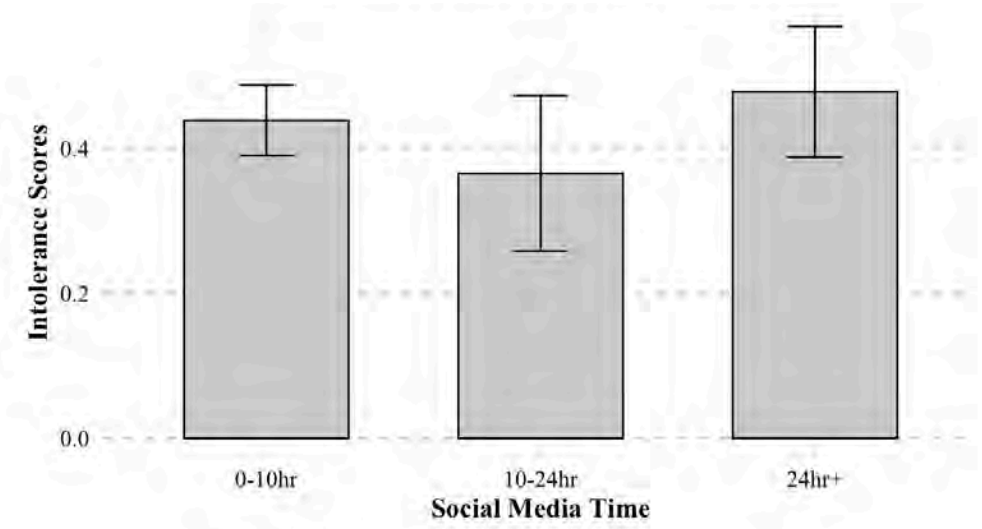


Figure 8b: Intolerance Scores by Social Media Time Group.

Secondly, it is possible that participants reporting high social media times have true values that are indeed higher than those reporting low social media times, but tend to overestimate their times to a greater extent. Assuming that measurement error in social media time grows exponentially as the true value of social media time increases, I apply a logarithmic function. This penalizes high reported social media times the most and yields a normal distribution. As shown in Figure 9, this transformation yields a null result (no correlation).

The logarithmic approach is imperfect, as it transforms some social media times into sub zero values. Additionally, it is unclear whether a normal distribution is suitable for social media usage (or more specifically, consumption of political content on social media). In order to ameliorate these shortcomings, I also produce scatter plots regressing ideological intolerance on the square and quartic roots of social media time. These transformations produce the same (null) results.

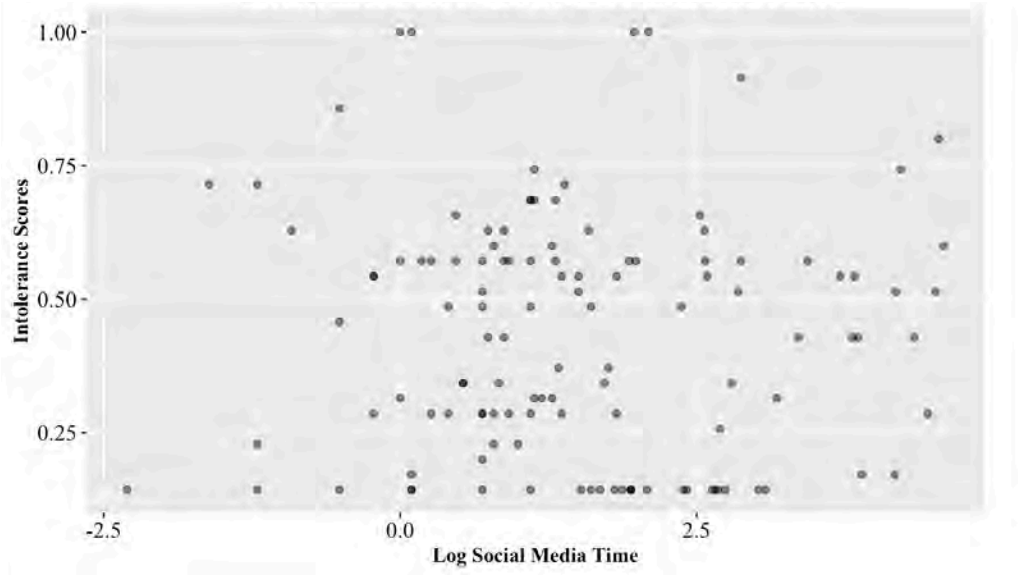


Figure 9: Intolerance Scores vs. Log Social Media Time

Thirdly, it is possible that participants reporting high social media times misread the survey question, which asked, “On a given weekend day, how many hours do you spend consuming political content on” a given social media site. Participants skimming the question may have read “a given weekend” rather than “a given weekend day” and thus reported their consumption over the course of forty-eight hours rather than twenty-four. Alternatively, participants may have overlooked the last part of the question (which reads “consuming political content on”) and therefore reported total social media time. Such misinterpretations would render large observations incomparable to smaller values. If, given this assumption, I remove all

observations greater than ten hours, the plot regressing intolerance scores on social media time (Figure 10) still exhibits no correlation.

The cutoff of ten hours (below which 71.67% of observations fall) is informed firstly by the distribution of observations, which seems to display a natural break around that value, and secondly by the literature, which reports a mean total social media time between two and three hours. A more conservative cutoff value of twenty-four hours produces the same (null) result.

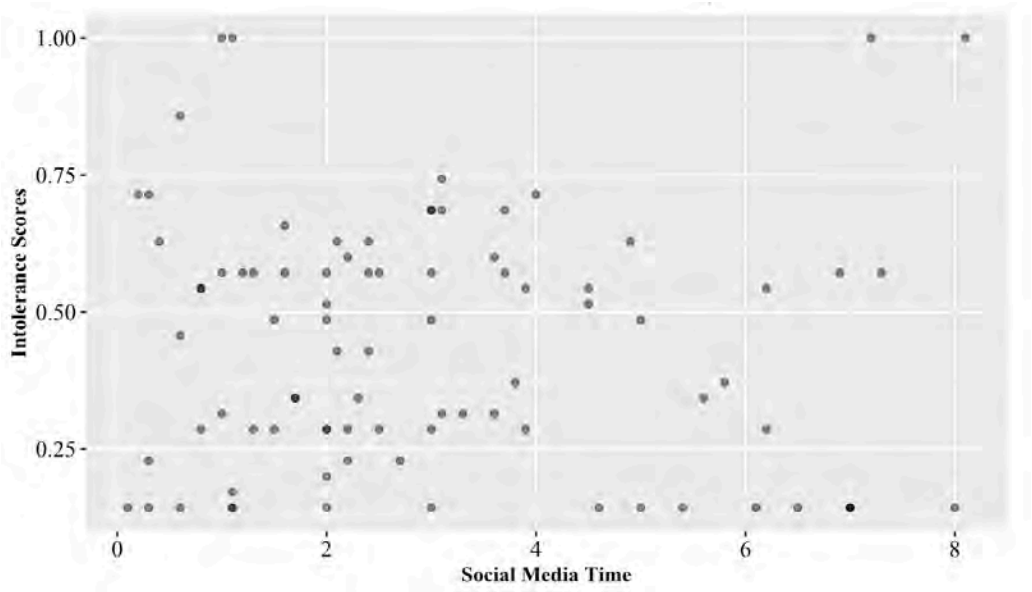


Figure 10: Intolerance Scores vs. Social Media Time (10 Hours or Less).

