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Research Note

Facebook algorithm changes may have amplified local republican parties

Kevin Reuning[1] , Anne Whitesell[1] and A. Lee Hannah[2]

Abstract

In this research note we document changes to the rate of comments, shares, and reactions on local Republican Facebook pages. Near the end of 2018, local Republican parties started to see a much higher degree of interactions on their posts compared to local Democratic parties. We show how this increase in engagement was unique to Facebook and happened across a range of over a thousand local parties. In addition, we use a changepoint model to identify when the change happened and find it lines up with reported information about the change in Facebook's algorithm in 2018. We conclude that it seems possible that changes in how Facebook rated content led to a doubling of the total shares of local Republican party posts compared to local Democratic party posts in the first half of 2019 even though Democratic parties posted more often during this period. Regardless of Facebook's motivations, their decision to change the algorithm might have given local Republican parties greater reach to connect with citizens and shape political realities for Americans. The fact that private companies can so easily control the political information flow for millions of Americans raises clear questions for the state of democracy.

Keywords

Facebook, political parties, US politics

Introduction

A growing body of research has found that social media engagement is related to increased anger (Eberl et al., 2020; Larsson, 2018), negativity (De Leon and Trilling, 2021), and "us versus them" rhetoric (Savolainen et al., 2020). Leaked Facebook documents and whistleblower testimony speak to these potential dangers. In September 2018, Facebook's newsfeed team shifted priorities "from societal good to individual value" and took a hands-off approach to regulating hostile content (Horwitz and Seetharaman, 2020). Facebook's employees realized by 2019 that recent changes in their algorithm created a more hostile website (Hagey and Horwitz, 2021). Facebook employees also heard from European political parties that the parties felt pressure to change policy positions to increase engagement on Facebook (Whistleblower Aid, 2021).

In this research note, we argue that U.S. political parties were also affected by Facebook's changing algorithm. Using an original dataset of Facebook and Twitter posts from local Republican and Democratic parties, we find evidence that changes in the Facebook's algorithm may have amplified local Republican parties' posts but not local Democratic parties' posts. Local Republican party Facebook content started receiving higher engagement during the fall of 2018, consistent with news reports on changes with the Facebook algorithm. In addition, the gap between local Republican and local Democratic parties does not appear in comparable data from Twitter. In total, after algorithmic changes, local Republican party posts were shared twice as much as local Democratic parties' content.
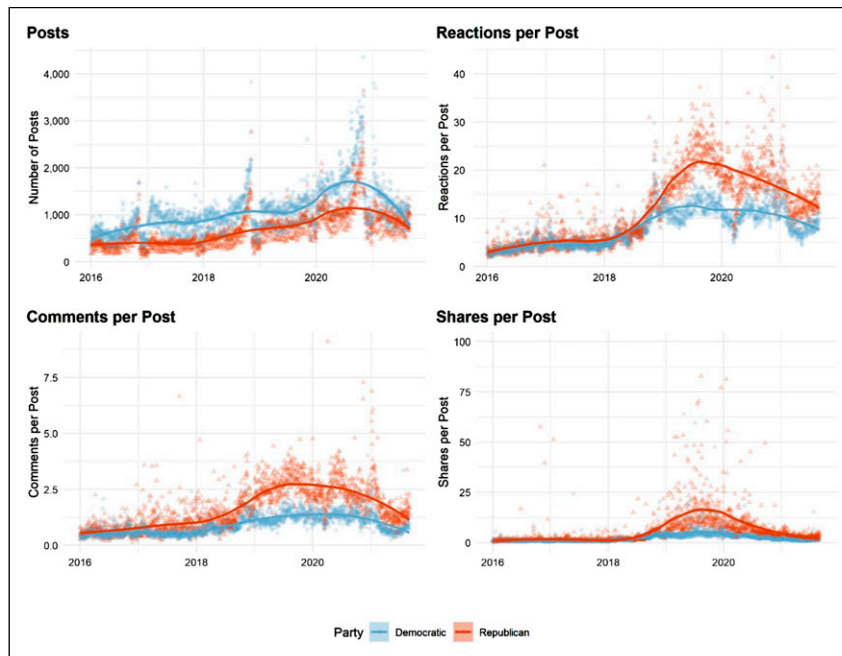
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Figure 1. Daily Facebook stats for local parties (Jan 2016–Aug 2021).

Here, we describe these changes and the extent that Republican parties received more interactions than Democratic parties. This pattern reveals important concerns about the current state of American politics. Facebook is a private company with a broad reach into the American public. As of 2021, 69% of Americans report using Facebook and 49% use it daily, and in 2020, 36% regularly got their news from Facebook (Gramlich, 2021). In addition, use of social media tends to be positively related to political participation (Skoric et al., 2016). If changes in Facebook's algorithm fundamentally change the reach of political parties on Facebook there is the potential for Facebook to accidentally, or purposefully, shape political realities for Americans.

