MEASURING THE IMPACTS OF DISINFORMATION ON ELECTORAL VIOLENCE AND GOVERNMENT POLICY RESPONSES

by

Vanessa Collier

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1. Abstract

This study analyzes whether disinformation contributes to electoral violence and whether disinformation and social media policy approaches to date have had significant impact in response. Using mediation analysis and multivariate panel regressions on the Varieties of Democracy (V-Dem) dataset for 2022, the study found that 1) disinformation is mediated by political polarization to a small degree but most effects are direct, 2) an increase in disinformation is associated with an increase in electoral violence and 3) social media monitoring had the largest impact on decreasing disinformation ratings in countries compared with other approaches like social media shutdowns, internet filtering, social media censorship, and arrests for political content.

2. Introduction

The U.S. Capitol Riot of 2021 revitalized interest in how disinformation in social media is affecting our political discourse, domestic security, and democratic stability. Notably, the infamous "Stop the Steal" campaign initiated by President Trump on Twitter after his election loss contributed not only to the increased recruitment of armed militia members nationwide, but the mainstream acceptance (40% of Republicans surveyed) of the opinion that the Capitol Riots were justified. Membership in right-wing extremist hate groups such as Q-Anon, Oathkeepers and Proud Boys flourished, and gun sales reached an all-time high in 2020. [1]

[1] (Marc Fisher , Mark Berman , Christine Spolar , Lori Rozsa and Andrew Ba Tran) Marc Fisher , Mark Berman , Christine Spolar , Lori Rozsa and Andrew Ba Tran, "America on Edge: Covid Lockdowns, Protests and Election Strife Led to Record Gun Sales," *Washington Post*. https://www.washingtonpost.com/national/record-gun-sales-us-2020/2021/01/18/d25e8616-55a9-11eb-a931-5b162d0d033d_story.html.

The connections between political disinformation, elections, and social media are part of a growing body of social science research focus; particularly after the U.S. 2016 election, which showcased the capacity of both foreign and domestic disinformation to penetrate the mainstream political debate. Just four years later, the U.S. Capitol erupted in post-electoral violence after President Trump had called his radicalized followers to action. After months of priming them with unsubstantiated claims of electoral corruption on Twitter and Parler, rioters used both social media platforms as organizing tools for the chaos that followed on January 6, 2021.

Disinformation as a political weapon of cyber warfare is now a global problem, with countries both deploying "bot armies" and struggling to defend themselves from similar attacks. As such, there are strong implications for the stability and credibility of elections and democratic institutions worldwide. It is therefore of critical importance for policy remedies to be evaluated internationally, but to date there has been little research that focuses on the outcomes of such policies; one reason for this is that the problem is so new and technologically complex that many countries, including the United States, have yet to implement any policies of significant value. Others have implemented such policies haphazardly, as in the case of Italy, where a "fake news" mandate gave police the authority to become fact checkers, with obvious conflicts of interest and consequences.

However, current literature leaves unanswered questions that will be the focus of this research effort, built on existing theories of the interactions between disinformation tactics, electoral violence, and deliberative systemic frameworks.

2.1 Research Questions and Hypotheses

The hypothesized relationship between the independent variables that measure disinformation is that they will drive electoral violence by contributing towards distrust in government institutions, elections, and other citizens. The hypothesized relationship between independent variables that measure government responses to disinformation is that the countries that monitor or filter disinformation (particularly on social media) will have less disinformation.

Research Question 1: Is there a mediating relationship between political polarization, disinformation, and electoral violence?

$\boldsymbol{H_0}$*: Political polarization does not act as a mediating variable between disinformation and electoral violence.*

$\boldsymbol{H_1}$*: Political polarization acts as a mediating variable between disinformation and electoral violence.*

Research Question 2: Does the level of disinformation in a country significantly contribute to the amount of electoral violence?

$\boldsymbol{H_0}$*: The amount of disinformation in a country does not have a significant effect on the electoral violence in that country.*

$\boldsymbol{H_2}$*: An increase in disinformation in a country will significantly increase the amount of electoral violence in that country.*

Research Question 3: ***Do government disinformation interventions significantly impact levels of disinformation?***

$\boldsymbol{H_0}$: *There is no significant relationship between disinformation and any of the global policy variables; these variables do not increase or decrease a country's disinformation rating.*

$\boldsymbol{H_3}$*: There is a significant relationship between disinformation and one or more of the global policy variables; one or more of these variables increase or decrease a country's disinformation rating.*

3. Literature Review

The following sections will provide a brief overview of research to date that explores 1) how disinformation evolved through social media, 2) how it contributed to political polarization and electoral violence and 3) the current state of government disinformation policy interventions.

3.1 A Brief History of Modern Disinformation in Elections

The role of disinformation as an international cyber warfare tactic became infamous after Russia's cyber disinformation bots interfered in the 2016 US election. Former Central Intelligence Agency Acting Director Michael Morell stated, "it is an attack on our very democracy. It's an attack on who we are as a people . . . this is to me not an overstatement, this is the political equivalent of 9/11." [2]

In "Disinformation as a Threat to Deliberative Democracy," McKay and Tenove work with Wardle and Derakshan's definition of disinformation as "intentionally false or deceptive communication, used to advance the aims of its creators or disseminators at the expense of others."[3] They evaluated the common perception that "disinformation is a threat to democracy" and that social media exacerbates this threat by enabling a faster, more targeted and extensive reach than ever before. Specifically, they investigate the "system-level, anti-deliberative" tactics of "epistemic cynicism, techno-affective polarization, and pervasive inauthenticity," which

[2] Sarah Birch and David Muchlinski, "The Dataset of Countries at Risk of Electoral Violence," no. 2 (2020), 217-236. doi:10.1080/09546553.2017.1364636. https://doi.org/10.1080/09546553.2017.1364636.; Spencer McKay and Chris Tenove, "Disinformation as a Threat to Deliberative Democracy," *Political Research Quarterly* 74, no. 3 (Sep, 2021), 703-717. doi:10.1177/1065912920938143. https://journals.sagepub.com/doi/full/10.1177/1065912920938143.

[3] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717

poisons the communication and interpretation of "facts, logic, moral respect, and democratic inclusion." [4]

Still at question is the extent of the harm from political disinformation and the impact it has on elections. Considering the 2016 and now the 2020 US elections, the seemingly universal fear is that "disinformation may change election outcomes." [5] In response, scholars have set out to find empirical evidence that disinformation can significantly influence voting preferences but the majority have concluded that voting preferences tend to be relatively stable; if the target of disinformation is a Republican, they will likely have voted Republican to begin with.[6] In an extensive analysis of Twitter disinformation of the 2016 election cycle, Bail et al similarly found insufficient evidence to support a change in political attitudes or behaviors as a result of the IRA's disinformation campaign.[7]

However, McKay and Tenove argue that this interpretation may be missing the mark; they note that empirical research demonstrates that disinformation is not usually about changing the election outcomes so much as the democratic institutions and processes themselves.[8] In other words, the real threat that disinformation imposes comes from the erosion of deliberative institutions because this would weaken a democratic state more than the outcome of any single election. Further damage would come from "epistemic cynicism," where citizens become

[4] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[5] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[6] Allcott and Gentzkow 2017; Guess, Nyhan, Reifler 2018, Kalla and Broockman, 2018
[7] Stephen Brock Schafer and Alex Bennet, *Handbook of Research on Global Media's Preternatural Influence on Global Technological Singularity, Culture, and Government* (Hershey: Information Science Reference, 2021).; Christopher A. Bail et al., "Assessing the Russian Internet Research Agency's Impact on the Political Attitudes and Behaviors of American Twitter Users in Late 2017," *Proceedings of the National Academy of Sciences - PNAS* 117, no. 1 (Jan 7, 2020), 243-250. doi:10.1073/pnas.1906420116. https://www.ncbi.nlm.nih.gov/pubmed/31767743.
[8] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717

disengaged or even hostile, causing corruption or collapse of the epistemic function of deliberative systems.[9]

3.2 Growth of Fake News, Political Polarization, Extremism, and Terrorist Recruitment

In 2021, the Pew Research Center, in their yearly update on American media habits, estimated that 53% of people get their news and political information from social media.[10] The advent of social media was originally hailed as a boon to democratic progress; Larry Diamond theorized such "liberation technology" could improve collective action, public debate and hold governments accountable. The Arab Spring seemed to reinforce this idea; though Diamond and others noted that authoritarian regimes like China had seized the opportunity of enacting internet censorship early on.[11]

Social media platforms have "partially displaced journalists as gatekeepers"[12] with algorithms that determine both the availability and priority of political news among the public discussion. One result of algorithms as gatekeepers is the "long-standing concern that social media produce 'echo chambers' or 'filter bubbles'[13] that contribute significantly to community divisions and political polarization while 'decreasing acceptance of shared facts'.[14]

