Shared partisanship dramatically increases social tie formation in a Twitter field experiment

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Americans are much more likely to be socially connected to copartisans, both in daily life and on social media. However, this observation does not necessarily mean that shared partisanship per se drives social tie formation, because partisanship is confounded with many other factors. Here, we test the causal effect of shared partisanship on the formation of social ties in a field experiment on Twitter. We created bot accounts that self-identified as people who favored the Democratic or Republican party and that varied in the strength of that identification. We then randomly assigned 842 Twitter users to be followed by one of our accounts. Users were roughly three times more likely to reciprocally follow-back bots whose partisanship matched their own, and this was true regardless of the bot's strength of identification. Interestingly, there was no partisan asymmetry in this preferential follow-back behavior: Democrats and Republicans alike were much more likely to reciprocate follows from copartisans. These results demonstrate a strong causal effect of shared partisanship on the formation of social ties in an ecologically valid field setting and have important implications for political psychology, social media, and the politically polarized state of the American public.

social media | echo chambers | partisanship | intergroup relations

Partisanship is a core element of social identity for many people (1). For example, Americans tend to distrust and dislike those from the opposing political party and often report that they are unwilling to be friends with members of the opposing party (2). In line with this self-reported dislike for counterpartisans, observational studies find that Americans are substantially more likely to have face-to-face social interactions with copartisans (3) and to be connected to copartisans on social media networks (4)—all of which may contribute to "echo chambers" where like-minded individuals preferentially exchange information with, and influence, those who share similar worldviews (5–7).

However, are people actually more likely to form social ties purely based on shared partisanship? Observational studies documenting assortment based on partisanship (sometimes described as homophily) do not offer credible evidence of a causal effect of shared partisanship on tie formation. Copartisanship is correlated with a multitude of other factors that are also likely to influence social tie formation. For example, individuals may simply be forming social ties based on other factors that happen to be correlated with partisanship, such as age, race, geographic location, or other interests and preferences (8). Furthermore, it may be that people have more opportunities to form ties with copartisans, rather than an actual preference for forming copartisan ties (9). In the context of social media in particular, recommendation algorithms may be preferentially suggesting like-minded users as new potential contacts.

Thus, experimental evidence on social tie formation is needed. Because one cannot easily randomly introduce individuals to one another and examine who decides to befriend whom, nearly all research investigating causal effects of shared partisanship on

interpersonal dynamics has relied on hypothetical self-report measures in survey experiments (e.g., ref. 2); a notable exception involves experimentally using a dating website to document copartisan preference in romantic relationships (10). As a result, despite all of the interest in this area, the extent to which people condition on partisanship when actually forming social ties "in the wild" remains a largely open question.

Here, we shed light on this issue. We do so by leveraging the power of field experiments on social media to allow for the causal identification of copartisanship's influence on actual social tie formation. Specifically, we created Twitter accounts that varied in their partisanship and examined how likely Twitter users were to reciprocate social tie formation when followed by copartisan versus counterpartisan accounts. Our bot accounts were designed to appear as humans with identical descriptions, except 1) which political party they identified with and 2) the strength of that identification; see Fig. 1.

Results

Fig. 2 shows the fraction of Democratic and Republican users that reciprocated our bot accounts' social tie formation in each experimental condition. We analyze the results using a linear probability model predicting whether the user followed the bot based on copartisanship with the bot, partisanship extremity of the bot, political partisanship of the user, and all interactions; we also report exact P values (P_{FRI}) calculated via Fisherian randomization inference based on 10,000 permutations. We found evidence for strong preferential social tie formation based on shared partisanship ($b = 0.093$ [0.051, 0.135], $t(840) = 4.381$, $P < 0.001$, $P_{FRI} < 0.001$): Users were nearly three times more likely to follow-back a copartisan compared to a counterpartisan. We found no significant interaction between copartisanship and partisanship strength of the bot ($P = 0.465$, $P_{FRI} = 0.469$) and no significant main effect of bot extremity ($P = 0.754$, $P_{FRI} = 0.748$). However, an exploratory post hoc analysis found some evidence of a positive three-way interaction between copartisanship, bot partisanship strength, and user partisanship strength ($P = 0.051$, $P_{FRI} = 0.037$), whereby more partisan users were particularly likely to follow-back strong copartisan bots.

In addition to documenting an overall preference for tie formation with copartisans, our design allows us to investigate partisan asymmetries in this effect. Some observational research has argued that conservatives tend to be more homophilous on Twitter (11). Yet, in our experiment there was no significant difference in the extent of preferential follow-back of copartisans

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Fig. 1. Design of bot accounts. We created eight human-like, identical-looking bot accounts (two per each condition) and varied their political partisanship (Republican versus Democrat) as well as the extremity of political partisanship (stronger versus weaker). The bot accounts followed a set of elite accounts matching their political partisanship and retweeted randomly from these accounts every day (this was the same for bot accounts with stronger or weaker political partisanship). Bot accounts with stronger partisanship have a background supporting the Democrat versus Republican candidate and include the name of the candidate as part of their profile names.

among Democrats versus Republicans (interaction between copartisan bot and user partisanship, $b = 0.012$ [$-0.071, 0.096$], $P = 0.771$, and $P_{FRI} = 0.784$). We also found no significant main effect of user partisanship, $P = 0.563$ and $P_{FRI} = 0.583$, and no significant three-way interaction with bot extremity, $P = 0.886$ and $P_{FRI} = 0.881$.

