Google Says So(S): An Examination of the Entanglement of Search Engines and Information on Ballot Propositions

EMMA LURIE, UC Berkeley School of Information

In the days leading up to the 2020 election, experts raised concerns that people who sought information about the California ballot propositions were displayed biased information that misrepresented the underlying sources' positions on Google search engine result pages. We conduct an algorithm audit to 1) provide an exploratory account of the composition of the search engine result pages for queries about ballot propositions and 2) investigate claims of search engine bias in the search results. We find that while the majority of search snippets do not take a clear stance towards the proposition some official government sources were incorrectly summarized to appear to take a stance on specific propositions.

ACM Reference Format:
Emma Lurie. 2021. Google Says So(S): An Examination of the Entanglement of Search Engines and Information on Ballot Propositions. 1, 1 (June 2021), 13 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

1 INTRODUCTION

Search engine results have become an increasingly important part of the voter information seeking process [7, 27]. In the days leading up to the 2020 election, individuals seeking information through Google searches about California ballot propositions found that the text displayed on the search result page for the California Secretary of State (SoS) indicated a stance on specific ballot propositions.

In the context of election administration, the SoS' office is mandated to provide non-partisan information to voters. In California, the Secretary of State's office produces voter information guides that summarize the arguments in favor and against each of the ballot propositions, but does not endorse any particular issue, with the intention of helping voters quickly understand the proposition and the interests at hand. The appearance of partisanship or preference for a ballot initiative that results from the search results displayed by Google or other search engines threatens the SOS' credibility as a non-partisan state actor and may undermine public trust in the information they provide. More broadly, because the SoS is in charge of elections, presenting their voter information as favoring a particular outcome on a ballot proposition can undermine public trust that elections are fair and free from manipulation.

On October 28, 2020, cybersecurity expert, Tom Kemp wrote a blog post with the following summary of the situation:

> Unfortunately, Google's algorithmic results have been returning snippets (i.e. website descriptions that appear in Google search results) that favor one proposition or another from the top ranking websites who are looked to be trusted and unbiased sources of voter information. It first happened with Ballotpedia...It is now happening with the Voter Information Guide website from the California Secretary of Site (typically

Author's address: Emma LurieUC Berkeley School of Information, emma_lurie@berkeley.edu.

XXXX-XXXX/2021/6-ART $15.00
https://doi.org/10.1145/nnnnnnn.nnnnnnn

> the top site returned by Google if you search for a given Proposition, e.g. Prop 14). **My concern is that the snippets that return Pro or Con language may subtly influence voters that this neutral Secretary of State web site is taking sides.**[1]

Soon after, Ashkan Soltani, a former chief technology officer at the Federal Trade Commission retweets Tom Kemp's blog post, with the comment:

> Another example of algorithmic bias impacting the CA 2020 vote. Note: #prop24 adds a provision requiring orgs provide "meaningful information about the logic involved in such decision-making processes" (i.e. search rankings). Too bad the bias might prevent its passage…[2]

Soon after, California state senator Henry Stern, a member of the California elections committee tweets:

> Today @Google CEO told @SenateCommerce "we approach our work without any political bias." But intent doesn't matter when it comes to bias. It's the results that matter. Or in this case, the search results.[3]

Then, *Politico* writes that "Google algorithms are being blamed for producing biased excerpts from the state's official election guide when California voters search for information on ballot measures this fall, raising new concerns about the outsize influence of tech platforms."[4]

In the United States, ballot propositions are as close as voters get to direct democracy, as they allow individuals to vote on proposed legislation rather than voting for representatives. However, as is the case in most U.S. elections [6], political scientists have found that voters are ill-informed about the propositions on the ballot [16]. To bridge this information gap, voters rely on heuristics, like party affiliation and endorsements, to make decisions ballot [4, 22].

The majority of the research on bias in Google search results has stemmed from conversation around the search engine manipulation effect, where researchers demonstrated that intentionally altering the rankings of search results could change searchers perceptions of candidates [9]. Recent discourse around Google's anti-conservative bias has also sparked a wave of research examining whether there is partisan bias in the ranking algorithm of Google [3, 24].

Guided by the question, *what search results were information seekers presented with when searching for queries about ballot propositions?*, we perform an algorithm audit of the Google search results pages for popular search queries about the twelve 2020 California ballot initiatives. This research paper offers two contributions:

(1) An analysis of the content displayed on search engine result pages for queries about ballot propositions leading up to the 2020 election.
(2) An exploratory analysis that investigates claims of bias in search results in California ballot propositions.