According to a 2017 report, "Republicans and Democrats are further apart ideologically than at any point since 1994."[15] Piazza hypothesized that "countries experiencing high levels of

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[9] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[10] https://www.pewresearch.org/fact-tank/2021/07/27/6-key-takeaways-about-the-state-of-the-news-media-in-2020/
[11] (Diamond 2010, 69-83)
[12] (Graves and Anderson, 2020)
[13] (Pariser 2011)
[14] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[15] Marina Azzimonti and Marcos Fernandes, *Social Media Networks, Fake News, and Polarization* (Cambridge, Mass: National Bureau of Economic Research,[2018]).

disinformation disseminated online through social media by their governments, domestic political parties or by foreign governments will experience higher levels of domestic terrorism" from individuals but also increasing political polarization in general. [16]

Techno-affective polarization is a technique where social media platforms target groups or individuals; perhaps the most famous example was the disinformation campaign aimed at presidential candidate Hilary Clinton that claimed she was involved in child sex trafficking. The responsible party, Russian based Internet Research Agency (IRA), used false identities to post disinformation on Facebook, Twitter and Instagram, successfully reaching over 147 million users. However, the 2016 election disinformation campaign was merely the grandest installment in a series of "dezinformatsiya" programs designed to demoralize, destabilize, and spread from within.[17]

Further damage, in the form of "pervasive inauthenticity," threatens the deliberative system when it is fraught with "problematic identities, such as fake accounts, foreign agents, and bots."[18] Simply put, if the public perception is that media cannot be trusted to be authentic, deliberation becomes impossible, as there is no established trust in the media as an institution. Evidence of the success of epistemic cynicism, pervasive inauthenticity and techno-affective polarization can be found in US polling that demonstrates citizens "don't know what to believe" and has resulted in 42% that claim they consume less news and information altogether.[19]

[16] (Piazza 20214)
[17] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[18] (McKay and Tenove 2021709)
[19] (McKay and Tenove 2021408)

Piazza theorized that "when political actors deliberately disseminate false or misleading information through social media in order to manipulate political attitudes or to mobilize supporters, their endeavors produce an environment in which domestic terrorism is more likely to occur."[20] To measure disinformation via social media, he used three independent variables derived from the Digital Society Project[21], the primary types of disinformation actors – government, political party, and foreign government. Models included 150 countries and focused exclusively on domestic terrorist attacks, operationalized by an annual count of domestic terrorist attacks in each country as measured by the Global Terrorism Database which defines terrorism as "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious or social goal through fear, coercion or intimidation." [22] This definition implies that electoral violence would be included, but the data is also not limited to electoral violence, providing an opening for a more specific inquiry in the future.

Piazza found that his hypothesis was supported by the results. "Countries featuring the propagation of disinformation online through social media by governments, political parties and foreign governments do experience higher subsequent levels of domestic terrorism." [23]

[20] (Piazza 2021, 1-23) James A. Piazza, "Fake News: The Effects of Social Media Disinformation on Domestic Terrorism," *Dynamics of Asymmetric Conflict* ahead-of-print, no. ahead-of-print (March 14, 2021), 1-23. doi:10.1080/17467586.2021.1895263. http://www.tandfonline.com/doi/abs/10.1080/17467586.2021.1895263.

[21] (Mechkova et al., 2019)

[22] Piazza, "Fake News: The Effects of Social Media Disinformation on Domestic Terrorism," , 1-23

[23] Piazza, "Fake News: The Effects of Social Media Disinformation on Domestic Terrorism," , 1-23

3.3 Electoral Stability and Fragility

Electoral violence has been increasing globally with far reaching effects.[24] While it might be tempting to think this doesn't apply to democracies, Hafner-Burton et. al point out that "less than half of the governments that now hold elections for national office do so within a context of consolidated democratic institutions and respect for human rights". [25] Birch and Muchlinski define electoral violence as "coercive force, directed towards electoral actors and /or objects, that occurs in the context of electoral competition." [26] Similarly, the U.N. defines it as "acts or threats of coercion or physical harm perpetrated to effect an electoral process or that arise in the context of electoral competition."[27] While both definitions include coercion, they also lack the presence of disinformation as a modern coercive tool with the capacity to undermine or threaten peaceful elections.

Burch and Muchlinski released a new dataset, Countries at Risk of Electoral Violence (CREV), which comprised data on electoral violence for 101 nations generated from the Integrated Crisis Early Warning System, or ICEWS.[28] Electoral Violence Prevention (EVP) strategies were evaluated, and research confirmed most electoral violence is perpetrated by state actors; however, the research did not mention disinformation as a measured variable.

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[24] Sarah Birch and David Muchlinski, "Electoral Violence Prevention: What Works?" *Democratization* 25, no. 3 (Apr 3, 2018), 385-403. doi:10.1080/13510347.2017.1365841. https://www.tandfonline.com/doi/abs/10.1080/13510347.2017.1365841.; Birch, "The Dataset of Countries at Risk of Electoral Violence,", 217-236

[25] Emilie M. Hafner-Burton, Susan D. Hyde and Ryan S. Jablonski, "When do Governments Resort to Election Violence?" *British Journal of Political Science* 44, no. 1 (Jan, 2014), 149-179. doi:10.1017/S0007123412000671. https://dx.doi.org/10.1017/S0007123412000671.

[26] Birch, "The Dataset of Countries at Risk of Electoral Violence," , 217-236

[27] Birch, "The Dataset of Countries at Risk of Electoral Violence," , 217-236

[28] Birch, "The Dataset of Countries at Risk of Electoral Violence," , 217-236

Hafner-Burton, Hyde and Jablonski demonstrated that electoral fraud is a key predictor of post-electoral violence and is typically mitigated by the presence of strong executive constraints.[29] However, this research appears to assume that an incumbent will not benefit from electoral protests; in the case of President Trump, using Twitter to manufacture claims of electoral fraud primed followers for violent post-electoral protests in his favor.

While this body of research has included important variables to account for capacity building, ethnic power distribution, electoral fraud and corruption rankings, they do not include a metric for the effects of disinformation in the media, either from foreign or domestic sources, which might contribute to electoral violence.

3.4 Policy Prescriptions to Date

In addressing media regulation of disinformation, scholars fear that it would be all too easy for the cure to be worse than the disease, and the existential threat of government induced censorship is very real. Tenove notes the "Ending Support for Internet Censorship Act", as supported by U.S. Senator Josh Hawley, which would "strip social media companies of their CDA Section 230 protections unless a government regulator declares them free of political bias." [30]

On the other hand, "all democracies regulate mass media organizations to enhance democratic debate," [31] and given the elections of 2016 and 2020, current lack of policy protections could prove to be just as harmful. "One striking feature of policy responses to disinformation since

[29] Hafner-Burton, "When do Governments Resort to Election Violence?" , 149-179
[30] Chris Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," *The International Journal of Press/Politics* 25, no. 3 (Jul, 2020), 517-537. doi:10.1177/1940161220918740. https://journals.sagepub.com/doi/full/10.1177/1940161220918740.
[31] Puppis, 2014

2016 is the fact that the United States, the country that experienced the highest-profile campaigns of online election interference, has not enacted a significant regulatory response."[32]

Evaluations of international responses to disinformation might help the U.S. in its current dilemma. Italy passed a "fake news" law establishing police as fact checkers, which Tenove called "inherently defective," but he also considered the Canadian government's non-partisan panel as "promising as it takes this decision out of the hands of the governing party and does not leave it solely up to security agencies." [33] In 2017, Germany passed the "NetzDG" law, which directly requires social media companies to "take swift action on content that likely violates one of Germany's preexisting statues on illegal communication or face a fine of up to fifty million Euros." [34] Arguably the most comprehensive approach to regulating disinformation comes from the EU's "Code of Practice on Disinformation." The code charter addresses specific commitments from all major social media companies including "reducing fake accounts, bots, improving advertising transparency, and improve users' ability to identify untrustworthy and trustworthy sources of information." [35]

However, since social media companies are primarily based in the United States, the most relevant regulation to date is Section 230 of the U.S. 1996 Communications Decency Act (CDA), which "enables social media companies to moderate the content that users share on their platforms without being legally responsible for that content (with some exceptions)." [36]

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[32] Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537 Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537
[33] Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537
[34] Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537
[35] Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537
[36] Tenove, "Protecting Democracy from Disinformation: Normative Threats and Policy Responses," , 517-537

As McKay and Tenove conclude, the lack of "democratic oversight of platforms and other media entities allows disinformation campaigns to leverage algorithmic gatekeeping and opportunities for viral amplification to distribute false claims." [37] Citing the fact that the Supreme Court has already recognized that false speech is considered protected under the First Amendment, some legal scholars and policy makers advocate that the government should not regulate social media content while others make the case that disinformation, when equated with fraud, is not considered speech. [38] Despite social media companies' overall avoidance of regulations to date, even Mark Zuckerberg has said that they "clearly wield social and political power that requires oversight." [39]

3.5 Theoretical Framework

Building on Piazza's theoretical framework that disinformation increases the likelihood of domestic terrorism within a country, the aims of this work are to:

1) Adapt it to focus on electoral violence as the dependent variable, since domestic terrorism (as Piazza defined it) is not necessarily linked with election outcomes.
2) Determine if political polarization acts as a mediator between disinformation and electoral violence.
3) Investigate the global policy options as operationalized by the V-Dem Digital Society Project by focusing on government disinformation policy approaches, with disinformation as the dependent variable.