Overall, I find no significant correlation between time spent consuming political content on social media and ideological intolerance.

H2A: Consumption of Political Content on Social Media and Echo Chamber Intensity

I examine the relationship between time spent consuming political content on social media and echo chamber intensity under the same three assumptions and find no significant correlation. Figures 11a and 11b display the relationship between social media times and echo chamber scores without alterations to the original data. Figures 12 and 13 plot the same variables when applying the logarithmic and subsetting modifications, respectively. None of the plots

exhibit significant correlation. This finding holds when regressing echo chamber scores on social media times for all eleven individual apps (see Appendix).

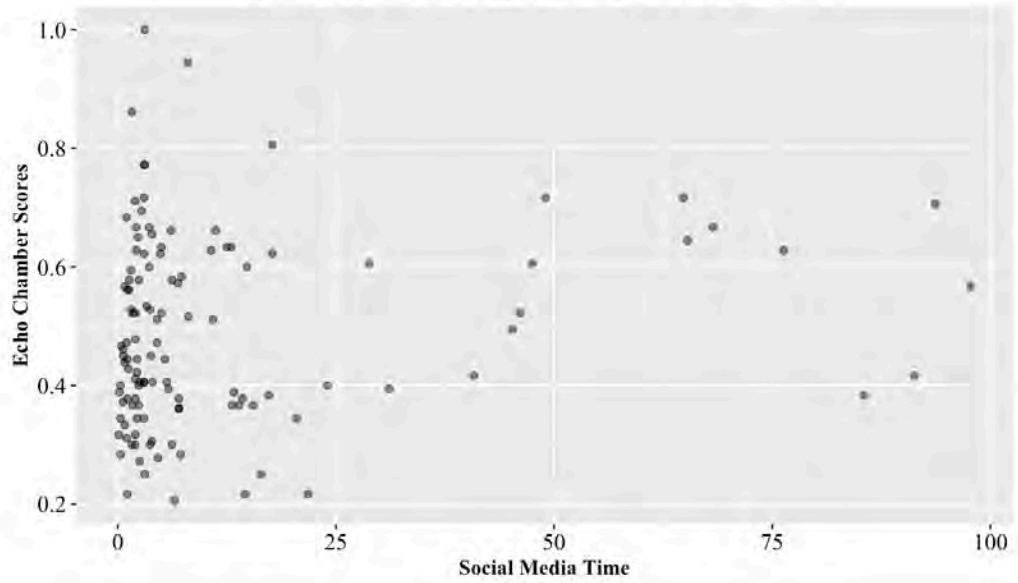


Figure 11a: Echo Chamber Scores vs. Social Media Time

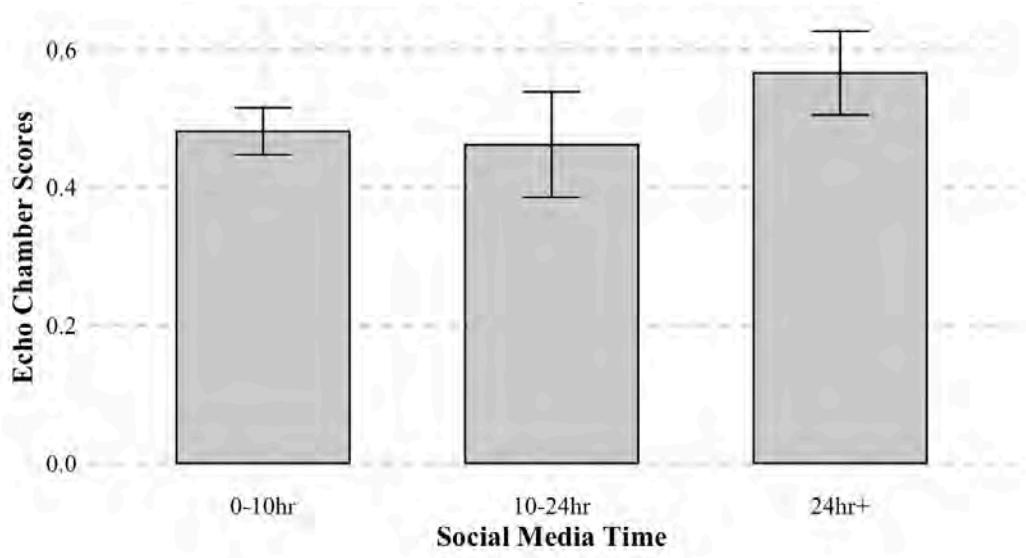


Figure 11b: Echo Chamber Scores by Social Media Time Group.

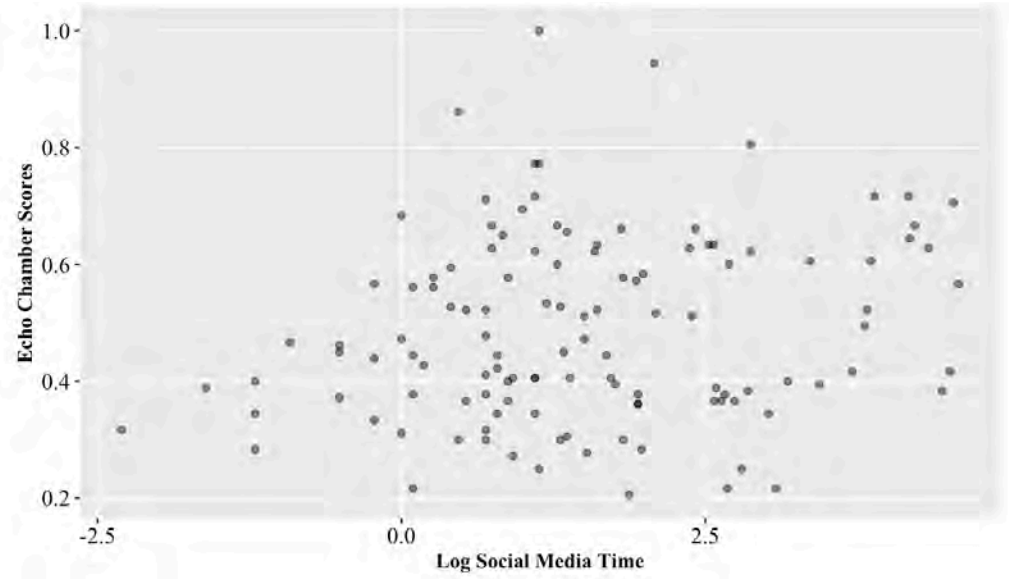


Figure 12: Echo Chamber Scores vs. Log Social Media Time.