Reaction to local parties on Facebook

In summer 2020 we searched for the website and social media profiles (Facebook, Twitter, and Instagram) of county (or equivalent) parties in the United States.[1] We used CrowdTangle to collect all the Facebook posts from party pages from January 2016 to August 2021. A majority of local Republican (68.91%) and Democratic (68.06%) parties have Facebook pages or groups; in this analysis we focus only on Facebook pages as posts are publicly available (2.16% of local Democratic parties and 2.58% of local Republican parties only had a Facebook group). Since 2016, local Democratic parties have tended to post more often than local Republican parties.

To summarize the activity of these local parties we calculate average daily number of posts, average daily reactions per post, average daily comments per post, and average daily shares per post (see Figure 1).[2] From 2016 to 2018, local Democratic and Republican party pages had similar reaction rates for their posts. By 2019 the local Republican and Democratic parties no longer received equal interactions. For example, in July 2019, posts from local Republican parties received on average 24.96 reactions, 2.87 comments, and 21.23 shares per post. Local Democratic party posts received 13.53 reactions, 1.47 comments, and 6.16 shares. Without data from Facebook on the algorithmic scoring for each post, we cannot be certain whether the increased interaction with local Republican parties is the result of algorithm changes. We can use several pieces of evidence to identify whether it is likely. First, we would expect to only see a change in interactions on Facebook and not on other social media platforms. Second, if it is a change in the algorithm, we would expect that this change will impact all local parties relatively equally. Third, the timing of the change in interactions should line up with what is known about the timing of the changes made to the Facebook algorithm.

Reactions on Twitter versus Facebook

We used the Twitter API to collect all tweets from local parties starting in 2016.[3] Local parties were less likely to have Twitter accounts and less likely to post consistently. 28.00% of local Democratic parties had a Twitter account,
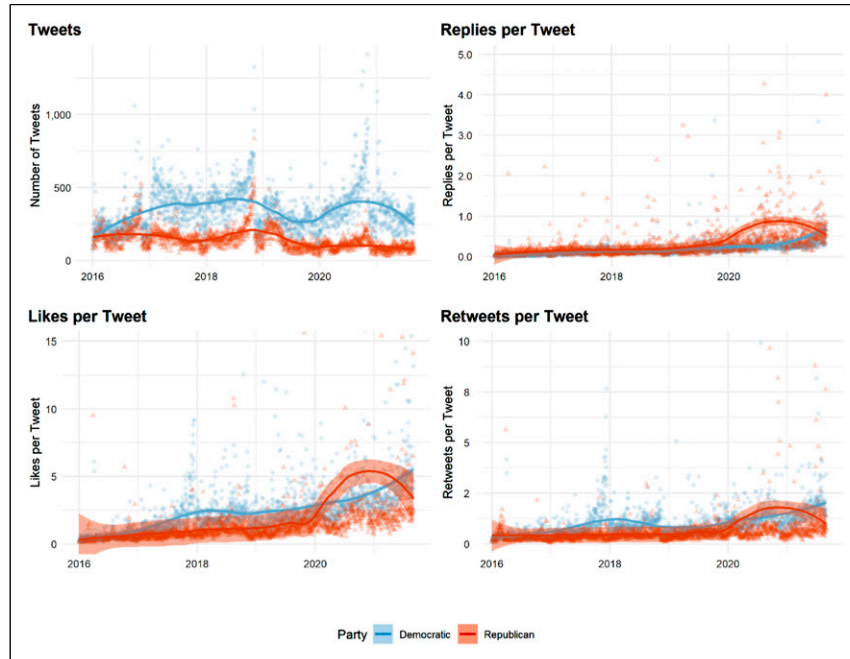
Figure 2. Daily tweet stats for local parties (Jan 2016–Aug 2021).

while 21.48% of local Republican parties did. If the changes above were a result of Republicans posting more resonant content starting in 2018, we should see a similar change in interactions on Twitter as on Facebook.

Figure 2 recreates Figure 1 using Twitter data and relevant Twitter metrics (replies, likes, and retweets) along with the number of tweets total. The top left plot shows that local Democratic parties tend to be more active than Republican parties; this trend is consistent across nearly the whole timeframe. The other three plots show the responses to these tweets.[4] Unlike for Facebook, the trajectory of interactions for both sets of parties is relatively stable during 2018 and 2019. There is an increase in engagement with local Republican parties starting in 2020 but the gap between the two is relatively small and short-lived compared to the gap in the Facebook data. This supports our claim that the changes in engagement on Facebook are limited to Facebook and are not the result of a change in social media strategy across platforms.