[37] (McKay and Tenove 2021708)
[38] Wes Henricksen, "Disinformation and the First Amendment: Fraud on the Public," (.
[39] McKay, "Disinformation as a Threat to Deliberative Democracy," 706

4. Data and Methods

4.1 Methodology

To answer the first research question, a mediation model was selected to explore the relationship between socio-political polarization, disinformation, and electoral violence; this stems from the approach used by J.A. Piazza in "Fake News: The Effects of Social Media Disinformation on Domestic Terrorism."[40] Based on the literature that suggests a strong relationship between political polarization and electoral violence, Piazza's model has been adapted to retain the mediating variable of political polarization while incorporating the dependent variable of electoral violence. First, the pathways were measured using the Sobol method (product of coefficients approach), then a bootstrapping resampling method was applied using the Mediation and Lavaan packages in R with 1000 successful bootstrap draws.

To address the second research question, a linear panel data regression model was selected for analysis with electoral violence (operationalized by V-Dem as electoral peace) as the dependent variable, disinformation as the independent variable of interest, and control variables:

$$\boldsymbol{Electoral\ Violence_{it}} = \boldsymbol{\beta_{0it}} + \boldsymbol{\beta_1 Disinformation_{it}} + \boldsymbol{\beta_2\ Political\ Polarization_{it}} + \boldsymbol{\beta_3\ Regime\ Type_{it}} + \boldsymbol{\beta_5\ Social\ Media\ Hate\ Speech_{it}} + \boldsymbol{\beta_6\ Online\ Media\ Existence_{it}} + \boldsymbol{u_{it}}$$

A panel data approach was selected to control for some of the inherent heterogeneity that might contribute to bias when comparing countries across units of years.[41] The second panel regression model incorporates disinformation as the dependent variable to assess the impact of several policy treatment variables, holding political polarization, regime type, online media existence, and social media hate speech constant.

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[40] Piazza, "Fake News: The Effects of Social Media Disinformation on Domestic Terrorism," , 1-23

[41] Yves Croissant and Giovanni Millo, "*Panel Data Econometrics with R",*Wiley-Blackwell, 2018). https://hal.univ-reunion.fr/hal-01699532.

$$Disinformation_{it} = \beta_{0it} + \beta_1 Political\ Polarization_{it} + \beta_2\ Regime\ Type_{it} + \beta_3\ Online\ Media\ Existence_{it} + \beta_4\ Social\ Media\ Hate\ Speech_{it} + \beta_5\ Government\ Internet\ Filtering\ Practice_{it} + \beta_6\ Government\ Internet\ Shut\ Down\ Practice_{it} + \beta_7\ Government\ Social\ Media\ Shut\ Down\ Practice_{it} + \beta_8\ Government\ Social\ Media\ Monitoring_{it} + \beta_9\ Government\ Social\ Media\ Censorship\ Practice_{it} + \beta_{10}\ Government\ Cyber\ Security\ Capacity_{it} + \beta_{11}\ Government\ Social\ Media\ Regulatory\ Capacity_{it} + \beta_{12}\ Government\ Social\ Media\ Regulatory\ Approach_{it} + \beta_{13}\ Arrests\ for\ Political\ Content_{it} + u_{it}$$

For both panel regression models, the process consisted of a series of sub-models and tests to determine which method was most appropriate. A pooled model was selected as the basis of comparison, followed by tests to refine the model type. For the first regression, to determine whether random or fixed effects should be applied, a Hausman test was run with a result of $p<0.05$ in both models; therefore, the null hypothesis of random effects was rejected and the fixed effects models using least squares were selected. Next, to determine whether time effects should be applied, an F test for individual effects was performed which showed that time effects should be omitted in the first model but included in the second. To check for heteroskedasticity in the fixed effects model, a Breusch-Pagan test was run which indicated there was heteroskedasticity present. To test for serial correlation, a Breusch-Godfrey/Wooldridge test was run which suggested that there is positive serial correlation present in the fixed effects models. To address both issues, heteroskedasticity and autocorrelation-consistent (HAC) standard errors were used for calculation. Finally, to test for stochastic trends, an augmented Dickey-Fuller test revealed that no roots were present in both models (p=0.01).

Tests for Regression Models:

Test	***Model 1 p-value***	***Model 2 p-value***
Chow	2.2e-16	2.2e-16
Hausman	0.006	3.932e-7
F Test (time effects)	0.6895	0.04573
Breusch-Godfrey/Wooldridge	0.0813	4.581e-12
Breusch-Pagan test	2.2e-16	1.636e-15
Augmented Dickey-Fuller	0.01	0.01

4.2 Data

All data was originally sourced from the V-Dem Institute, specifically the Digital Society Project[42], and analyzed using R statistical software. The study is a panel-based comparison of disinformation and related policies across countries per year, making the unit of observation a country-year. The V-Dem dataset was filtered to include only years 2000-2020 because disinformation variables were not included with regularity until that timeframe; it also made sense to focus on that period since the internet and social media developed during that timeframe.

Prior to analysis, the dataset was checked for missing data, distribution, normality, and outliers. However, outliers remain in all models, as there were no compelling reasons for their exclusion; contrarily, many showed the development of disinformation-related trends. For example, the box plot below shows a series of outliers with high disinformation in 2005-2018, followed by a

[42] http://digitalsocietyproject.org/the-project/
Mechkova, Valeriya, Daniel Pemstein, Brigitte Seim, Steven Wilson. 2020. Digital Society Project Dataset v3.

change increase in 2019; the median, third and fourth quartiles all increase significantly and establish a new trend wherein the median is a disinformation rating of 2 for the first time.

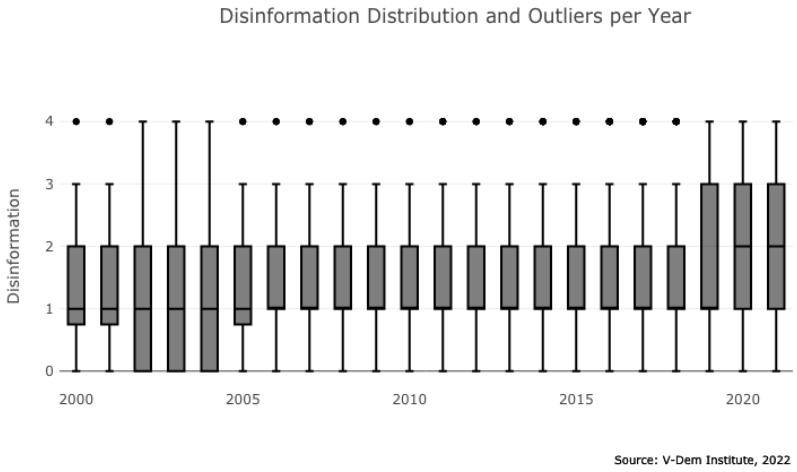
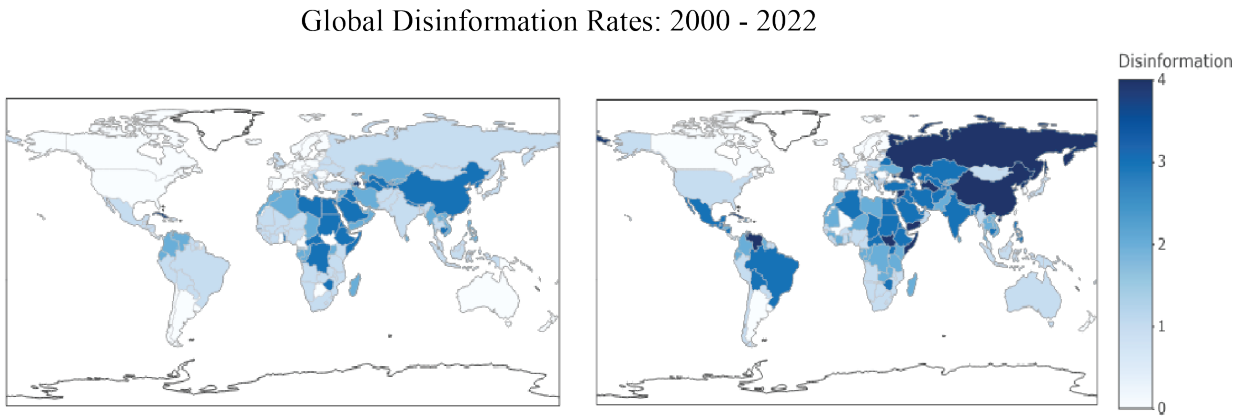


Figure 1

These outliers contribute to a stark contrast between disinformation in the world between the start and end of the analysis period shown in Figure 2:



Source: V-Dem Institute

Figure 2

While the outliers remain, the dataset was modified in the follow ways:

1. Listwise deletion – due to the nature of the electoral violence variable, for the mediation and first regression model, list-wise deletion was performed wherein there was no electoral violence value listed since countries vary in their election cycles. This reduced the total observations to 1,040 from 3,920; however, each year has a relevant sample size of countries (for details, please see Appendix B).
2. Rescaled variables – electoral violence, polarization and the six disinformation variables were rescaled by reverse coding. The reason for doing so was to align "0" with a lower value, as the V-Dem Institute's default on these variables was to scale "0" as the presence of high disinformation. For ease of interpretation, these were rescaled to 0-4, with 4=high disinformation.
3. Regime type – for the first and second models, data was filtered by regime type in order to limit analysis to countries that hold elections.