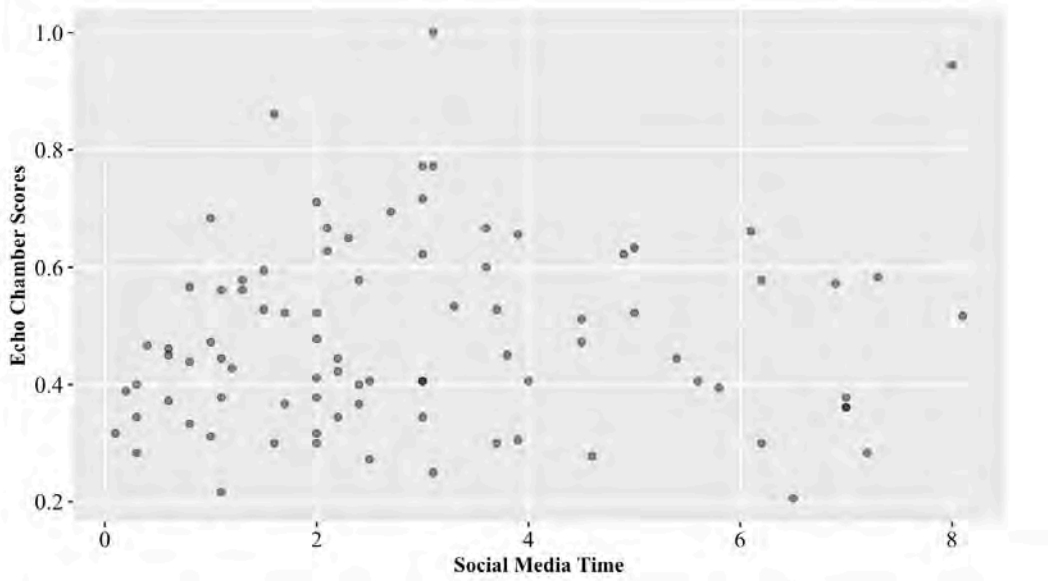


Figure 13: Intolerance Scores vs. Social Media Time (10 Hours or Less).

H2B: Echo Chamber Intensity and Ideological Intolerance

Finally, in order to measure the relationship between echo chamber intensity and ideological intolerance, I plot intolerance scores against echo chamber scores (shown in Figure 14). Here, it is sufficient to leave the original data unaltered, as there is no reason to suspect systematic measurement error for either variable. This plot shows little to no correlation.

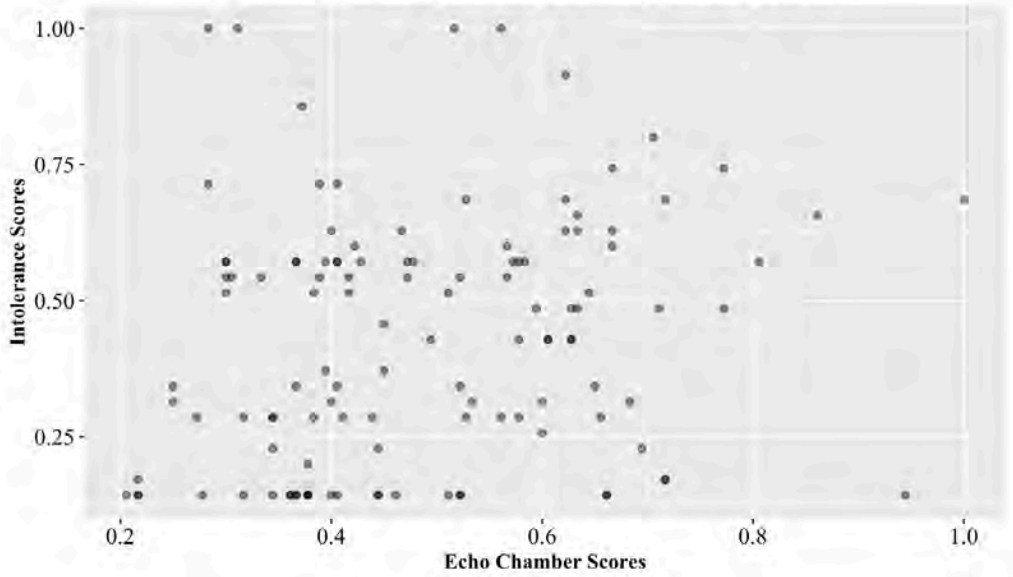


Figure 14: Intolerance Scores vs. Echo Chamber Scores.

VII. Discussion

I begin by discussing the implications of my results with respect to the pertinent literature. I then outline the limitations of my study and offer suggestions for further research.

Implications

With regard to H1 (which posits a positive correlation between time spent consuming political content on social media and ideological intolerance), my result suggests that no correlation exists. This casts doubt on the popular consensus (Bromwich, 2020; Romeo, 2022; Nierman, 2022; Hunt, 2024) and existing literature (Lim, 2017; Haidt and Lukianoff, 2019) claiming a positive correlation. Moreover, preliminary research indicates that Instagram usage is positively correlated with Left Wing Authoritarianism, while Twitter and YouTube usage are not (Singal and Finkelstein, 2025). My null result with respect to individual platforms counters the former finding and supports the latter. Overall, the failure of the relationship to hold in a cross-sectional correlational analysis suggests an absence of a causal link between consumption

of political content on social media and ideological intolerance. This necessarily nullifies the mechanisms linking the two variables.

I also find that no correlation exists between the consumption of political content on social media and echo chamber intensity, thereby disproving H2A. This result stands in contrast to a substantial body of research supporting such a relationship (Himmelboim et al., 2013; Barberá et al., 2015, Garimella et al., 2018, Cinelli et al., 2021). This contradiction may be explained the disproportionate focus on Twitter in the existing literature. My result casts doubt on the prevalence of echo chambers on Twitter itself and, at a minimum, suggests that such a finding should not be generalized to other platforms.

Why is it the case that those consuming more political content on social media do not have higher echo chamber intensities? The literature offers two potential explanations. Firstly, Mummolo (2016) suggests that individuals will sometimes overlook ideological similarity when selecting news content in order to maximize topic relevance. If considerations besides ideological similarity play an unexpectedly large part in content consumption decisions, a positive relationship between social media time and echo chamber intensity may not hold. Secondly, Guess et al. (2018) argue that the percentage of U.S. adults consuming political content on social media sites is far lower than on large mainstream sites, which do not contain ideologically homogeneous clusters. Accordingly, it is possible that social media usage comprises only a tiny fraction of individuals' ideological networks, and thus even a large increase in social media time changes echo chamber intensity very little.

Finally, I find that no correlation exists between echo chamber intensity and ideological intolerance, thereby disproving H2B. This null result potentially reflects a tension between two findings in the literature. On the one hand, as mentioned in the Conceptual Framework section,

Levendusky (2013) finds that exposure to like-minded media leads to greater dislike and decreased trust for non-copartisans. This result supports a positive correlation between echo chamber intensity and ideological intolerance. On the other hand, Bail et al. (2016) finds that increased exposure to opposing views on social media results in increased, rather than decreased, polarization. To the extent that polarization is linked to ideological intolerance, then, this finding implies that decreasing ideological heterogeneity (increasing echo chamber intensity) would actually lead to ideological moderation and tolerance. Although Bail et al. (2016) does not propose mechanisms explaining this relationship, these opposing findings suggest that counterbalancing forces may be responsible for my null result.

It is worth reiterating that my experiment examines the relationship specifically between the consumption of political content on social media and ideological intolerance. It is therefore still possible that *total* time spent on social media may be correlated (or even causally linked) with ideological intolerance. In turn, this implies that Mechanism D – the only mechanism that does not involve the consumption of political content – could still hold. Additionally, the results of my experiment do not preclude the possibility that the consumption of political content on social media might affect intolerant behavior, rather than intolerant beliefs. That is, although consumption of political content on social media may not change the degree of intolerance in beliefs, it could still facilitate intolerant behavior. Such a relationship could be mediated by Mechanism E, which frames social media as a tool for mobilization.