2 RELATED RESEARCH

2.1 Politics & Search Engines

Search engines help facilitate voters' access to political information which supports engagement in democratic processes [8, 26, 27]. Google has responded to information seekers' reliance on its platform for access to civic and political information by augmenting search results for political

[1] https://tomkemp.blog/2020/10/28/googles-algorithmic-results-are-inadvertently-putting-its-thumb-on-the-scale-for-california-voters-doing-proposition-searches/
[2] https://twitter.com/ashk4n/status/1321572153729245186?s=20
[3] https://twitter.com/HenrySternCA/status/1321674972570415104?s=20
[4] https://www.politico.com/states/california/story/2020/10/29/google-algorithms-blamed-for-giving-california-voters-a-biased-look-at-ballot-initiatives-1332651

candidates, and other civic information [7]. Metaxa et al. [21] performs a longitudinal search engine audit and finds political incumbency is a bigger determinant of the composition and rate of change of the search engine result page than partisanship for political candidates.

Researchers have raised concerns about biases and potential for manipulation [9]. Search engines, a type of online platform, are not neutral, apolitical intermediaries [10]. Previous research has sought to detect filter bubbles by measuring search engine personalization [23]. Information seekers specific query formulations shape search results [15, 25, 30]; however others have not identified meaningful differences in searchers with different partisan affiliations query formulation [29]. Additionally, the politics of platforms are not limited to information seekers and platforms. Information providers are constantly working to become algorithmically recognizable to search engines [11], sometimes hijacking obscure search query formulations and filling data voids [12].

While much of the research in the U.S. about politics and elections on search often use party affiliation or party vote share as an input or outcome, in cases like ballot propositions, where party affiliation is not as straightforward, the role of search has been found to increase. In the California top-two election, where the candidates were from the same party, Sinclair and Wray found an increased reliance on search engines to fill the information gap [26].

2.2 Ballot Propositions

Twenty-six U.S. states have ballot propositions.[5] Advocates of ballot propositions see it as a form of direct democracy that allows voters to improve the performance of government [19], while others worry about the ability of low-information voters to make decisions in their best interest [2, 5]. Augenblick and Nicholson [1] find voters get fatigued by having to decided on many subsequent proposition questions and can turn to heuristics like incumbency and candidate ordering. They find the effect size of such fatigue enough to occasionally alter election outcomes. Lupia argues that voters rely on heuristics, and that these heuristics are a good approximation of their interests [16, 17].

3 METHODS

3.1 Algorithm Audit Procedure

An algorithm audit programmatically executes a set of input queries and then evaluates the output of the algorithm output. In our work, we defined a set of search terms related to ballot props, executed those queries on Google, and analyzed the search engine result pages (SERPs).

For this audit, we used the top autocomplete suggestions on October 28th for the query "prop X" as the basis for our input queries: "proposition X", "prop X explained", "prop X how to vote" and "prop X yes or no." Using Selenium, an automated browser tool, we made 60 back to back requests to Google (5 query formulations x 12 ballot propositions). Each query used a fresh browser instance, so there was no search history or existing cookies when each request was made. We ran these queries and collected the search engine results pages (SERPs) on four different occasions in the week before the election: October 28th, October 31th, November 2nd, and November 3rd 2020 from an IP address in [withheld town], California.

Using a modified version of the WebSearcher[6] library, we then parsed elements on the SERP, classifying the categories of elements (e.g. ads, featured snippets, top stories).

[5] https://www.ncsl.org/research/elections-and-campaigns/chart-of-the-initiative-states.aspx
[6] https://github.com/gitronald/WebSearcher

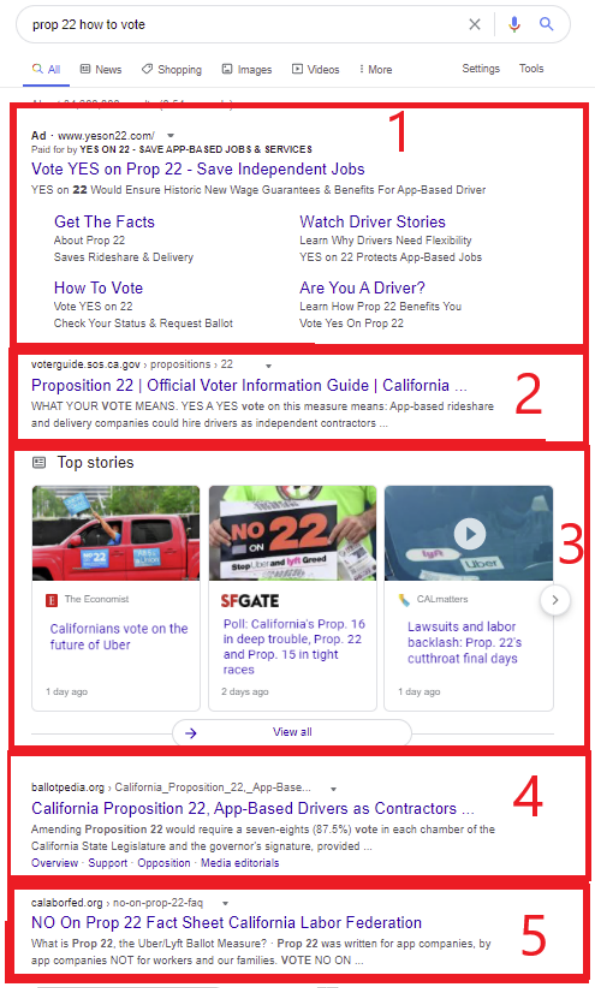


Fig. 1. A screenshot of the SERP where 1) is a political advocacy ad; 2) is a search result from the CA SoS where the snippet appears to be endorsing a candidate; and 3) a series of news articles in a Top Stories panel; 4) a snippet from Ballotpedia that we labelled neutral, and 5) an organic political advocacy search result that we labeled against the proposition.