Dependent Variable(s)

The initial dependent variable, electoral violence, is a V-Dem Institute researcher-coded measure of how peaceful or violent major elections were in a given country and year. Since elections are not held every year, this contributed to an unbalanced panel, and listwise deletion was applied as mentioned. Additionally, electoral violence was significantly skewed at 1.16 (see Figure 3). Due to the ordinal nature of the variable (which also contained zeros), a square root transformation was performed that reduced the skewness to 0.53.

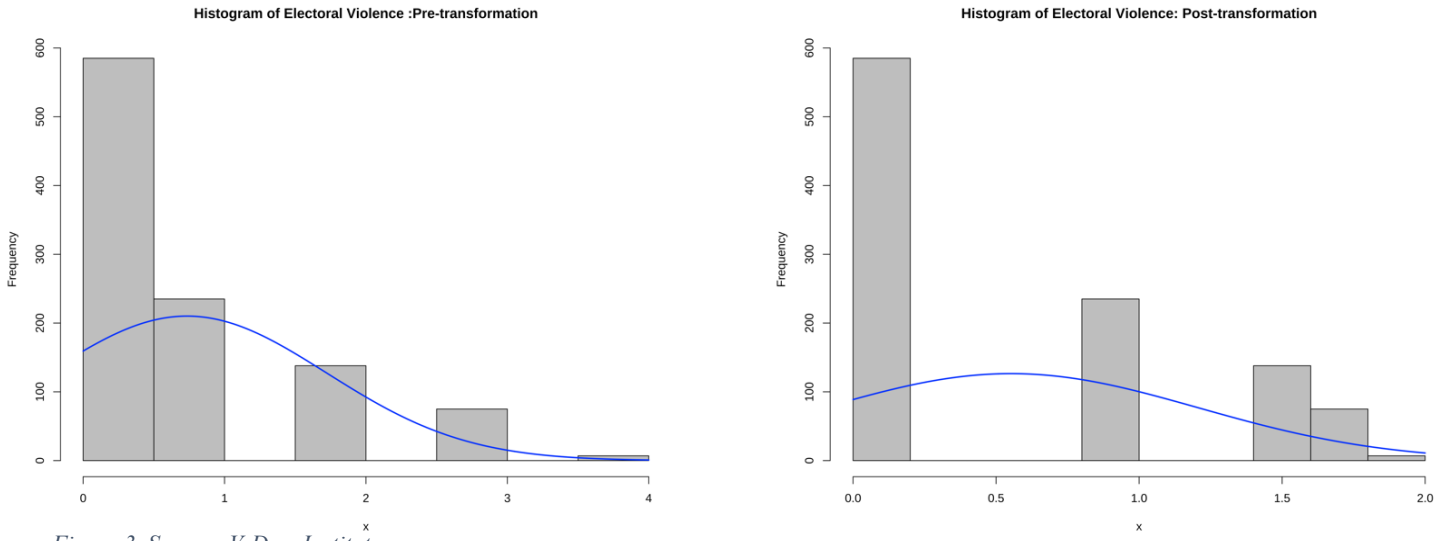


Figure 3. Source: V-Dem Institute

Independent Variable

The independent variable of interest, disinformation (and later a dependent variable), is a composite of six variables in the V-Dem dataset that operationalize different facets of disinformation:

V-Dem Name	Description
v2smgovdom	Government dissemination of false information-domestic
v2smgovab	Government dissemination of false information-abroad
v2smpardom	Party dissemination of false information-domestic
v2smparab	Party dissemination of false information-abroad
v2smfordom	Foreign government dissemination of false information
v2smforads	Foreign government ads

The rationale for merging these into one variable of interest is 1) to achieve a more accurate interpretation of the aggregate effects of disinformation on a given country and 2) to reduce multicollinearity in the model.

For the second panel regression, the independent variables included are disinformation-related policy approaches. Note there are separate variables for both capacity and practice, as some

countries have less resources to deal with external cybersecurity threats (disinformation bots, for instance). For detailed descriptions and scaling, please see Appendix A.

Government Internet Filtering Capacity
Government Internet Filtering Practice
Government Internet Shut Down Practice
Government Social Media Shut Down Practice
Government Social Media Monitoring
Government Social Media Censorship Practice
Government Cyber Security Capacity
Government Social Media Regulatory Capacity
Government Social Media Regulatory Approach
Arrests for Political Content

Control Variables

In both regression models, regime type, political polarization, online media consumption, and social media hate speech are held constant. From the literature surveyed, it was expected that regime type plays a significant role since institutions of democracy are more likely to withstand disinformation tactics, as Diamond and others have suggested.[43] Similarly, political polarization likely contributes to the possibility of electoral violence, regime instability, and disinformation (and this was investigated further in the mediation analysis), thus, making it a control variable isolates some of its impact. Online media consumption was also selected as a control since disinformation has increased steadily in the social media/internet sphere, yet there still exist disparities in internet usage within both first and third-world countries. Last, social media hate

[43] Larry Jay Diamond, "Liberation Technology," *Journal of Democracy* 21, no. 3 (2010), 69-83. doi:10.1353/jod.0.0190. https://muse.jhu.edu/article/385959.; Hunt Allcott and Matthew Gentzkow, "Social Media and Fake News in the 2016 Election," *The Journal of Economic Perspectives* 31, no. 2 (Apr 1, 2017), 211-235. doi:10.1257/jep.31.2.211. https://www.jstor.org/stable/44235006.; Valeriya Mechkova et al., *Introducing the Digital Society Project*, 2019).; McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717; Lawrence W. Green, Jonathan E. Fielding and Ross C. Brownson, "More on Fake News, Disinformation, and Countering these with Science," *Annual Review of Public Health* 42, no. 1 (Apr 1, 2021), v-vi. doi:10.1146/annurev-pu-42-012821-100001. http://dx.doi.org/10.1146/annurev-pu-42-012821-100001.

speech was held constant to limit further influence from both polarization (an element of hate speech) and online media consumption.

Descriptive Statistics - Overview

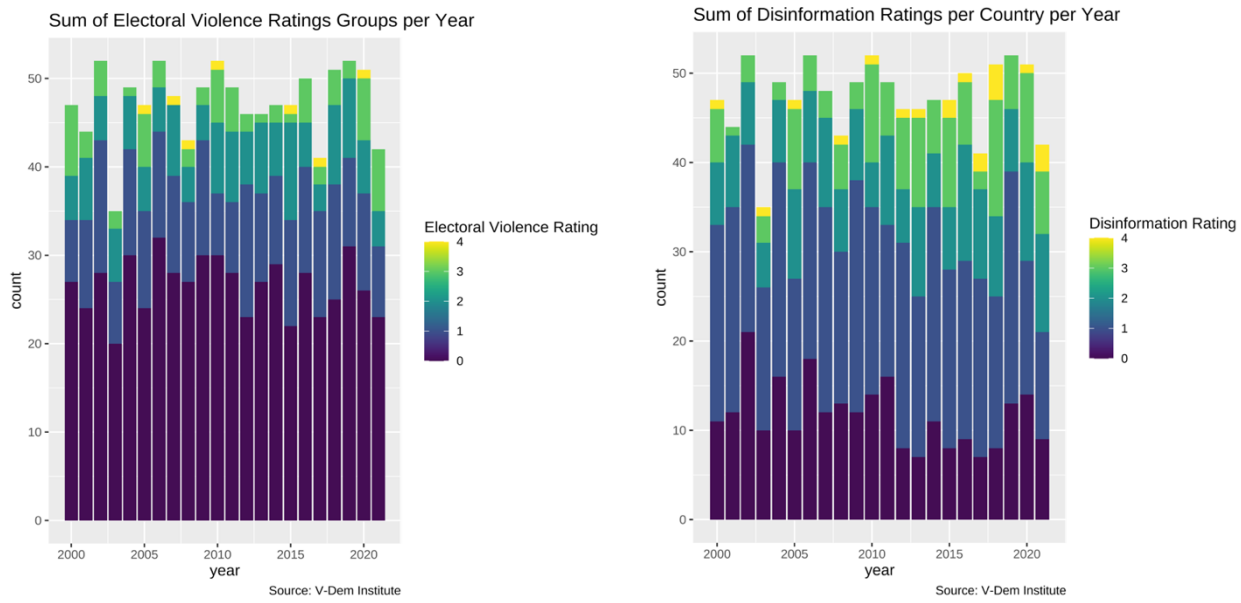


Figure 4

Figure 4 shows the sum of electoral violence and disinformation ratings for all countries per year. What can be inferred from both are the increased proportion of higher ratings beginning in 2005. While there would be lag time for disinformation to reach its intended audience and make an impact, the graphs show a general trend of increased upper quartile growth.