Limitations

The conclusions of my experiment cannot necessarily be extrapolated beyond elite circles in the United States. I conduct my survey on UCLA undergraduate students, who are more educated, more liberal, and younger than the average American. While my results suggest that

consumption of political content on social media is uncorrelated with ideological intolerance for students at elite American universities, such a finding may not hold true for the American population writ large. My examination of these two variables in an elite context is consistent with Haidt and Lukianoff (2019) and data from the Foundation for Individual Rights and Expression, both of which observe ideological intolerance (in its modern iteration) as primarily a phenomenon of academia and other elite institutions.

Moreover, even in the context of elite American institutions, there are reasons to interpret my results with some amount of caution. Firstly, it is possible that the survey questions used to echo chamber intensity yielded biased responses. Some items may have been excessively vague, leaving room for varied interpretations. In such cases, responses may reflect not only true echo chamber intensity but also individual understandings of item wording. Additionally, certain items may have imposed excessive cognitive burden on survey participants, resulting in guessing or misreporting. These concerns, however, only pose a limitation insofar as the composite "echo chamber score" fails to neutralize the measurement error in individual items.

In addition to possible measurement error, given the particular courses from which survey participants were drawn ("Ethics and Governance" and "Diversity, Disagreement, and Democracy," respectively), the levels of ideological intolerance in this sample group may be unrepresentative of the average American elite. Individuals with a strong interest in (or strong preexisting beliefs about) topics related to ideological intolerance may have self-selected into these courses. Alternatively, the beliefs of individuals may have been influenced by the course itself. In either case, survey results with respect to H1 and H2B (the hypotheses concerning ideological intolerance) would be biased.

Future Research

Future research should draw on a wider and more diverse sample in order to assess the relationship between social media usage, echo chamber intensity, and ideological intolerance among the larger American population (or in a different national context). Indeed, there is reason to believe that the null results attained in this experiment may not be replicated in the broader American population. As a large majority of UCLA students are liberal, their in-person communities may be more ideologically homogeneous than their social media networks. If typical American communities are more ideologically heterogeneous than UCLA, we might expect to observe a relationship between social media usage and echo chamber intensity that is closer to the one posited in H2A.

Future scholarship should also incorporate a broader range of methodological approaches. In particular, randomized controlled trials would enable scholars to reach stronger causal inferences regarding the effect of social media on ideological intolerance. Additionally, scholars could supplement self-reported data with data-intensive computational methods in order to independently verify both social media usage and echo chamber intensity.

VIII. Conclusion

This paper begins with two key objectives: to evaluate the relationship between social media usage and ideological intolerance in a cross-sectional context, and to validate echo chamber intensity as the mediating mechanism. On the first account, my survey of UCLA undergraduate students reveals no correlation between consumption of political content on social media and ideological intolerance. This challenges the prevailing public consensus and complicates causal narratives in the literature. On the second account, it finds that echo chamber intensity is correlated with neither consumption of political content on social media nor

ideological intolerance. This calls the proposed mechanism into question and underscores the need for caution in generalizing findings from platform-specific studies.

While these results suggest that political content on social media has a minimal impact on ideological intolerance, other types of content may still play a role. It also remains a possibility that political content on social media may facilitate intolerant behavior without altering underlying ideological positions. Overall, this study represents one of the first empirical investigations into the relationship between social media and ideological intolerance – a norm that is central to liberal democracy. Additional research is necessary in order to verify these findings and further illuminate the complex connection between these two variables.

IX. Appendix

Complete Survey

*People in my **in-person** community have the same political perspective as me.

Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
○	○	○	○	○

*People in my **online** community have the same political perspective as me.

Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
○	○	○	○	○

*Of the public figures and organizations you follow on social media, is there one that does not share your political perspective?

- ○ Yes
- ○ No

*When was the last time you disagreed with a friend's political perspective?

- ◯ A week ago
- ◯ Several weeks ago
- ◯ A month ago
- ◯ Several months ago
- ◯ A year ago
- ◯ Never

*When was the last time you changed your opinion on a political issue?

- ◯ A week ago
- ◯ Several weeks ago
- ◯ A month ago
- ◯ Several months ago
- ◯ A year ago
- ◯ Never

*When was the last time you encountered a news source with a different political perspective than your own?

- ◯ A week ago
- ◯ Several weeks ago
- ◯ A month ago
- ◯ Several months ago
- ◯ A year ago
- ◯ Never

< Previous Next >

*I would most strongly oppose a federal law that...

- ◯ ...bans gender-affirming surgery for minors.
- ◯ ...allows gender-affirming surgery for minors.
- ◯ ...bans abortion under all circumstances.
- ◯ ...allows abortion under all circumstances.
- ◯ ...bans racial preferences in college admissions.
- ◯ ...allows racial preferences in college admissions.
- ◯ ...bans all military aid flows to Israel.
- ◯ ...allows all military aid flows to Israel.
- ◯ ...bans all undocumented immigration.
- ◯ ...allows all undocumented immigration.

< Previous | Next >

A physics professor at Duke University publishes a book and posts on social media advocating for a federal law that bans gender-affirming surgery for minors.

*X (Twitter) should ban him.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

*Library staff should remove his book from the UCLA collection.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

*Duke administrators should fire him.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

*UCLA administrators should prohibit him from being a guest speaker on campus.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

*Public officials should prohibit him from holding a rally in Durham, North Carolina.

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
○	○	○	○	○	○	○

< Previous Next >

*What is your sex?

- ◯ Male
- ◯ Female

*How would you describe your political perspective?

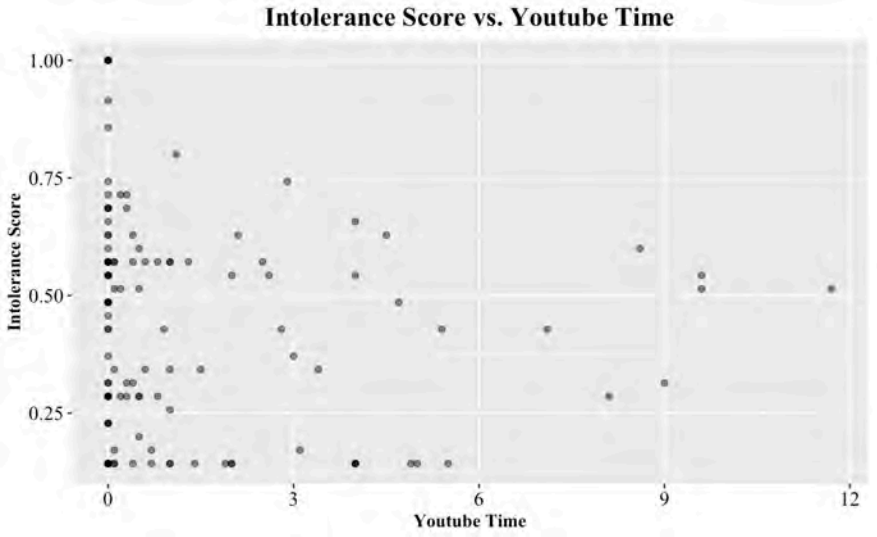
◯	◯	◯	◯	◯
Conservative	Lean conservative	Independent	Lean liberal	Liberal

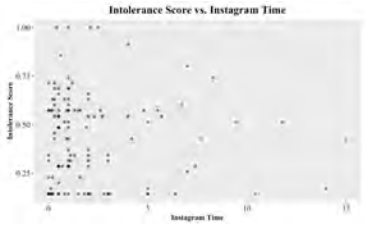
*When was the last time you encountered political news?