3.2 Evaluating The Stance of Individual Search Results

We need to evaluate the *stance* of each search result in the corpus with regard to the ballot proposition. To label the stance of every search result, the first author hand labelled the search snippets (title and search text) as *supporting* the proposition, *opposing* the proposition, or *neutral* to the proposition.

- If *both* supporting and oppositional phrases appear in the text, label the search result as *neutral*. (e.g. Box 4 in Figure 1)
- If *any* of the following phrases appear in the title or text of the search result, label the search result as in *support* the proposition: "yes on", "pro" or "vote yes". (e.g. "Yes on 14" or Box 2 in Figure 1)

	10/28	10/31	11/2	11/3
# SERPs	60	60	60	60
Avg # search results per page	10.35	10.4	10.28	10
Supports Prop	0.14	0.14	0.11	0.11
Opposes Prop	0.10	0.09	0.08	0.07
Neutral to Prop	0.76	0.78	0.81	0.83

Table 1. This table summarizes the results of our data collection and labeling of search snippets. We find that there are on average 10 search results per page; 11-14% of search results support the proposition, 7-10% of search results oppose the proposition and 76%-83% are neutral to the proposition. We see a small but consistent increase of neutral search results as election day approaches (November 3rd).

- If *any* of the following phrases appear in the title or text of the search result, label the search result as *opposing* the proposition: "no on" or "con" or "vote no". (e.g. "Vote no on 22" or Box 5 on Figure **??**)
- If there are no supporting or oppositional phrases, label the text as *neutral* (e.g. the first news story in Box 3 in Figure 1).

Of the 3,261 search results in the corpus, 13% of snippets indicate support for the proposition, 79% of search results are neutral, and 8% of the snippets indicate opposition to the proposition.

3.3 Evaluating the composition of the SERP

In addition to stance, we explore the composition of the SERP from two additional criteria rank and source type. *Rank* looks at the search results relative position on the SERP. A rank of 1 indicates that the search result is at the top of the SERP, right below the search bar. A search engine result page (SERP) in our dataset has between 4 and 15 search results on the page.

Result source is a categorization of the type of site. We have four categories: 1) news; 2) Ballotpedia; 3) government sites (e.g. SoS website); and 4) advocacy groups (e.g. PACs, unions, etc.). The first author labeled all of the unique URLs in the dataset (n=634). These four categories comprise 85% of all URLs. 12% of URLs are from YouTube. These videos are a mix of news and political advocacy topics and while we include them in our stance analysis, we do not capture them in the result source analysis.

4 RESULTS

4.1 Stance

The search engine results have on average 10 snippets per page. On average on each SERP, 12% of search snippets appear to support a ballot proposition, 8% of search snippets indicate opposition to the the ballot proposition, and 79% of the snippets do not take a clear stance (see Table 1 for details). This is true across ballot propositions as shown in Figure 2.

However, as visible in Table 1 the percent of neutral search results increases steady from 10/28 to 11/3.

4.2 Rank & Source Type

Figure 3 graph displays the average rank of the most common source types on the SERP. Government sites, namely the SoS website, appears towards the top of the SERPs. Ballotpedia also often appears in the top third of the SERP, and on average above the government sites. Political/advocacy groups

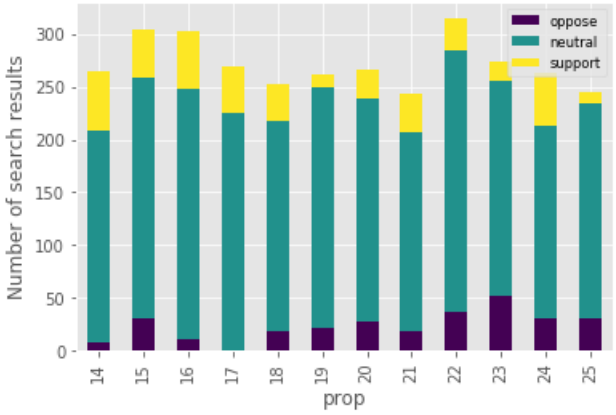


Fig. 2. The stacked bar chart illustrates that while there is some variance in the quantity of search results that are in support or against a specific ballot proposition, a minority of snippets take a clear stance for every CA proposition on the ballot in 2020.

often have advertisements in the top position as well as organic results further down the page.News is the most frequent category, but often appears outside of the top three results.

As shown in Figure 4, there are differences ($p < 0.05$) between the ranks for the different source element types (e.g. political advocacy groups appear higher on the SERP for queries of the form "prop X yes or no"), indicating that there the order of content users see depending on the query formulation they enter.