Further evidence of this relationship can be seen in a jittered scatterplot with a regression line (Figure 5).

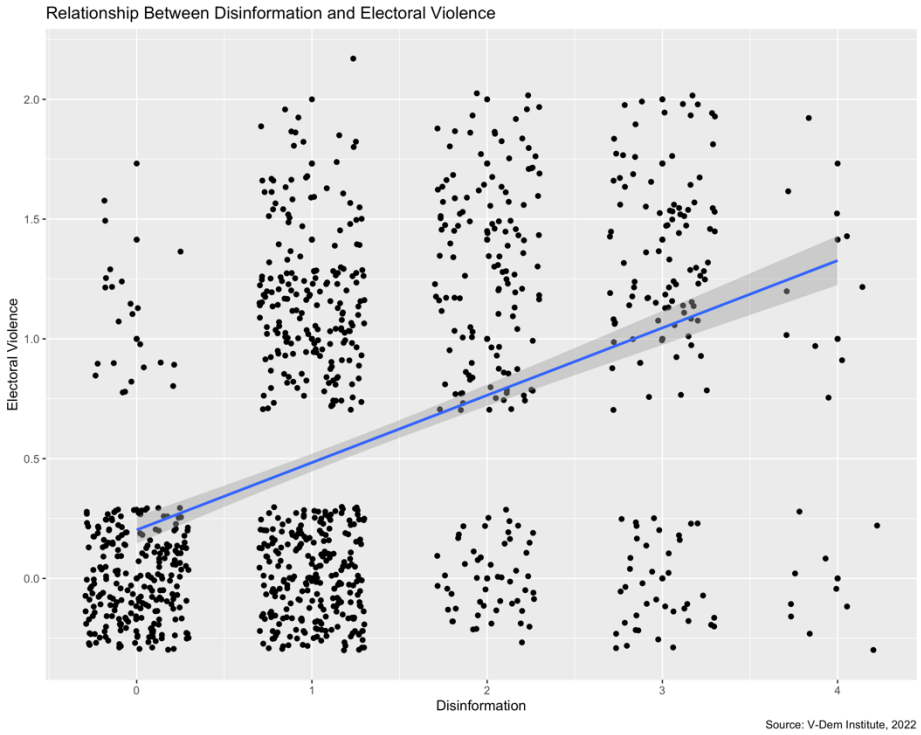


Figure 5

Summary Statistics - V-Dem Disinformation Data

Statistic	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Disinformation	1.2	1.0	0	1	1	2	4
$\sqrt{Electoral\ Violence}$	0.6	0.7	0.0	0.0	0.0	1.0	2.0
Regime Type	1.8	0.8	1	1	2	3	3
Social Media-Political Hate Speech	2.5	1.0	0	2	3	3	4
Socio-Political Polarization	2.6	1.1	0	2	3	4	4
Government Internet Filtering Capacity	1.7	0.9	0	1	2	2	3
Government Internet Filtering Practice	3.2	1.0	0	3	4	4	4
Government Internet Shut Down Practice	3.7	0.6	0	4	4	4	4
Government Social Media Shut Down Practice	3.7	0.7	1	4	4	4	4
Government Social Media Monitoring	2.8	1.0	0	2	3	4	4
Government Social Media Censorship Practice	3.5	0.7	1	3	4	4	4
Government Cyber Security Capacity	1.9	0.9	0	1	2	3	4
Government Social Media Regulatory Capacity	1.9	0.9	0	1	2	3	4
Government Social Media Regulatory Approach	1.8	0.9	0	1	2	2	4
Arrests for Political Content	2.1	0.9	0	1	2	3	3
Online Media Existence	2.1	0.7	1	2	2	3	3

The table above shows summary statistics for the panel dataset after transformation of the dependent variable and listwise deletion to create a balanced panel for the first regression. It is noteworthy that the mean of the internet filtering practice is 3.2 (indicating a high level of active filtering) and the social media regulatory approach mean is 1.8, indicating that the "mean approach" is somewhere between the following categories:

1: Most online content monitoring and regulation is done by the state, though the state involves private actors in a limited way.
2: Some online content monitoring and regulation is done by the state, but the state also involves private actors in monitoring and regulation in various ways.

It is also worth noting that the standard deviation of this variable is 0.9, indicating that there is a large degree of variation in how countries approach regulation.

5. Results

5.1 Correlation Analysis

The objective of the correlation analysis was to check for high multicollinearity prior to analysis, as well as to determine the association between the variables. A Pearson's correlation coefficient was computed to assess the linear relationships. The correlation between disinformation and electoral violence was positive but relatively minor at 0.4. There was a strong negative correlation (-0.7) between regime type and disinformation which might be expected given the literature to date which contributes to our understanding of how democracies can better withstand disinformation impacts and are less prone, historically, to electoral violence. Finally,

there were strong negative correlations between disinformation and the policy approaches to curb it (-0.5 to -0.7), whereas the correlations between capacity variables were significantly lower (-0.1 to 0.3). This suggests that the capacity of a nation to deal with disinformation has less to do with the outcome of disinformation than direct policy responses.

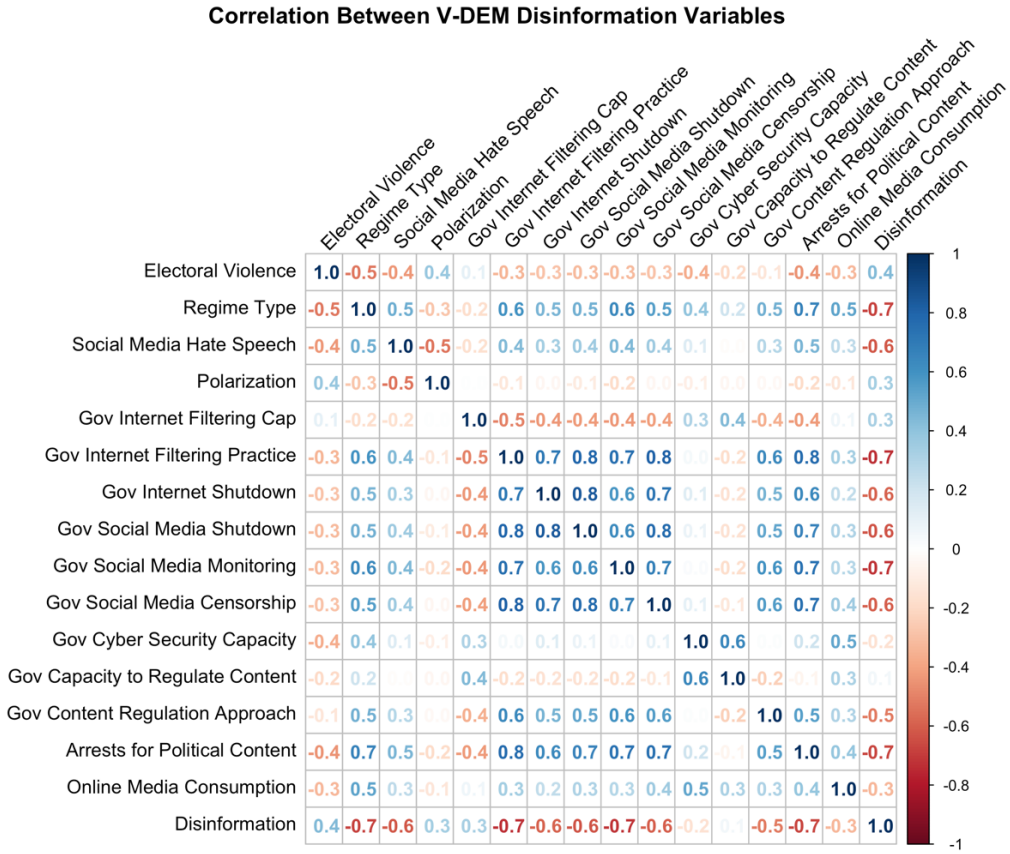
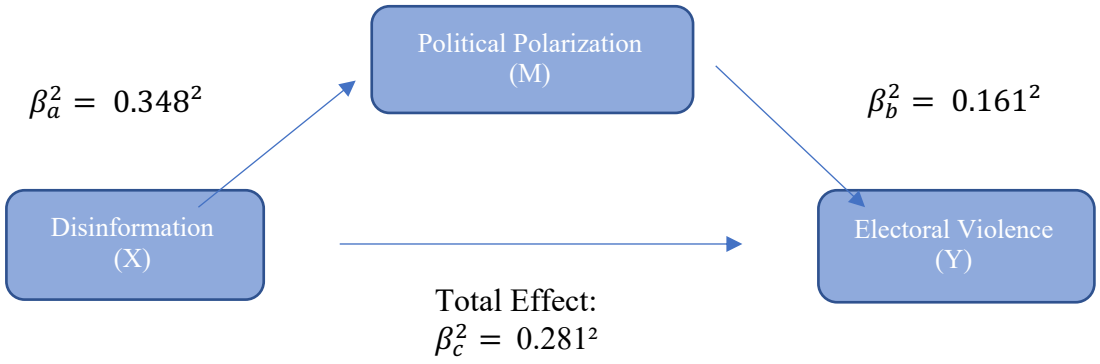