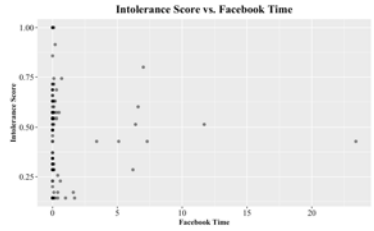
- ◯ An hour ago
- ◯ A day ago
- ◯ A week ago
- ◯ A month ago
- ◯ More than a month ago

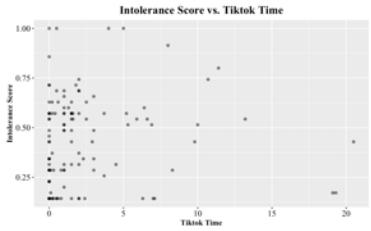
< Previous Next >

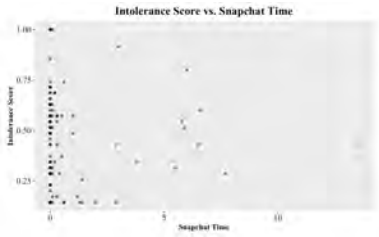
Intolerance Score vs. Time Spent Consuming Political Content on Social Media by App

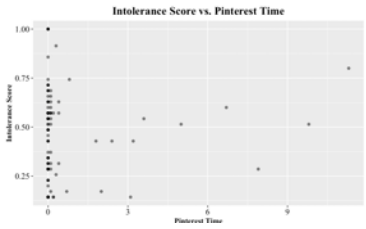


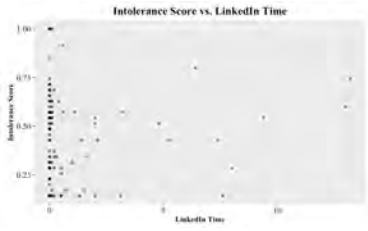


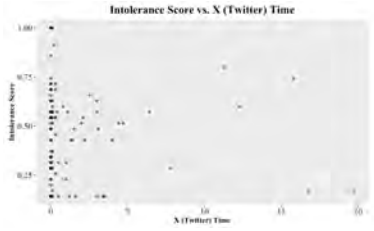




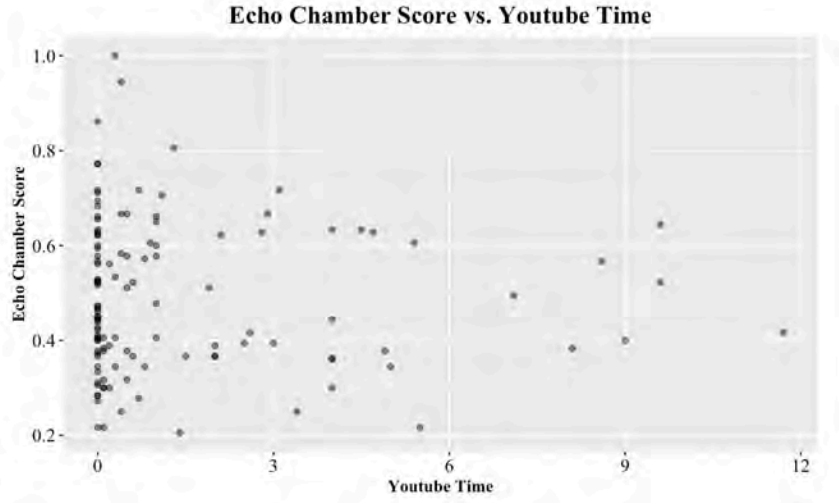


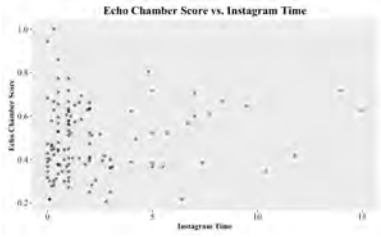


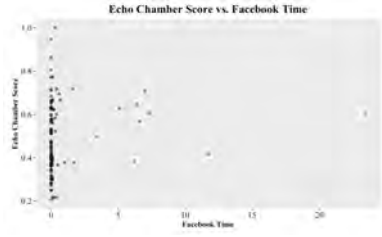


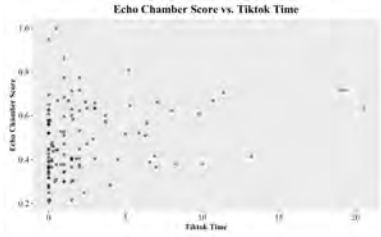


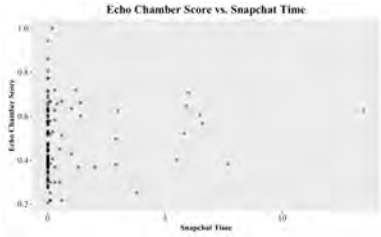
Echo Chamber Score vs. Time Spent Consuming Political Content on Social Media by App

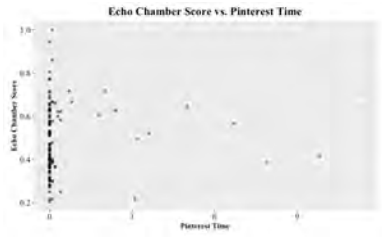


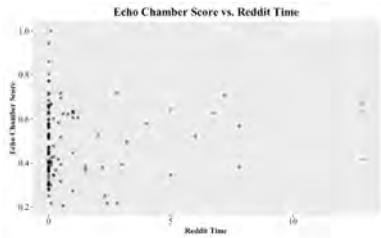


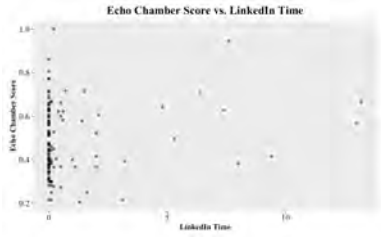


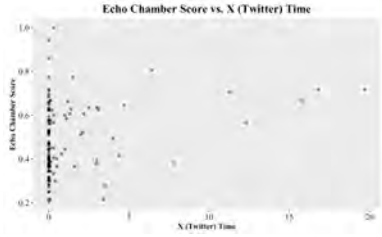


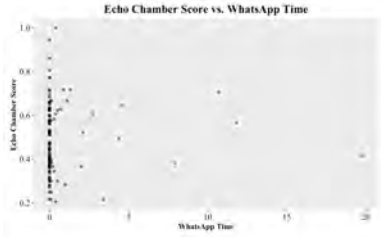


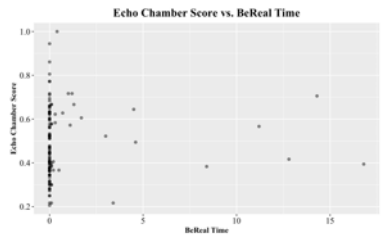












X. Bibliography

Abramson, Jeffrey B., Gary R. Orren, and F. Christopher Arterton. Electronic Commonwealth: The Impact of New Media Technologies on Democratic Politics. New York: Basic Books, 1990.