A Tukey-Kramer test (post-hoc multiple comparisons test for unequal sample sizes) finds significant differences for the the different source element types across the query formulations ($p < 0.05$).

4.3 Source type: Secretary of State snippets

There are 230 search results from the Secretary of State's web page in our dataset. Of those, 24 (10%) imply that the SoS office advocates a particular position on a ballot proposition:

- On the first data collection instance (10/28), 21 of the 58 search snippets (36%) appear to take a stance. The other 3 search snippets that appear to take a stance were observed on November 2nd.
- 18 (66%) of the non-neutral snippets implied support of the ballot proposition, 6 (33%) implied opposition to the proposition.
- 11 of the 12 ballot propositions have at least 1 non-neutral snippet. Prop 24 (privacy law amendment) has the greatest number of non-neutral snippets (6), 2 supporting the proposition, and 4 opposing the proposition.

5 DISCUSSION

5.1 Composition of the SERP

Google has committed to "providing timely and authoritative information on Google Search to help voters understand, navigate, and participate in democratic processes. Through our products, we hope to connect users with the civic information that they need."[7] As documented in Diakopoulos

[7]https://elections.google/civics-in-search

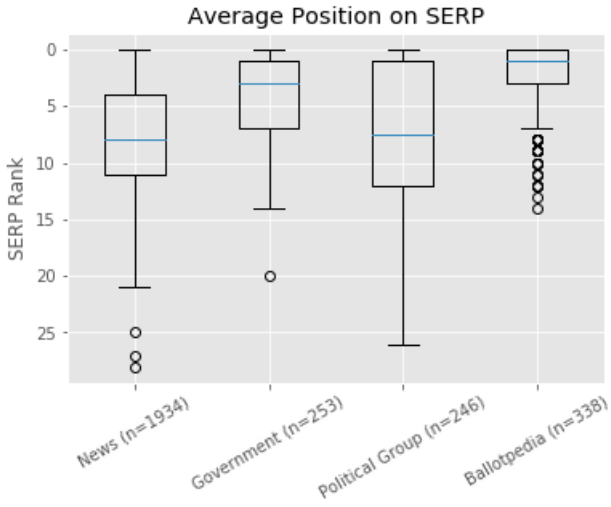


Fig. 3. This boxplot illustrates the average position of various element types on the SERP. We see that Ballotpedia is the highest ranked source information type, followed by government information sources (e.g. the SoS office).

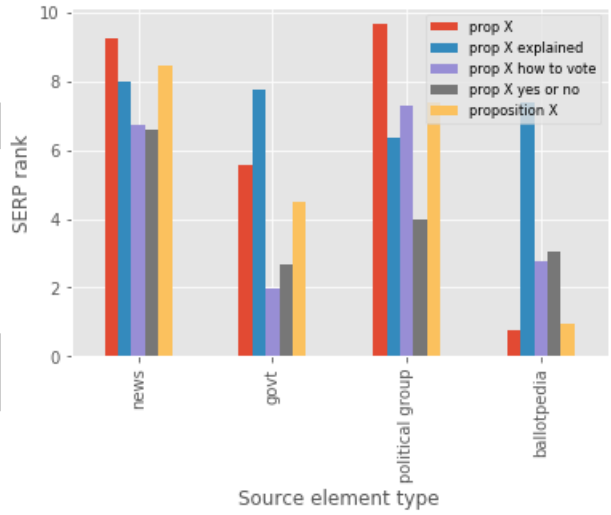


Fig. 4. This barchart displays the average rank a type of source element has on the SERP for a given query formulation. While there are general trends across source element types, there is significant variation across query formulations.

[7], Google has augmented many of the search engine results pages about elections with “Issue Guides” that summarizes the various positions candidates take on the issues, and an “In the News” section that summarizes recent news coverage about a candidate.

The Issue guides and are absent from the SERPs responding to California proposition queries. While queries for “prop x” and “proposition X”have knowledge panels, for other query formulations

knowledge panels are appear only occassionally (4% of the time). This unevenness may not be surprising because much of this infrastructure is geared towards candidate specific queries. However, the rationale for fortifying the information provided in response to queries about political candidates are even more compelling in the context of ballot propositions where not only are voters ill-informed but traditional heuristics, such as party affiliation, may be less helpful.

Given that Google hasn't placed some of the popular CA ballot propositions under its "civics in search" initiative, we may expect to find SERP composition similar to those observed more generally in search results on these SERPs. As Vincent [31] documents, Wikipedia commonly appears at or near the top of the majority of search engine result pages, either in knowledge panels or as an organic search result. However, we find knowledge panels with Wikipedia on only the "prop X" and "proposition X" search result. While Wikipedia information is present in those knowledge panels, so is Ballotpedia information. When excluding knowledge panels, Wikipedia appears on only 26% of SERPs.