Figure 6-Source: V-Dem Institute

5.2 Mediation Analysis

To address the first research question, a mediation model based on the method suggested by Baron and Kenny (1986) was used to determine the extent to which polarization acts as a mediator between disinformation and electoral violence. The hypothesis is that there is an indirect effect of disinformation on electoral violence in a country via the political polarization of that country. Remembering that electoral violence underwent a square root transformation, the resulting coefficients are depicted in the tables below.



Mediation Pathway Effects

REGRESSIONS	ESTIMATE	SE	Z	P(>|Z|)	STD.LV	STD.ALL
POLARIZATION ~ DISINFORMATION (A)	0.348^2	0.033	10.654	0.000	0.348	0.335
$\sqrt{Electoral\ Violence}$ ~ **POLARIZATION (B)**	0.161^2	0.019	8.676	0.000	0.161	0.262
DISINFORMATION $\sqrt{Electoral\ Violence}$ **(CP)**	0.225^2	0.019	11.884	0.000	0.225	0.353
VARIANCES						
	1.015^2	0.036	27.980	0.000	1.015	0.888
	0.320^2	0.011	28.891	0.000	0.320	0.745
DEFINED PARAMETERS						
AB	0.056^2	0.007	7.841	0.000	0.056	0.088
TOTAL	0.281^2	0.019	14.831	0.000	0.281	0.441

Nonparametric Bootstrap Confidence Intervals with the Percentile Method

	Estimate	**CI Lower 95%**	**CI Upper 95%**	***p*-value**
ACME	0.0559^2	0.0423	0.07	2×10^{-16} ***
ADE	0.2252^2	0.1908	0.26	2×10^{-16} ***
Total Effect	0.2811^2	0.2460	0.32	2×10^{-16} ***
Prop.Mediated	0.1990^2	0.1470	0.25	2×10^{-16} ***

*Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1*

Sample Size Used: 1040, Simulations: 1000

The effect of disinformation on electoral violence was partially mediated via political polarization. The regression coefficients between disinformation and electoral violence and between political polarization and electoral violence were significant. The average causal mediation effects (ACME) reflects the indirect effect of disinformation on electoral violence that goes through the mediator (political polarization). As with Piazza's study, all pathways were significant; in this study, the indirect effect had a small coefficient of 0.0559^2 or 0.003. The average direct effects (ADE) describe the direct effect of disinformation on electoral violence;the coefficient is 0.051 when squared. The total effect of disinformation on electoral violence is significant (p<0) and the coefficient is 0.079 when squared. From these results it can be inferred that 1) polarization does act as a mediator, albeit a relatively minor one, and 2) the direct effects are significantly higher in magnitude, meaning disinformation has more of a direct impact on electoral violence.

Effects of Disinformation on Electoral Violence

	Dependent variable:		
	Electoral Violence		
	Model 1-Within	Model 1-Between	Model 1-First Differences
	(1)	(2)	(3)
Disinformation	0.112***	-0.057	0.125***
	(0.024)	(0.062)	(0.030)
Regime Type	-0.168***	-0.391***	-0.197***
	(0.038)	(0.074)	(0.042)
Social Media Hate Speech	-0.026	-0.100*	-0.121***
	(0.030)	(0.057)	(0.034)
Polarization	0.076***	0.151***	0.080***
	(0.024)	(0.044)	(0.027)
Online Media Existence	-0.086***	-0.092	-0.010
	(0.030)	(0.072)	(0.040)
Constant		1.438***	-0.022*
		(0.311)	(0.013)
Observations	1,040	161	879
R^2	0.099	0.503	0.105
Adjusted R^2	-0.072	0.486	0.100
F Statistic	19.110*** (df = 5; 874)	31.315*** (df = 5; 155)	20.513*** (df = 5; 873)

Note: *p<0.1; **p<0.05; ***p<0.01
Source: V-Dem Institute, 2022
Y was transformed via square root; results are for $\sqrt{Y}$

5.3 Panel Regression Model with Electoral Violence as Dependent Variable

To address the second research question, a panel regression model was used to estimate the effect of disinformation on electoral violence holding the control variables constant. The model output is listed above.

Significance Summary

The coefficient of all variables excluding social media hate speech are significant in Model 1 using the within/fixed effects estimator which computes the variation within countries; R^2 is 0.099 so the model accounts close to ten percent of the variance, though adjusted R^2 is close to zero indicating a poor fit for the included variables. In the between estimator model, disinformation was not significant; however, this model only uses the between variation in variables across individual countries for calculation, and the time variation is not considered, so there is significant data loss in the model (reduced to 161 observations). Lastly, the first differences estimator model was much closer in its estimations to the within model; all variables were significant excluding online media existence. Since the first observation for each country is lost due to differencing, only 879 observations are retained, but the adjusted R^2 is 0.100, indicating it is a better fit overall for the variables in question. Using the first differences model, we can infer that a one unit/group increase in a country's coded disinformation will yield a 0.016 increase (0.125^2) in electoral violence, holding the control variables constant. With this in mind, we can reject the second null hypothesis in favor of $\boldsymbol{H_2}$*: An increase in disinformation in a country will significantly increase the amount of electoral violence in that country.*

5.4 Panel Regression Model with Disinformation as Dependent Variable

For the third research question, "*Do government disinformation interventions significantly impact levels of disinformation?",* a second panel regression model was used to estimate the policy effects on disinformation while holding the control variables constant. The primary objective was to determine if any of the policy variables were associated with a decrease in disinformation; the full regression table is listed in Appendix D.

Preliminary results of the Chow test indicated that time fixed effects should be included for improved accuracy; the dummy variables for years 2013 and 2016 - 2018 were found to be significant at the 0.1 and 0.5 levels respectively. Model 2-3 (the within and time fixed effects model) performed the best overall as it did not suffer data loss when compared with the between and first differences models. The R^2 value was 0.460 and the adjusted R^2 performed surprisingly well at 0.336 considering the number of variables in the model (35 degrees of freedom). In this model, the variables of social media hate speech, polarization, government internet filtering practice, social media monitoring and arrests for political content were significant at the 0.01 level, while government internet filtering capacity and internet shutdown were significant at the 0.1 and 0.05 levels respectively. Regime type and online media existence were not found to be significant, another surprise, indicating that both are less viable in this model than in the previous regression on electoral violence. From this model we can draw several conclusions:

1) There is a significant effect of government internet filtering practice on disinformation; there is a 2% decrease (-0.142^2) associated with moving from one category of its practice to a higher level, holding control variables constant. However, this brings with it a concerning dilemma when observing that the variable is defined by the question "How

frequently does the government censor political information on the internet by filtering?". A shortcoming of this variable is that it does not address whether the political information is disinformation or not.

2) Social media monitoring has the highest negative impact on disinformation; there is a 11.2 % decrease (-0.335[2]) in disinformation associated with social media monitoring. However, within this variable are some troubling definitions. The highest level of comprehensive monitoring is "the government surveils virtually all content on social media." While social media monitoring for fake news and bots makes sense, we must also ask ourselves how much responsibility the government should have, who will hold them responsible, and by what mechanism?
3) Arrests for political content are associated with a -0.059 decrease in disinformation (-0.242[2]). This definition is also inherently troubling and future research might explore in detail the likely chilling effect it has on free speech. However, a limitation of this study is that the data includes electoral autocracies as well as democracies, meaning that the model does not explain the difference in responses amongst different regime types.

With the F Statistic significant at the 0.01 level, we can reject the third null hypothesis and state that H_A: there is a significant negative correlation between disinformation and government internet filtering, internet shutdowns, social media monitoring, and arrests for political content.