Alatawi, Faisal, Lu Cheng, Anique Tahir, Mansooreh Karami, Bohan Jiang, Tyler Black, and Huan Liu. "A Survey on Echo Chambers on Social Media: Description, Detection and Mitigation." arXiv, December 9, 2021. https://doi.org/10.48550/arXiv.2112.05084.

Altemeyer, Bob. The Authoritarian Specter. Cambridge: Harvard University Press, 1996.

Bail, Christopher A. "Emotional Feedback and the Viral Spread of Social Media Messages About Autism Spectrum Disorders." American Journal of Public Health 106, no. 7 (2016): 1173-1180.

Bakshy, Eytan, Solomon Messing, and Lada A. Adamic. "Exposure to Ideologically Diverse News and Opinion on Facebook." Science 348, no. 6239 (June 5, 2015): 1130–32. https://doi.org/10.1126/science.aaa1160.

Barberá, Pablo. "Birds of the Same Feather Tweet Together: Bayesian Ideal Point Estimation Using Twitter Data." Political Analysis 23, no. 1 (January 2015): 76–91. https://doi.org/10.1093/pan/mpu011.

Beam, Michael A., Myiah J. Hutchens, and Jay D. Hmielowski. "Facebook News and (De) Polarization: Reinforcing Spirals in the 2016 US Election." In Digital Media, Political Polarization and Challenges to Democracy, pp. 26-44. Routledge, 2020.

Berger, Jonah. "Arousal Increases Social Transmission of Information." Psychological Science 22, no. 7 (2011): 891-893.

Blader, Steven L., and Tom R. Tyler. "A Four-Component Model of Procedural Justice: Defining the Meaning of a "Fair" Process." Personality and Social Psychology Bulletin 29, no. 6 (2003): 747-758.

Bode, Leticia. "Gateway Political Behaviors: The Frequency and Consequences of Low-Cost Political Engagement on Social Media." Social Media and Society 3, no. 4 (October 1, 2017): 2056305117743349. https://doi.org/10.1177/2056305117743349.

Bode, Leticia. "Political News in the News Feed: Learning Politics from Social Media." Mass Communication and Society 19, no. 1 (2016): 24-48.

Brady, William J., Julian A. Wills, John T. Jost, Joshua A. Tucker, and Jay J. Van Bavel. "Emotion Shapes the Diffusion of Moralized Content in Social Networks." Proceedings of the National Academy of Sciences 114, no. 28 (2017): 7313-7318.

Braghieri, Luca, Ro'ee Levy, and Alexey Makarin. "Social Media and Mental Health." American Economic Review 112, no. 11 (2022): 3660-3693.

Brandt, Mark J., Christine Reyna, John R. Chambers, Jarret T. Crawford, and Geoffrey Wetherell. "The Ideological-Conflict Hypothesis: Intolerance Among Both Liberals and Conservatives." Current Directions in Psychological Science 23, no. 1 (2014): 27–34.

Bright, Jonathan, Nahema Marchal, Bharath Ganesh, and Stevan Rudinac. "Echo Chambers Exist! (But They're Full of Opposing Views)." arXiv preprint arXiv:2001.11461 (2020).

Bromwich, Jonah E. "Why 'Cancel Culture' Is a Distraction." *The New York Times*, August 14, 2020, sec. Podcasts. https://www.nytimes.com/2020/08/14/podcasts/daily-newsletter-cancel-culture-beirut-protest.html.

Carr, Caleb T., and Rebecca A. and Hayes. "Social Media: Defining, Developing, and Divining." Atlantic Journal of Communication 23, no. 1 (January 1, 2015): 46–65. https://doi.org/10.1080/15456870.2015.972282.

Chang, Kiyoung, and Jeeyoung Park. "Social Media Use and Participation in Dueling Protests: The Case of the 2016–2017 Presidential Corruption Scandal in South Korea." The International Journal of Press/Politics 26, no. 3 (2021): 547-567.

Cho, Jaeho, Saifuddin Ahmed, Heejo Keum, Yun Jung Choi, and Jong Hyuk Lee. "Influencing Myself: Self-Reinforcement Through Online Political Expression." Communication Research 45, no. 1 (February 1, 2018): 83–111. https://doi.org/10.1177/0093650216644020.

Cinelli, Matteo, Gianmarco De Francisci Morales, Alessandro Galeazzi, Walter Quattrociocchi, and Michele Starnini. "The Echo Chamber Effect on Social Media." Proceedings of the National Academy of Sciences 118, no. 9 (March 2, 2021): e2023301118. https://doi.org/10.1073/pnas.2023301118.

Colleoni, Elanor, Alessandro Rozza, and Adam Arvidsson. "Echo Chamber or Public Sphere? Predicting Political Orientation and Measuring Political Homophily in Twitter Using Big Data."

Journal of Communication 64, no. 2 (April 1, 2014): 317–32. https://doi.org/10.1111/jcom.12084.

Conway III, Lucian Gideon, Shannon C. Houck, Laura Janelle Gornick, and Meredith A. Repke. “Finding the Loch Ness Monster: Left-Wing Authoritarianism in the United States.” Political Psychology 39, no. 5 (2018): 1049–67. https://doi.org/10.1111/pops.12470.

Coyne, Sarah M., Adam A. Rogers, Jessica D. Zurcher, Laura Stockdale, and McCall Booth. "Does Time Spent Using Social Media Impact Mental Health?: An Eight Year Longitudinal Study." Computers in Human Behavior 104 (2020): 106160.

Crawford, Jarret T., and Jane M. Pilanski. “Political Intolerance, Right and Left.” Political Psychology 35, no. 6 (2014): 841–51. https://doi.org/10.1111/j.1467-9221.2012.00926.x.

Davis, Darren W., and Brian D. Silver. "Civil Liberties vs. Security: Public Opinion in the Context of the Terrorist Attacks on America." American Journal of Political Science 48, no. 1 (2004): 28-46.

Davis, James A. “Gradual Increases in Americans Tolerance of Free Expression, 1972-2004.” National Opinion Research Center, 2007. https://gss.norc.org/content/dam/gss/get-documentation/pdf/reports/social-change-reports/SC51%20Gradual%20Increases%20in%20Americans%20Tolerance%20of%20Free%20Expression%201972-2004.pdf.

Dubois, Elizabeth, and Grant Blank. "The Echo Chamber is Overstated: The Moderating Effect of Political Interest and Diverse Media." Information, Communication & Society 21, no. 5 (2018): 729-745.

Fisher, Randy, Stuart Lilie, Clarice Evans, Greg Hollon, Mary Sands, Dawn Depaul, Christine Brady et al. "Political Ideologies and Support for Censorship: Is It A Question of Whose Ox is Being Gored?." Journal of Applied Social Psychology 29, no. 8 (1999): 1705-1731.

Fletcher, Richard, and Rasmus Kleis Nielsen. “Are People Incidentally Exposed to News on Social Media? A Comparative Analysis.” New Media & Society 20, no. 7 (July 1, 2018): 2450–68. https://doi.org/10.1177/1461444817724170.

The Foundation for Individual Rights and Expression. “REPORT: Scholars Punished for Their Speech Skyrocketed over Last Three Years,” April 20, 2023. https://www.thefire.org/news/report-scholars-punished-their-speech-skyrocketed-over-last-three-years.