This dataset has several distinctive compositional features: the prevalence of Ballotpedia, the relatively low position of government sources, and the prevalence of news sites.

Ballotpedia seems to have replaced Wikipedia as the highest ranked information source by Google's algorithm. Ballotpedia "is a nonprofit and nonpartisan online political encyclopedia that covers American federal, state, and local politics, elections, and public policy. Written by a staff of researchers and writers, the website was founded in 2007."[8] For the California ballot propositions, it aggregates information from the California SoS voter information guide, aggregates key excerpts of op-eds and endorsements by prominent leaders, and displays publicly available spending and poll numbers. Ballotpedia is the source of information that appears on average, closest to the top of the SERP.

Both Wikipedia and Ballotpedia appear on knowledge panels that are displayed for SERPs of the form "prop X" and "proposition X." Vincent et al. [31] and McMahon et al. [20] have previously documented the relationship between Wikipedia and other user-generated content and Google search, but despite the shared "pedia" in the name, Ballotpedia is not user-generated content.

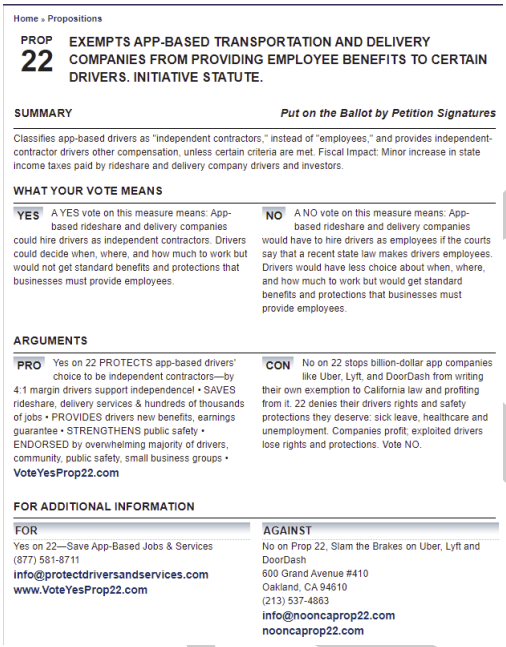
Government results, most notably the Secretary of State's official voter information guide, appears on average at the 3rd position. While query formulation had a limited impact on the average stance, queries in the form "prop X explained" had a significant drop off in the presence and rank of the Secretary of State official voter information guide on the SERP. The ranking of the voter information guide below Ballotpedia means government produced information is being ranked below content that is aggregating the primary source material.

The overwhelming majority of search results come from news publishers, but most commonly on the bottom half of the SERP. While news is well-established as an important part of Google search results their seems to be a higher prevalence of news stories per SERP than in previous research [7, 28]. In the collected dataset, Top Stories appear on 73% of SERPs. Top Stories is a Google feature that displays a horizontal carousel of 3-10 news stories on the SERP. Even if we only count the Top Stories panel as a single element of the SERP (opposed to counting each news story as an element of the SERP), articles from news publishers comprise an average of 6 of the average 10 elements of the SERP. Many of these news sources are California based news publishers, including the Los Angeles Times, KQED, and ABC 10. As shown in 3, the majority of the news stories are in the bottom half of the SERP.

In summary, we find that:

- Despite a robust literature on Google's augmented search results around political search results, we do not find civic information features in the search results of ballot propositions.

[8]https://ballotpedia.org/Ballotpedia:About



Home » Propositions

PROP 22 EXEMPTS APP-BASED TRANSPORTATION AND DELIVERY COMPANIES FROM PROVIDING EMPLOYEE BENEFITS TO CERTAIN DRIVERS. INITIATIVE STATUTE.

SUMMARY *Put on the Ballot by Petition Signatures*

Classifies app-based drivers as "independent contractors," instead of "employees," and provides independent-contractor drivers other compensation, unless certain criteria are met. Fiscal Impact: Minor increase in state income taxes paid by rideshare and delivery company drivers and investors.

WHAT YOUR VOTE MEANS

YES A YES vote on this measure means: App-based rideshare and delivery companies could hire drivers as independent contractors. Drivers could decide when, where, and how much to work but would not get standard benefits and protections that businesses must provide employees.

NO A NO vote on this measure means: App-based rideshare and delivery companies would have to hire drivers as employees if the courts say that a recent state law makes drivers employees. Drivers would have less choice about when, where, and how much to work but would get standard benefits and protections that businesses must provide employees.

ARGUMENTS

PRO Yes on 22 PROTECTS app-based drivers' choice to be independent contractors—by 4:1 margin drivers support independence! • SAVES rideshare, delivery services & hundreds of thousands of jobs • PROVIDES drivers new benefits, earnings guarantee • STRENGTHENS public safety • ENDORSED by overwhelming majority of drivers, community, public safety, small business groups • **VoteYesProp22.com**

CON No on 22 stops billion-dollar app companies like Uber, Lyft, and DoorDash from writing their own exemption to California law and profiting from it. 22 denies their drivers rights and safety protections they deserve: sick leave, healthcare and unemployment. Companies profit; exploited drivers lose rights and protections. Vote NO.