6. Conclusion

As the January 6th riots demonstrated, electoral violence can happen anywhere, even in wealthy countries that seemed impervious to assaults on democracy, when the foundations of democracy are under constant attack by disinformation from both internal and external actors.

According to systemic theory, there are three functions necessary for a healthy deliberative system. First, the epistemic function is required to facilitate debate and decision-making grounded in logic and facts. Second, the ethical function "promotes mutual respect among citizens," and third, the democratic function promotes inclusion and equal opportunities for participation."[44] Perhaps the most compelling problem with disinformation is that it attacks all three functions simultaneously, and with social media as a tool, potential dictators or those who wish to see democracy fail have never been more empowered to do so.

Future research possibilities are abundant, particularly with disinformation policy change analysis; the focus should be on specific policy outcomes in democracies with high disinformation to establish a clear picture of what works and what doesn't when it comes to curbing disinformation, particularly in terms of elections. The European Commission of the EU established a "Code of Practice" in 2018 that sought to bring stakeholders together on a voluntary basis to self-regulate and was renewed in June of 2022 in light of the Covid-19 pandemic;[45] however, outcomes of such voluntary practices are rarely analyzed and there is limited data on their efforts. Therefore, one important aim of future research will be to generate disinformation data for evaluation of policy outcomes. Encouragingly, research centers focused on disinformation are appearing at many major universities and research institutions. The Organization for Economic Co-operation and Development (OECD) and the GovLab at the NYU Tandon School of Engineering launched the "100 Questions Initiative" to answer some of the "most pressing, high-impact questions that could be answered if relevant datasets were leveraged in a responsible manner."

[44] McKay, "Disinformation as a Threat to Deliberative Democracy," , 703-717
[45] https://digital-strategy.ec.europa.eu/en/policies/online-disinformation

Since there is inherent legal conflict in government regulating speech, it is critical that companies take seriously the charge of self-regulation. Some are bowing to public pressure and are beginning to take action. In May of 2022, Twitter announced plans for a new "crisis misinformation policy" on Ukraine where it will add warning labels to fraudulent claims, but more importantly, users will not be able to share any flagged posts that violate rules.[46] This is of course, threatened by the potential acquisition by Elon Musk, who proclaimed that he would turn Twitter into a "haven for free speech" and rescind the ban of Donald Trump.[47] This points to the larger problem of oligarchy having extreme control over the social media systems in the U.S. without a policy mechanism to protect the public from the harms of disinformation.

This study addressed three questions related to the impact of disinformation. First, it evaluated whether disinformation is directly or indirectly influencing electoral violence and found that while there is a mediating relationship between political polarization and disinformation, most of the effects on electoral violence are direct. Second, it explored whether the level of disinformation in a country significantly contributes to the amount of electoral violence and found that there was an associated 1.6% increase when countries move from one level of disinformation to a higher one. This increase may seem insignificant unless one remembers that any violent disturbance to an election threatens the stability of any state, not to mention the possible loss of life and chaos that ensues. The events of January 6, 2021, have unfortunately proven that to be the case.

[46] https://www.npr.org/2022/05/19/1100100329/twitter-misinformation-policy-ukraine
[47] https://time.com/6171272/elon-musk-twitter-disinformation/

Third, the study explored relationships between government disinformation policy interventions and found that social media monitoring, government internet filtering, and arrests for political content significantly impact levels of disinformation. However, there are immediate democratic implications for all such policies to be evaluated thoroughly to ensure the cure is not worse than the disease. If government is the main arbiter of disinformation, then government itself must also be monitored continually to promote democratic distribution of political information rather than merely punishment or censorship – such policies will inherently contribute to democratic decline.

While disinformation itself is not a new problem, the scaling of its distribution via social media platforms make it a Hydra's head dilemma; while Parler was eventually taken offline, it would return a few months later and there will always be competitors that will fill any void in the interim. And while Twitter eventually banned Donald Trump, it took years of him using the platform in a destructive manner before anything was done. There are still factions of disinformation everywhere; from "innocent" fake news sharing to millions of stealth disinformation bots programmed by state actors such as (but not limited to) Russia that continue unabated.

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8. APPENDIX

Appendix A: Variable Descriptions

V-Dem Variable Name	Definition	Scale
country_name	Country	*NA*
year	Year	*2000-2021*
Disinformation * (Aggregate of 6 disinformation measures)	IV (Models 1,2, Mediation), Y2 (Model 3)	*0-4, 4 = highest level of disinformation*
v2elpeace_ord	Electoral Violence, Y1	*0-4, 4= highest level of electoral violence*
v2smpolsoc_ord	Polarization of Society	*0-4, 4= highest level of polarization*
v2x_regime_ord	Regime Type	*Responses*: 0: Closed autocracy: No multiparty elections for the chief executive or the legislature. 1: Electoral autocracy: De-jure multiparty elections for the chief executive and the legislature, but failing to achieve that elections are free and fair, or de-facto multiparty, or a minimum level of Dahl's institutional prerequisites of polyarchy as measured by V-Dem's Electoral Democracy Index (v2x_polyarchy). 2: Electoral democracy: De-facto free and fair multiparty elections and a minimum level of Dahl's institutional prerequisites for polyarchy as measured by V- Dem's Electoral Democracy Index (v2x_polyarchy), but either access to justice, or transparent law enforcement, or liberal principles of respect for personal liberties, rule of law, and judicial as well as legislative constraints on the executive not satisfied as measured by V-Dem's Liberal Component Index (v2x_liberal). 3: Liberal democracy: De-facto free and fair multiparty elections and a minimum level of Dahl's institutional prerequisites for polyarchy as measured by V- Dem's Electoral Democracy Index (v2x_polyarchy) are guaranteed as well as access to justice, transparent law enforcement and the liberal principles of respect for personal liberties, rule of law, and judicial as well as legislative constraints on the executive satisfied as measured by V-Dem's Liberal Component Index (v2x_liberal).
v2x_monex_ord	Online Media Existence	*Question*: Do people consume domestic online media? *Responses*: 0: Not at all. No one consumes domestic online media. Skip next question if this answer is selected. 1: Limited. Domestic online media consumption is limited.

		2: Relatively extensive. Domestic online media consumption is common. 3: Extensive. Almost everyone consumes domestic online media.
v2smgovfilcap_ord	Government internet filtering capacity	*Responses*: 0: The government lacks any capacity to block access to any sites on the Internet. 1: The government has limited capacity to block access to a few sites on the Internet. 2: The government has adequate capacity to block access to most, but not all, specific sites on the Internet if it wanted to. 3: The government has the capacity to block access to any sites on the Internet if it wanted to.
v2smgovfilprc_ord	Government internet filtering practice-How frequently does the government censor political information on the internet by filtering?	*Responses*: 0: Extremely often. It is a regular practice for the government to remove political content, except to sites that are pro-government. 1: Often. The government commonly removes online political content, except sites that are pro-government. 2: Sometimes. The government successfully removes about half of the critical online political content. 3: Rarely. There have been only a few occasions on which the government removed political content. 4: Never, or almost never. The government allows Internet access that is unrestricted, with the exceptions mentioned in the clarifications section.
v2smgovshut_ord	Government internet shut down in practice-How often does the government shut down domestic access to the Internet?	*Responses*: 0: Extremely often. It is a regular practice for the government to shut down domestic access to the Internet. 1: Often. The government shut down domestic access to the Internet numerous times this year. 2: Sometimes. The government shut down domestic access to the Internet several times this year. 3: Rarely but there have been a few occasions throughout the year when the government shut down domestic access to Internet. 4: Never, or almost never. The government does not typically interfere with the domestic access to the Internet.
v2smgovsm_ord	Government social media shut down in practice-How often does the government shutdown access to social media platforms?	*Responses*: 0: Extremely often. It is a regular practice for the government to shut down access to social media. 1: Often. The government shuts down access to social media numerous times this year. 2: Sometimes. The government shuts down access to social media several times this year. 3: Rarely. There have been a few occasions throughout the year when the government shuts down access to social media. 4: Never, or almost never. The government does not interfere with the access to social media, except in the cases mentioned in the clarifications section.