Garimella, Kiran, Gianmarco De Francisci Morales, Aristides Gionis, and Michael Mathioudakis. “Political Discourse on Social Media: Echo Chambers, Gatekeepers, and the Price of Bipartisanship.” In Proceedings of the 2018 World Wide Web Conference, 913–22. WWW ’18. Republic and Canton of Geneva, CHE: International World Wide Web Conferences Steering Committee, 2018. https://doi.org/10.1145/3178876.3186139.

Gentzkow, Matthew, and Jesse M. Shapiro. “Ideological Segregation Online and Offline.” The Quarterly Journal of Economics 126, no. 4 (November 1, 2011): 1799–1839. https://doi.org/10.1093/qje/qjr044.

Gibson, James L. “Alternative Measures of Political Tolerance: Must Tolerance Be ‘Least-Liked’?” American Journal of Political Science 36, no. 2 (1992): 560–77. https://doi.org/10.2307/2111491.

Gibson, James L., and Amanda Gouws. “Social Identities and Political Intolerance: Linkages within the South African Mass Public.” American Journal of Political Science 44, no. 2 (2000): 278–92. https://doi.org/10.2307/2669310.

Gibson, James L., and Raymond M. Duch. "Political Intolerance in the USSR: The Distribution and Etiology of Mass Opinion." Comparative Political Studies 26, no. 3 (1993): 286-329.

Gibson, James L., and Richard D. Bingham. “On the Conceptualization and Measurement of Political Tolerance.” American Political Science Review 76, no. 3 (September 1982): 603–20. https://doi.org/10.2307/1963734.

Guess, Andrew, Brendan Nyhan, Benjamin Lyons, and Jason Reifler. "Avoiding the Echo Chamber about Echo Chambers." Knight Foundation 2, no. 1 (2018).

Guess, Andrew M., Neil Malhotra, Jennifer Pan, Pablo Barberá, Hunt Allcott, Taylor Brown, Adriana Crespo-Tenorio, et al. “How Do Social Media Feed Algorithms Affect Attitudes and Behavior in an Election Campaign?” Science 381, no. 6656 (July 28, 2023): 398–404. https://doi.org/10.1126/science.abp9364.

Halperin, Eran, Daphna Canetti-Nisim, and Sivan Hirsch-Hoefler. “The Central Role of Group-Based Hatred as an Emotional Antecedent of Political Intolerance: Evidence from Israel.” Political Psychology 30, no. 1 (2009): 93–123. https://doi.org/10.1111/j.1467-9221.2008.00682.x.

Hauben, Michael, and Ronda Hauben. Netizens: On The History and Impact of Usenet and The Internet. Washington, DC: IEEE Computer Society Press, 1997.

Hill, Kevin A., and John E. Hughes. Cyberpolitics: Citizen Activism in The Age of the Internet. Lanham: Rowman & Littlefield Publishers, 1998.

Himelboim, Itai, Stephen McCreery, and Marc Smith. “Birds of a Feather Tweet Together: Integrating Network and Content Analyses to Examine Cross-Ideology Exposure on Twitter.” Journal of Computer-Mediated Communication 18, no. 2 (January 1, 2013): 154–74. https://doi.org/10.1111/jcc4.12001.

Hobolt, Sara B., Katharina Lawall, and James Tilley. "The Polarizing Effect of Partisan Echo Chambers." American Political Science Review 118, no. 3 (2024): 1464-1479.

Huckfeldt, Robert, Paul E. Johnson, and John Sprague. Political Disagreement: The Survival of Diverse Opinions within Communication Networks. Cambridge University Press, 2004.

Hunt, Elle. “Everyone’s so Intolerant Online. Am I Right to Stay Silent?” *The Guardian*, May 22, 2024, sec. Wellness. https://www.theguardian.com/wellness/article/2024/may/22/cancel-culture-social-media.

Iyengar, Shanto, Robert C. Luskin, and James S. Fishkin. "Facilitating Informed Public Opinion: Evidence from Face-to-Face and Online Deliberative Polls." In Annual Meeting of the American Political Science Association, Philadelphia, pp. 1-45. 2003.

Johnson, Benjamin K., Rachel L. Neo, Marieke EM Heijnen, Lotte Smits, and Caitrina van Veen. "Issues, Involvement, and Influence: Effects of Selective Exposure and Sharing on Polarization and Participation." Computers in Human Behavior 104 (2020): 106155.

Johnson, Thomas J., Barbara K. Kaye, and Angela M. Lee. "Blinded By The Spite? Path Model of Political Attitudes, Selectivity, and Social Media." Atlantic Journal of Communication 25, no. 3 (2017): 181-196.

Jost, John T., Pablo Barberá, Richard Bonneau, Melanie Langer, Megan Metzger, Jonathan Nagler, Joanna Sterling, and Joshua A. Tucker. “How Social Media Facilitates Political Protest: Information, Motivation, and Social Networks.” Political Psychology 39, no. S1 (2018): 85–118. https://doi.org/10.1111/pops.12478.

Kaufmann, Eric. “The Mental Health Crisis Does Not Explain Wokeness.” UnHerd. Accessed March 30, 2025. https://unherd.com/newsroom/the-mental-health-crisis-does-not-explain-wokeness/.

Kemp, Simon. “Digital 2024: Global Overview Report.” DataReportal. Kepios, 2024. https://datareportal.com/reports/digital-2024-global-overview-report.

Levitsky, Steven, and Daniel Ziblatt. *How Democracies Die*. New York: Crown Publishing Group, 2019.

Levendusky, Matthew. “Partisan Media Exposure and Attitudes Toward the Opposition.” Political Communication 30, no. 4 (October 1, 2013): 565–81. https://doi.org/10.1080/10584609.2012.737435.

Lim, Merlyna. “Freedom to Hate: Social Media, Algorithmic Enclaves, and the Rise of Tribal Nationalism in Indonesia.” Critical Asian Studies 49, no. 3 (July 3, 2017): 411–27. https://doi.org/10.1080/14672715.2017.1341188.

Lindner, Nicole M., and Brian A. Nosek. "Alienable Speech: Ideological Variations in the Application of Free‐Speech Principles." Political Psychology 30, no. 1 (2009): 67-92.

Lukianoff, Greg, and Jonathan Haidt. The Coddling of the American Mind: How Good Intentions and Bad Ideas Are Setting Up a Generation for Failure. New York: Penguin Random House, 2019.

Luttig, Matthew D. “Authoritarianism and Affective Polarization: A New View on the Origins of Partisan Extremism.” Public Opinion Quarterly 81, no. 4 (December 12, 2017): 866–95. https://doi.org/10.1093/poq/nfx023.

Marcus, George E. With Malice Toward Some: How People Make Civil Liberties Judgments. Cambridge: Cambridge University Press, 1995.

McKenna, Katelyn YA, and John A. Bargh. "Plan 9 from Cyberspace: The Implications of the Internet for Personality and Social Psychology." In Personality and Social Psychology at the Interface, pp. 57-75. Psychology Press, 2014.

Mill, John Stuart. On Liberty and Other Essays. Oxford: Oxford University Press, 1998.

Mitra, Ananda. "Virtual Commonality: Looking for India on the Internet." Virtual culture: Identity and Communication in Cybersociety (1997): 55-79.