FOR ADDITIONAL INFORMATION

FOR
Yes on 22—Save App-Based Jobs & Services
(877) 581-8711
info@protectdriversandservices.com
www.VoteYesProp22.com

AGAINST
No on Prop 22, Slam the Brakes on Uber, Lyft and DoorDash
600 Grand Avenue #410
Oakland, CA 94610
(213) 537-4863
info@nooncaprop22.com
nooncaprop22.com

Fig. 5. A screenshot of the CA SoS Official Voter Information Guide for Prop 22 on 10/28/2020. When Google's document summarization algorithm extracted pieces of the "What Your Vote Means" or 'Arguments" section instead of the summary the snippet could be interpreted to indicate the SoS office was in favor or against of ballot proposition.

- Contrary to previous research, Wikipedia plays a minor role in the top search results, but Ballotpedia seems to take its place as the common top search result.
- Official SoS voting guides appear on average below Ballotpedia, and in the 3rd position.
- The overwhelming majority of search results come from news publishers, but most commonly on the bottom half of the SERP.

5.2 There's Something (Unhelpful) About Bias

Allegations of bias prompted this study, yet commentators did not carefully define the biases of concern. In one instance bias was equated with snippets that created the perception that an impartial party was advocating a position on a ballot proposition (e.g. Tom Kemp). In the other, bias was equated with the SERP as a whole appearing to favor a ballot position assumed to be in Google's commercial interest (e.g. Ashkan Soltani).

We don't find bias to be a particularly useful concept in either context. First, with respect to snippets suggesting the SoS was supporting a particular outcome on a ballot initiative the concern is more accurately described as distortion. The concern isn't with a particular bias in the positions taken in the snippets but with any position at all. More sharply put, returning pro and con results from the SoS pages in equal numbers–debiasing them–would not alleviate the concern. Appropriate results must return both pro and con statements, or nothing suggesting support of opposition.

Second, concerns with SERP that provide more results advocating a ballot proposition outcome assumed to be aligned with Google's interests assume that there is a "right" or "neutral" SERP. While in algorithm audits of partisanship in search engines [18, 24, 28], which generally compare

left-leaning to right-leaning content, the implicit assumption that the ideal outcome is an equal amount of right and left-leaning content may make sense, this normative stance makes substantially less sense in the context of ballot propositions. The contents of a good or fair or unbiased SERP for ballot propositions is unclear. Should it take a neutral stance akin to the SoS voter guide? Should it present the relative support and opposition as measured along some dimension?

Not all ballot propositions are keenly contested. Some have large differentials in vote share and dollars raised (see Table 2 for details). Some are robustly debated by the public; others are barely discussed. Some propositions receive broad support and receive high profile endorsements. Should supporters of Proposition 23 (kidney dialysis), which had no major newspaper in the Bay Area endorse it, have the same number of search results as opponents? It's hard to measure bias without a normative baseline and it's unclear what that is in this context

Instead of adopting the language of bias, we shift to examining the following issues:

(1) **Was the text on the SERP misrepresenting neutral government sources?** This would be problematic for publishers like the SoS that need public trust as well as for voters that may be misinformed about a particular publisher's POV.
(2) **Is there evidence that Google manipulated SERPs to favor their commercial interests?** This would confirm fears of a potential search engine manipulation effect and research that commercial interests are served over public interest on search engines [14].

Our analysis does find that Google's document summarization algorithm was in 36% of cases on October 28, 2020, extracting text from the SoS website (see Figure 5) that indicated that the SoS was taking a stance on a proposition. In the days leading up to the election, this became a less prevalent problem. We suspect that Google made tweaks to the algorithm based on Kemp's blog post[9] as Google reps responded to *Politico*, but other explanations are possible.

Previous research from Hu et al. [13] has found that Google's document summarization algorithm magnifies partisanship in search results (compared to the source articles). They use a large corpus of political speeches to determine left and right leaning words and then compare the partisan scores of the words in the search snippets and source articles.

However, when we tried to replicate the method of Hu et al., but found we couldn't given 1) that there wasn't enough text written about each ballot proposition to construct a meaningful lexicon and 2) a comparative absence of markedly partisan language that allows the differentiation between right and left-leaning content in the U.S. context.

The second question of whether there is evidence that Google manipulated SERPs to favor their interests is harder to assess. In his tweet, Soltani, former CTO of the FTC, implies that Google may be altering information about Prop 24 (privacy law amendment). However, Google did not publicly oppose Prop 24. In fact, many technology civil liberties groups were opposed to the Prop 24 because they worried it would only further help big tech. If we assume that Google was opposed to Prop 24, what would we expect to see in the data? One theory is that there would be more content on search result pages that opposes Prop 24 than for other propositions. Or more content opposing than supporting the proposition on the SERP? However, as shown in Figure **??**, neither occurs in the data.