v2smgovsmmon_ord	Government social media monitoring How comprehensive is the surveillance of political content in social media by the government or its agents?	*Responses*: 0: Extremely comprehensive. The government surveils virtually all content on social media. 1: Mostly comprehensive. The government surveils most content on social media, with comprehensive monitoring of most key political issues. 2: Somewhat comprehensive. The government does not universally surveil social media but can be expected to surveil key political issues about half the time. 3: Limited. The government only surveils political content on social media on a limited basis. 4: Not at all, or almost not at all. The government does not surveil political content on social media, with the exceptions mentioned in the clarifications section.
v2smgovsmcenprc_ord	Government social media censorship in practice – To what degree does the government censor political content on social media in practice?	*Responses*: 0: The government simply blocks all social media platforms. 1: The government successfully censors all social media with political content. 2: The government successfully censors a significant portion of political content on social media, though not all of it. 3: The government only censors social media with political content that deals with especially sensitive issues. 4: The government does not censor political social media content, with the exceptions mentioned in the clarifications section.
v2smgovcapsec_ord	Government cyber security capacity-Does the government have sufficiently technologically skilled staff and resources to mitigate harm from cyber-security threats?	*Responses*: 0: No. The government does not have the capacity to counter even unsophisticated cyber security threats. 1: Not really. The government has the resources to combat only unsophisticated cyber attacks. 2: Somewhat. The government has the resources to combat moderately sophisticated cyber attacks. 3: Mostly. The government has the resources to combat most sophisticated cyber attacks. 4: Yes. The government has the resources to combat sophisticated cyber attacks, even those launched by highly skilled actors.
v2smregcap_ord	Government capacity to regulate online content-Does the government have sufficient staff and resources to regulate Internet content in accordance with existing law?	*Responses*: 0: No, almost all online activity happens outside of reach of the state, where it lacks the capacity to remove illegal content. 1: Not really. The state has extremely limited resources to regulate online content. 2: Somewhat. The state has the capacity to regulate only some online content or some portions of the law. 3: Mostly. The state has robust capacity to regulate online content, though not enough to regulate all content and all portions of the law.

		4: Yes, the government has sufficient capacity to regulate all online content.
v2smregapp_ord	Government online content regulation approach - *Question*: Does the government use its own resources and institutions to monitor and regulate online content or does it distribute this regulatory burden to private actors such as Internet service providers?	*Responses*: 0: All online content monitoring and regulation is done by the state. 1: Most online content monitoring and regulation is done by the state, though the state involves private actors in a limited way. 2: Some online content monitoring and regulation is done by the state, but the state also involves private actors in monitoring and regulation in various ways. 3: The state does little online content monitoring and regulation, and entrusts most of the monitoring and regulation to private actors. 4: The state off-loads all online content monitoring and regulation to private actors.
v2smarrest_ord	Arrests for political content - If a citizen posts political content online that would run counter to the government and its policies, what is the likelihood that citizen is arrested?	*Responses*: 0: Extremely likely. 1: Likely. 2: Unlikely. 3: Extremely unlikely 4: Rarely or never
v2smonex_ord		*Question*: Do people consume domestic online media? *Responses*: 0: Not at all. No one consumes domestic online media. Skip next question if this answer is selected. 1: Limited. Domestic online media consumption is limited. 2: Relatively extensive. Domestic online media consumption is common. 3: Extensive. Almost everyone consumes domestic online media.

Appendix B: Sample Sizes per year

Sample Size per Year

	year	count
1	2000	47
2	2001	44
3	2002	52
4	2003	35
5	2004	49
6	2005	47
7	2006	52
8	2007	48
9	2008	43
10	2009	49
11	2010	52
12	2011	49
13	2012	46
14	2013	46
15	2014	47
16	2015	47
17	2016	50
18	2017	41
19	2018	51
20	2019	52
21	2020	51
22	2021	42

Appendix C: Regression Table 1-Effects of Disinformation on Electoral Violence

Effects of Disinformation on Electoral Violence

	Dependent variable:		
	Electoral Violence		
	Model 1-Within	Model 1-Between	Model 1-First Differences
	(1)	(2)	(3)
Disinformation	0.112***	-0.057	0.125***
	(0.024)	(0.062)	(0.030)
Regime Type	-0.168***	-0.391***	-0.197***
	(0.038)	(0.074)	(0.042)
Social Media Hate Speech	-0.026	-0.100*	-0.121***
	(0.030)	(0.057)	(0.034)
Polarization	0.076***	0.151***	0.080***
	(0.024)	(0.044)	(0.027)
Online Media Existence	-0.086***	-0.092	-0.010
	(0.030)	(0.072)	(0.040)
Constant		1.438***	-0.022*
		(0.311)	(0.013)
Observations	1,040	161	879
R^2	0.099	0.503	0.105
Adjusted R^2	-0.072	0.486	0.100
F Statistic	19.110*** (df = 5; 874)	31.315*** (df = 5; 155)	20.513*** (df = 5; 873)

Note: *p<0.1; **p<0.05; ***p<0.01

Source: V-Dem Institute, 2022

Y was transformed via square root; results are for $\sqrt{Y}$

Appendix D: Regression Table 2 - Effects of Government Policy on Disinformation

Effects of Government Policy Approaches on Disinformation

	Dependent variable:				
	Disinformation				
	Model 2-Pool	Model 2-Within	Model 2-With-TE	Model 2-Between	Model 2-First Differences
	(1)	(2)	(3)	(4)	(5)
Regime Type	-0.063	-0.063	-0.070	-0.315***	-0.085*
	(0.047)	(0.047)	(0.047)	(0.088)	(0.044)
Social Media Hate Speech	-0.165***	-0.165***	-0.166***	-0.213***	-0.157***
	(0.036)	(0.036)	(0.037)	(0.057)	(0.036)
Polarization	0.108***	0.108***	0.083***	0.062	0.105***
	(0.029)	(0.029)	(0.029)	(0.047)	(0.028)
Gov Internet Filtering Capacity	0.107**	0.107**	0.079*	-0.072	0.093**
	(0.042)	(0.042)	(0.043)	(0.058)	(0.045)
Gov Internet Filtering Practice	-0.145***	-0.145***	-0.142***	-0.412***	-0.135***
	(0.048)	(0.048)	(0.048)	(0.091)	(0.048)
Gov Internet Shutdown	-0.154**	-0.154**	-0.146**	-0.216*	-0.048
	(0.061)	(0.061)	(0.061)	(0.129)	(0.058)
Gov Social Media Shutdown	0.081	0.081	0.054	-0.068	0.058
	(0.070)	(0.070)	(0.070)	(0.128)	(0.063)
Social Media Monitoring	-0.340***	-0.340***	-0.335***	-0.166**	-0.269***
	(0.039)	(0.039)	(0.039)	(0.070)	(0.039)
Gov Social Media Censorship	0.054	0.054	0.056	0.208*	-0.112
	(0.065)	(0.065)	(0.066)	(0.110)	(0.068)
Gov Cyber Security Capacity	0.042	0.042	0.016	-0.035	-0.011
	(0.040)	(0.040)	(0.042)	(0.073)	(0.044)
Gov Capacity to Reg Online Content	0.086*	0.086*	0.056	0.031	0.080
	(0.045)	(0.045)	(0.046)	(0.065)	(0.049)
Gov Online Content Reg Approach	0.012	0.012	0.024	-0.028	-0.054
	(0.058)	(0.058)	(0.058)	(0.059)	(0.066)
Arrests for Political Content	-0.220***	-0.220***	-0.242***	0.078	-0.163***
	(0.047)	(0.047)	(0.047)	(0.083)	(0.045)
Online Media Existence	-0.010	-0.010	-0.041	0.044	-0.025
	(0.040)	(0.040)	(0.043)	(0.084)	(0.043)
factor(year)2001			0.029		
			(0.081)		
factor(year)2002			-0.001		
			(0.078)		
factor(year)2003			-0.016		

			(0.086)		
factor(year)2004			-0.049		
			(0.078)		
factor(year)2005			0.032		
			(0.078)		
factor(year)2006			0.005		
			(0.078)		
factor(year)2007			0.073		
			(0.079)		
factor(year)2008			0.040		
			(0.081)		
factor(year)2009			-0.076		
			(0.080)		
factor(year)2010			0.003		
			(0.078)		
factor(year)2011			0.088		
			(0.081)		
factor(year)2012			0.105		
			(0.082)		
factor(year)2013			0.142*		
			(0.084)		
factor(year)2014			0.074		
			(0.083)		
factor(year)2015			0.077		
			(0.081)		
factor(year)2016			0.192**		
			(0.081)		
factor(year)2017			0.178**		
			(0.088)		
factor(year)2018			0.192**		
			(0.084)		
factor(year)2019			0.037		
			(0.084)		
factor(year)2020			-0.043		
			(0.084)		
factor(year)2021			0.117		
			(0.089)		
Constant				4.179***	0.015
				(0.362)	(0.014)
Observations	1,040	1,040	1,040	161	879
R^2	0.439	0.439	0.460	0.776	0.266
Adjusted R^2	0.326	0.326	0.336	0.754	0.254
F Statistic	48.358*** (df = 14; 865)	48.358*** (df = 14; 865)	20.571*** (df = 35; 844)	36.101*** (df = 14; 146)	22.386*** (df = 14; 864)

Note: * p<0.1,** p<0.05,***p<0.01

Source: V-Dem Institute, 2022

Y was transformed via square root; results are for √ Y