Variation within Republican parties

Not all parties have a consistent presence on social media. It is possible that the change in interaction is driven by a subset of parties changing how they post which leads to an overall increase in responses.

To test this, we calculate the monthly average comment, reaction, and share rate for each local party (excluding accounts with fewer than five posts in a month). Table 1 shows the median interaction rates each July from 2016 to

2021. Both parties saw increased interactions across the period. To compare the two sets of local parties, we estimate a Mann–Whitney test. From 2016 to 2018 the differences are small and any differences tend to favor Democrats. Beginning in 2019 the differences are statistically significant in favor of Republicans. For example, in July 2019 the median local Republican party had a share rate of 2.33; for the median local Democratic party it was 1.49.

When did the change happen?

Finally, we estimate a model that identifies *when* the changes in the trends of Facebook interactions happened. We then see if the relevant change lines up across metrics and with what is publicly known about how Facebook modified their algorithm.

We use a Bayesian Estimator of Abrupt Change, Seasonal Change, and Trend (BEAST) model from ecology (Zhao et al., 2019). This is a type of changepoint model that decomposes a time series into its trend and seasonal components and estimates changes in either of these parts.[5] We assume weekly seasonality (posts on certain days of the week are more likely to get response compared to others) and remove outliers in the data (leaving them missing). We do this as the model is susceptible to data artifacts and a manual inspection of the data identified some posts that became extremely viral.[6] Dropping days with viral posts from the dataset allows us to better identify changes in trends.

Figure 3 shows the estimated trend for the average number of comments, reactions, and shares per posts per

Table 1. Comparison of median local party interactions.

	Comments		Reactions		Shares		
	Republican	Democratic	Republican	Democratic	Republican	Democratic	N
2016	0.18	0.21	2.26	2.29	0.39	0.31	1332
	(−0.04, 0.00)		(−.27, 0.13)		(−0.00, 0.08)		
2017	0.20	0.27*	2.88	2.96	0.33	0.35	1440
	(−0.06, −0.00)		(−0.33, 0.20)		(−0.04, 0.03)		
2018	0.33	0.41*	3.89	4.18*	0.75	1.00*	1800
	(−0.07, −0.00)		(−0.64, −0.01)		(−0.21, −0.05)		
2019	0.74	0.56**	8.89	6.32**	2.33	1.49**	1882
	(0.10, 0.23)		(1.39, 2.75)		(0.42, 0.81)		
2020	0.89	0.47**	7.16	4.59**	1.53	0.88**	2081
	(0.23, 0.38)		(1.38, 2.37)		(0.40, 0.65)		
2021	0.54	0.33**	6.82	4.78**	1.00	0.63**	1697
	(0.14, 0.24)		(1.29, 2.34)		(0.27, 0.43)		

Note. $* = p < .05$; $** = p < .01$. Medians calculated based on the average response each local party recieved in July of the given year. Numbers in parentheses are 95% CI of the median difference; positive values indicate Republican medians are higher.
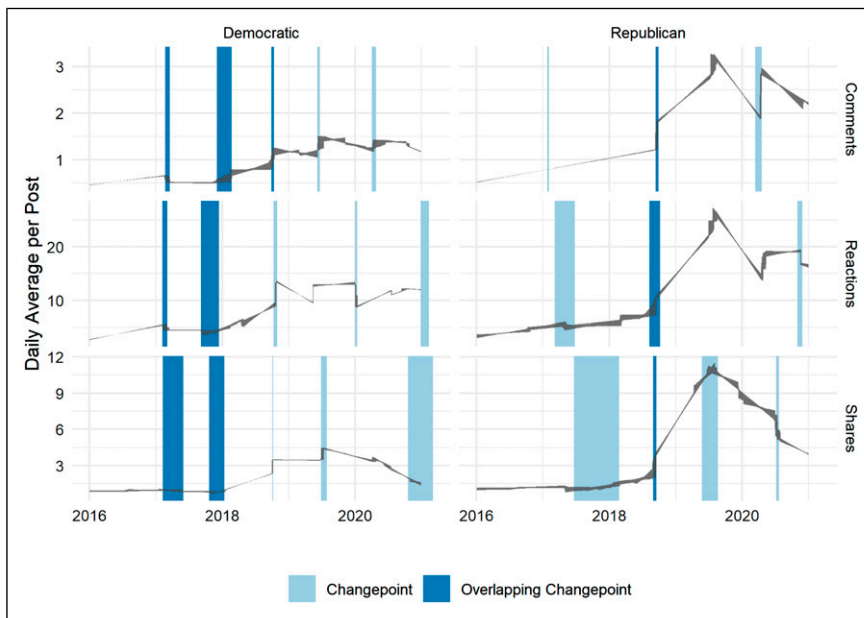
Figure 3. Estimated trend and changepoints for local Facebook interactions.

day. The vertical blue bars represent estimated changepoints in the trend; dark blue represents any instances where the changepoint on different metrics overlap within a party. The trends for reactions to local Democratic and Republican parties are relatively stable for the first several years of the data, with a few small changes identified among Democratic parties.