In the Secretary of State snippets; however, Prop 24 does have 6 non-neutral snippets (the proposition with the second most has 3 non-neutral snippets). While 4 of the snippets are in opposition to the proposition, 2 are in support of it. We could not find any explanation for why 4 of the 6 SoS snippets that oppose a proposition occur on Prop 24.

[9]https://tomkemp.blog/2020/10/28/googles-algorithmic-results-are-inadvertently-putting-its-thumb-on-the-scale-for-california-voters-doing-proposition-searches/

Given the lack of clarity around Google's position on prop 24, the comparatively low rate of oppositional search results, and the non-neutral SoS snippets of both opposing and supportive stances, we don't find meaningful evidence of Google manipulated the search results.

5.3 Limitations

This study's scope is limited in nature: 4 data collection instances over a 1 week period from one IP address. While we focus on the most popular queries for that time period and previous research suggests that many voters made up their mind last minute, this is not a longitudinal study. Additionally, we did not collect data on this topic before Tom Kemp's original blog post (though we did <1 hour after it was published), so it is possible that actors reacted before data collection began. While collecting data from multiple IP addresses in California could help us measure effects of personalization, few search results seemed hyper-local, which previous research has found to be the most prevelant type of personalization on search engine result pages [24].

6 CONCLUSION

In many cases, algorithm audits test for the presence of an undesirable behavior or phenomenon (e.g. discrimination). Often, the goal is to use the audit to bring awareness to an issue or provide added transparency to an opaque algorithmic systems. In this case, the potential undesirable outcome we are trying to limit is not only individuals being misled when searching for ballot information, but also to evaluate whether the undermining of public confidence in key election information infrastructure is warranted. While we find evidence that Google's document summarization algorithm intermittently misrepresents the underlying web sources, we don't find clear evidence, or testing mechanism for the allegations of Google promoting its own commercial interests. This study also finds evidence that Google's augmented features for civic information are applied unevenly. While the algorithm auditing community has repeatedly studied politics and search engines, we think the importance of search engines in low-information and local elections necessitates further dedicated research.

REFERENCES

[1] Ned Augenblick and Scott Nicholson. 2016. Ballot position, choice fatigue, and voter behaviour. *The Review of Economic Studies* 83, 2 (2016), 460–480.

[2] Larry M Bartels. 1996. Uninformed votes: Information effects in presidential elections. *American Journal of Political Science* (1996), 194–230.

[3] Yochai Benkler, Robert Faris, and Hal Roberts. 2018. *Network propaganda: Manipulation, disinformation, and radicalization in American politics.* Oxford University Press.

[4] Rachel Bernhard and Sean Freeder. 2020. The more you know: Voter heuristics and the information search. *Political Behavior* 42, 2 (2020), 603–623.

[5] Shaun Bowler, Todd Donovan, and Trudi Happ. 1992. Ballot propositions and information costs: Direct democracy and the fatigued voter. *Western Political Quarterly* 45, 2 (1992), 559–568.

[6] Robert A Dahl. 2008. *Democracy and its Critics.* Yale University Press.

[7] Nicholas Diakopoulos, Daniel Trielli, Jennifer Stark, and Sean Mussenden. 2018. I vote for—how search informs our choice of candidate. *Digital Dominance: The Power of Google, Amazon, Facebook, and Apple, M. Moore and D. Tambini (Eds.)* 22 (2018).

[8] William H Dutton, Bianca Reisdorf, Elizabeth Dubois, and Grant Blank. 2017. Social Shaping of the Politics of Internet Search and Networking: Moving Beyond Filter Bubbles, Echo Chambers, and Fake News. (2017).

[9] Robert Epstein and Ronald E Robertson. 2015. The search engine manipulation effect (SEME) and its possible impact on the outcomes of elections. *Proceedings of the National Academy of Sciences* 112, 33 (2015), E4512–E4521.

[10] Tarleton Gillespie. 2010. The politics of 'platforms'. *New media & society* 12, 3 (2010), 347–364.

[11] Tarleton Gillespie. 2017. Algorithmically recognizable: Santorum's Google problem, and Google's Santorum problem. *Information, communication & society* 20, 1 (2017), 63–80.

[12] M Golebiewski and boyd, d. 2018. Data voids: Where missing data can easily be exploited. *Data & Society* 29 (2018).