Moscovici, Serge. "Toward a Theory of Conversion Behavior." In Advances in Experimental Social Psychology, vol. 13, pp. 209-239. Cambridge: Academic Press, 1980.

Moss, Jordan T., and Peter J. O'Connor. "Political Correctness and the Alt-Right: The Development of Extreme Political Attitudes." Plos One 15, no. 10 (October 7, 2020): e0239259. https://doi.org/10.1371/journal.pone.0239259.

Mummolo, Jonathan. "News from the Other Side: How Topic Relevance Limits the Prevalence of Partisan Selective Exposure." The Journal of Politics 78, no. 3 (July 2016): 763–73. https://doi.org/10.1086/685584.

Mutz, Diana C. "The Consequences of Cross-Cutting Networks for Political Participation." American Journal of Political Science (2002a): 838-855.

Mutz, Diana C. "Cross-Cutting Social Networks: Testing Democratic Theory in Practice." American Political Science Review 96, no. 1 (March 2002b): 111–26. https://doi.org/10.1017/S0003055402004264.

Nierman, Evan. "Why Social Media, Cancel Culture, and Crisis Management Have Become Intertwined." Fast Company, August 31, 2022. https://www.fastcompany.com/90781299/why-social-media-cancel-culture-and-crisis-management-have-become-intertwined.

Papacharissi, Zizi. "The Virtual Sphere: The Internet as a Public Sphere." New Media & Society 4, no. 1 (2002): 9-27.

Parmelee, John H., and Nataliya Roman. "Insta-echoes: Selective Exposure and Selective Avoidance on Instagram." Telematics and Informatics 52 (2020): 101432.

Pavlik, J. V. "Citizen Access, Involvement, and Freedom of Expression in an Electronic Environment." In F. Williams & J. V. Pavlik (Eds.), "The people's right to know: Media, democracy, and the information highway" (pp. 139-162). Hillsdale, NJ: Lawrence Erlbaum, 1994.

Perrin, Andrew. "Social Media Usage." Pew Research Center 125 (2015): 52-68.

Pew Research Center. "Social Media Fact Sheet," November 13, 2024. https://www.pewresearch.org/internet/fact-sheet/social-media/.

Prooijen, Jan-Willem van, and André P. M. Krouwel. “Extreme Political Beliefs Predict Dogmatic Intolerance.” Social Psychological and Personality Science 8, no. 3 (April 1, 2017): 292–300. https://doi.org/10.1177/1948550616671403.

Rastegarpanah, Bashir, Krishna P. Gummadi, and Mark Crovella. "Fighting Fire with Fire: Using Antidote Data to Improve Polarization and Fairness of Recommender Systems." In Proceedings of the Twelfth ACM International Conference on Web Search and Data Mining, pp. 231-239. 2019.

Romeo, Julianna. “Cancel Culture: How Social Media Has Become Its Leading Cause.” *The Gallery* (blog). Accessed April 3, 2025. https://nycmuseumgallery.org/1196/entertainment/how-has-social-media-affected-cancel-culture/

Singal, Jesse. “We Obviously Shouldn’t Ignore Left-Wing Online Radicalization.” Singal-Minded, January 6, 2025. https://jessesingal.substack.com/p/we-obviously-shouldnt-ignore-left.

Sniderman, Paul M., Philip E. Tetlock, James M. Glaser, Donald Philip Green, and Michael Hout. "Principled Tolerance and the American Mass Public." British Journal of Political Science 19, no. 1 (1989): 25-45.

Stevens, Sean. “The Skeptics Are Wrong Pt 3: Political Intolerance on Campus.” The Foundation for Individual Rights and Expression, May 11, 2018. https://heterodoxacademy.org/blog/the-skeptics-are-wrong-part-3-intolerance-levels-are-high/.

Stouffer, Samuel Andrew. Communism, Conformity, and Civil Liberties: A Cross-Section of the Nation Speaks its Mind. Piscataway, NJ: Transaction Publishers, 1955.

Sullivan, John L., James Piereson, and George E. Marcus. “An Alternative Conceptualization of Political Tolerance: Illusory Increases 1950s–1970s.” American Political Science Review 73, no. 3 (September 1979): 781–94. https://doi.org/10.2307/1955404.

Sunstein, Cass R. “Republic.com 2.0.” Princeton, NJ: Princeton University Press, 2006. http://www.jstor.org/stable/j.ctt7tbsw.

Sunstein, Cass R. “The Law of Group Polarization.” John M. Olin Program in L. & Econ. Working Paper No. 91, 1999.

Tucker, Joshua A., Andrew Guess, Pablo Barberá, Cristian Vaccari, Alexandra Siegel, Sergey Sanovich, Denis Stukal, and Brendan Nyhan. "Social Media, Political Polarization, and Political Disinformation: A Review of the Scientific Literature." Hewlett Foundation (2018).

Tufekci, Zeynep, and Christopher Wilson. "Social Media and the Decision to Participate in Political Protest: Observations From Tahrir Square." Journal of Communication 62, no. 2 (April 1, 2012): 363–79. https://doi.org/10.1111/j.1460-2466.2012.01629.x.

Twenge, Jean M., Jonathan Haidt, Jimmy Lozano, and Kevin M. Cummins. "Specification Curve Analysis Shows That Social Media Use Is Linked to Poor Mental Health, Especially Among Girls." *Acta Psychologica* 224 (April 1, 2022): 103512. https://doi.org/10.1016/j.actpsy.2022.103512.

Valenzuela, Sebastián, Ingrid Bachmann, and Matías Bargsted. "The Personal is the Political? What do Whatsapp Users Share and How It Matters for News Knowledge, Polarization and Participation in Chile." In Digital Journalism in Latin America, pp. 26-46. Routledge, 2023.

Van Alstyne, Marshall, and Erik Brynjolfsson. "Electronic Communities: Global Villages or Cyberbalkanization?" ICIS 1996 Proceedings (1996): 5.

Vogels, Emily A., Brooke Auxier, and Anderson. "Partisan Differences in Social Media Use Show Up for Some Platforms, but Not Facebook." Pew Research Center, April 7, 2021. https://www.pewresearch.org/short-reads/2021/04/07/partisan-differences-in-social-media-use-show-up-for-some-platforms-but-not-facebook/.

Weeks, Brian E. "Emotions, Partisanship, and Misperceptions: How Anger and Anxiety Moderate the Effect of Partisan Bias on Susceptibility to Political Misinformation." Journal of Communication 65, no. 4 (2015): 699-719.

Wojcieszak, Magdalena E., and Diana C. Mutz. "Online Groups and Political Discourse: Do Online Discussion Spaces Facilitate Exposure to Political Disagreement?" Journal of Communication 59, no. 1 (2009): 40–56. https://doi.org/10.1111/j.1460-2466.2008.01403.x.

Zafarani, Reza, Mohammad Ali Abbasi, and Huan Liu. *Social Media Mining: An Introduction.* Cambridge: Cambridge University Press, 2014.

Zhuravskaya, Ekaterina, Maria Petrova, and Ruben Enikolopov. "Political Effects of the Internet and Social Media." Annual Review of Economics 12, no. Volume 12, 2020 (August 2, 2020): 415–38. https://doi.org/10.1146/annurev-economics-081919-050239.