Near the end of 2018 there was a changepoint across all three metrics within the local Republican party Facebook activity. After this point there is a significantly sharper increase in interactions with Republican party posts. For shares per post the change was between August 28th and September 17th, for comments the change was between September 12th and September 27th, and for the reactions it was between August 9th and October 8th.

Identifying if this coincides with Facebook's algorithmic changes is difficult given Facebook's opacity. Facebook publicly rolled out major changes to their metric in early 2018, introducing the Meaningful Social Interactions metric. They succeeded at keeping users

engaged and continued to make changes to the metric and weighting over the year (Metz, 2021). By fall of 2018 Facebook knew these changes led to increased negative interactions. An internal memo shows that Facebook saw the virality of a divisive Buzzfeed article (published on September 18th) as an "unhealthy side effects" of their algorithm changes (Hagey and Horwitz, 2021). Another internal memo from November 2018 demonstrates that Facebook staff knew posts with more negative comment generated more engagement (Metz, 2021). By April of 2019 Facebook knew that some European political parties had changed the content of their posts because of the algorithmic change. One Polish party wrote that they went from posting 50% positive content to 80% negative content in response to algorithm changes (Hagey and Horwitz, 2021). All of this points to important changes in 2018 that were first noticed starting in later 2018 which broadly lines up with the timeline found in the changepoint model above.

Discussion and conclusion

The companies running social media platforms make both political and market-oriented decisions (Kreiss and McGreggor, 2017). These decisions have real consequences for local political parties in the United States. From January 1 to June 30, 2019, local Republican parties had their posts shared 1,684,586 times—twice as often as local Democratic parties' posts were shared (800,659 times). Over the same 6 months in 2018, Democratic parties had their posts shared almost 50% more than Republicans (222,297 and 150,862 shares respectively). The change in interaction rate was not found on Twitter and affected a wide range of local parties posting on Facebook. In addition, the change lines up with known changes in Facebook's algorithm.

The causal mechanism linking Facebook's algorithm and increased engagement with local Republican party content is beyond this scope of this paper, but we offer two possible explanations. First, anger is a potent force in both politics (Phoenix, 2019; Webster, 2020) and social media engagement (Eberl et al., 2020; Larsson, 2018). Local political parties that harness anger on social media may benefit both online and off. Local Republican party leaders might have been more likely to share content consistent with these characteristics (we briefly explore this in the Supplementary Appendix). Second, internal Facebook documents show that the company feared a political backlash from conservatives and might have overcompensated, allowing conservative news and pages to have greater reach (Ellison and Izadi, 2021). Local parties regularly shared news stories and perhaps local Republican parties benefited from sharing news from conservative sources.

Social media and the internet more broadly provide both hope and deep concern for democracy (Tucker et al., 2017). Much has been written about what happens on social media, the use of government-paid trolls, the spread of disinformation, and the use of fine grained micro-targeting by campaigns (Persily and Tucker, 2020). Largely unexplored, however, is the role of local political parties in the social media ecosystem. Local parties perform critical functions in American politics that range from consulting and recruiting candidates and volunteers as well as communicating about the party's positions and values (Doherty et al., 2021). If these parties are also spreading information on social media that increases division and anger, it could further contribute to declining trust in government and the erosion of democratic norms (Webster, 2020). We do not yet know how changes to algorithms impact voters, candidates, and donation patterns; we leave this to future work.

Declaration of conflicting interests

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Supplemental Material

Supplemental material for this article is available online. The replication files are available at https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/HTXY3R

Notes

1. See Supplementary Material for description of data collection as well as Whitesell et al. (2022).
2. We have trimmed the Y-axis on Shares per Post plot as there were a few outlier days with extreme values. These outliers were still used to estimate the smoothed line.
3. We used a combination of the "/2/tweets/search/all" and "/2/users/:id/tweets" endpoints. This was done using the Twitter API python package (geduldig, 2021).
4. We again trim the Y-axis, this time for all three interaction plots.
5. Changepoint models estimate changes in timeseries, breaking the timeseries into stable components. The BEAST model assumes that the observed data is a function of trend component (a line) and seasonal components (a harmonic function) and looks for changes in both. We provide more details in the Supplementary Appendix.

6. Outliers were identified using the tsclean function in the forecast package. For example, the most shared post was shared 141,443 times. It was a generic post declaring the intention to vote for Donald Trump. It received only 18 shares in the first 24 h after it was posted.

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