Title	Subject	Description	Support Vote	Oppose vote	Support Contributions	Oppose Contributions	Outcome
Prop 14	Bonds	Issues $5.5 billion in bonds for state stem cell research institute	51%	49%	$19.7M	$1.3K	Support
Prop 15	Taxes	Requires commercial and industrial properties to be taxed based on market value and dedicates revenue	48%	52%	$69.2M	$74.8M	Against
Prop 16	Affirmative Action	Repeals a CA law which says that the state cannot discriminate or grant preferential treatment based on sensitive characteristics (e.g. race, sex)	42%	48%	$25.1M	$1.7M	Against
Prop 17	Suffrage	Restores the right to vote to people convicted of felonies who are on parole	59%	41%	$1.4M	$0K	Support
Prop 18	Suffrage	Allows 17-year-olds who will be 18 at the time of the next general election to vote in primaries and special elections	44%	56%	$1.2M	$0K	Against
Prop 19	Taxes	Changes tax assessment transfers and inheritance rules	51%	49%	$47.5M	$238.5K	Support
Prop 20	Law Enforcement	Makes changes to policies related to criminal sentencing charges, prison release, and DNA collection	38%	62%	$5.9M	$8.6M	Against
Prop 21	Housing	Expands local governments' power to use rent control	40%	60%	$40.8M	$83.6M	Against
Prop 22	Business	Considers app-based drivers to be independent contractors and enacts several labor policies related to app-based companies	59%	41%	$205.3M	$18.9M	Support
Prop 23	Healthcare	Requires physician on-site at dialysis clinics and consent from the state for a clinic to close	37%	63%	$8.9M	$105.2M	Against
Prop 24	Business	Expands the provisions of the California Consumer Privacy Act and agency to implement and enforce the CCP.	56%	44%	$6.5M	$34.4K	Support
Prop 25	Trials	Replaces cash bail with risk assessments for suspects awaiting trial	44%	56%	$15.3M	$11.3M	Against

Table 2. An overview of the 2020 CA ballot propositions. Adapted from Ballotpedia and Secretary of State Office data

[13] Desheng Hu, Shan Jiang, Ronald E. Robertson, and Christo Wilson. 2019. Auditing the partisanship of google search snippets. In *The World Wide Web Conference*. 693–704.
[14] Lucas D Introna and Helen Nissenbaum. 2000. Shaping the Web: Why the politics of search engines matters. *The information society* 16, 3 (2000), 169–185.
[15] Juhi Kulshrestha, Motahhare Eslami, Johnnatan Messias, Muhammad Bilal Zafar, Saptarshi Ghosh, Krishna P Gummadi, and Karrie Karahalios. 2017. Quantifying search bias: Investigating sources of bias for political searches in social media. In *CSCW' 17*. ACM, 417–432.
[16] Arthur Lupia. 1994. Shortcuts versus encyclopedias: Information and voting behavior in California insurance reform elections. *American Political Science Review* (1994), 63–76.
[17] Arthur Lupia. 2016. *Uninformed: Why people know so little about politics and what we can do about it*. Oxford University Press.
[18] Emma Lurie and Eni Mustafaraj. 2019. Opening Up the Black Box: Auditing Google's Top Stories Algorithm. In *Proceedings of the International Florida Artificial Intelligence Research Society Conference*, Vol. 32.
[19] John G Matsusaka. 2005. Direct democracy works. *Journal of Economic perspectives* 19, 2 (2005), 185–206.
[20] Connor McMahon, Isaac Johnson, and Brent Hecht. 2017. The substantial interdependence of Wikipedia and Google: A case study on the relationship between peer production communities and information technologies. In *Proceedings of the International AAAI Conference on Web and Social Media*, Vol. 11.
[21] Danaë Metaxa, Joon Sung Park, James A Landay, and Jeff Hancock. 2019. Search media and elections: A longitudinal investigation of political search results. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–17.
[22] Eni Mustafaraj, Emma Lurie, and Claire Devine. 2020. The case for voter-centered audits of search engines during political elections. In *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*. 559–569.
[23] Eli Pariser. 2011. *The filter bubble: What the Internet is hiding from you*. Penguin UK.
[24] Ronald E Robertson, Shan Jiang, Kenneth Joseph, Lisa Friedland, David Lazer, and Christo Wilson. 2018. Auditing partisan audience bias within google search. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 1–22.
[25] Ronald E Robertson, Shan Jiang, David Lazer, and Christo Wilson. 2019. Auditing autocomplete: Suggestion networks and recursive algorithm interrogation. In *ACM WebSci*. 235–244.
[26] Betsy Sinclair and Michael Wray. 2015. Googling the top two: Information search in California's top two primary. *California Journal of Politics and Policy* 7, 1 (2015).
[27] Filippo Trevisan, Andrew Hoskins, Sarah Oates, and Dounia Mahlouly. 2018. The Google voter: search engines and elections in the new media ecology. *Information, Communication & Society* 21, 1 (2018), 111–128.
[28] Daniel Trielli and Nicholas Diakopoulos. 2019. Search as news curator: The role of Google in shaping attention to news information. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–15.
[29] Daniel Trielli and Nicholas Diakopoulos. 2020. Partisan search behavior and Google results in the 2018 US midterm elections. *Information, Communication & Society* (2020), 1–17.
[30] Francesca Tripodi. 2018. Searching for Alternative Facts. *Media Manipulation Research Initiative. New York, NY: Data & Society Research Institute.* (2018).
[31] NICHOLAS VINCENT and BRENT HECHT. 2021. A Deeper Investigation of the Importance of Wikipedia Links to Search Engine Results. *Proceedings of the ACM on Human-Computer Interaction* CSCW.