Discussion

Here we provide evidence that shared partisanship per se has a causal—and large—effect on preferential social tie formation on Twitter. This observation has important implications.

First, our results suggest that prior findings about preferential attachment from survey experiments in political psychology do generalize to actual social tie formation. This is of substantial theoretical significance, given the large body of existing survey work coupled with lack of field experiments outside the context of romantic relationships (10). Furthermore, our results contribute

to ongoing debates about asymmetries in partisan bias (12, 13). In contrast to the suggestions of some observational work (11), we find that Democrats and Republicans in our sample are equally likely to favor copartisan strangers when forming new social ties. Of course, here we studied (at least somewhat) politically active Twitter users, who are not representative of either Twitter users or the country as a whole. Future work should investigate how our findings generalize to more representative samples. Relatedly, our bots signaled their partisanship largely via which presidential candidate they supported. However, members of a given party may not support the party's nominee, and thus the bots' candidate identification may have put off some copartisans. If so, our experiment would have underestimated the true impact of shared partisanship on tie formation, potentially to different extents for Democrats versus Republicans. Future work should investigate this issue.

Second, we shed light on the microfoundations of the partisan assortment—and associated potential for "echo chambers"—
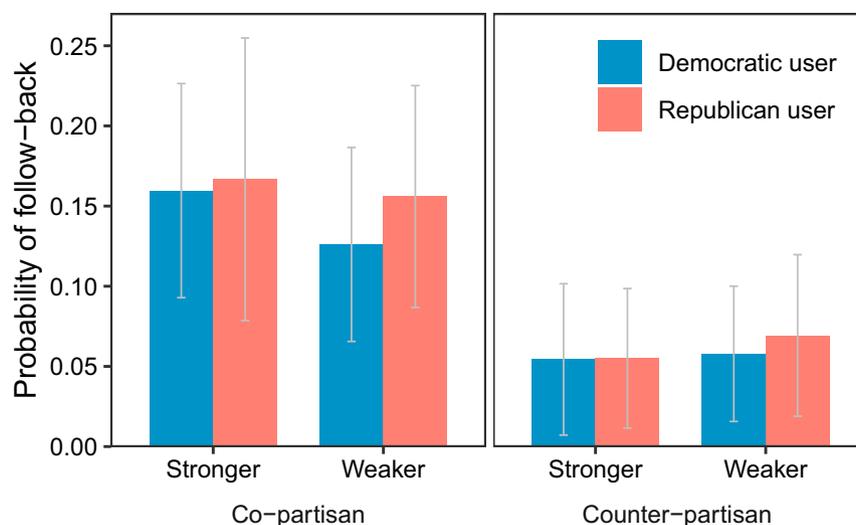

Fig. 2. Twitter users of both parties were nearly three times more likely to follow-back a copartisan account compared to a counterpartisan account. Shown is the probability of Democratic and Republican users following-back our accounts in each experimental condition. Error bars indicate 95% confidence intervals.

that is observed on social media networks. Our findings demonstrate that people are more likely to be connected to copartisans not just because of preexisting partisan assortment in offline networks or because algorithms preferentially recommend new connections with copartisans. Instead, partisans are much more likely to connect to complete strangers simply because they share the same political views. This suggests that if one seeks to reduce partisan assortment on social media networks it may be necessary for algorithms to actively counteract preexisting psychological biases—biases that are part of the political sectarianism in which America is currently embroiled (14).

Methods

We identified Twitter users who had retweeted MSNBC or Fox News posts, collected up to their last 3,200 tweets, and classified each user's partisanship based on the content they shared from left- versus right-leaning websites (15) (strength of partisanship was measured as the absolute value of partisanship score). We removed users with more than 15,000 followers or for whom the partisanship estimator was unable to return a score and then constructed a politically balanced set of users to form the subject pool for our experiment. We created homogeneous blocks of users based on partisanship, users' partisanship extremity (absolute value of estimated partisanship), number of followers, number of days with at least one tweet in

past 14 d, and number of mutual friendships divided by total number of followers (as a proxy for tendency to reciprocate follows). We then used this blocking to randomly assign the partisanship concordance and identification strength of the bot that followed each user. To make our bot accounts credible, each account initially had ∼1,000 politically neutral followers and retweeted 10 political tweets aligned with the bot's ideology. We had planned to follow 6,000 users over 14 d, but Twitter blocked our accounts' ability to follow more users after 2 d, at which point we were forced to conclude the experiment after following $n = 842$ users (median 64.5 followers, 218 followed accounts, 4,416 total tweets, 46% Republican, 45% female, and mean age 45.8 y). Our study was approved with a waiver of informed consent by the MIT Committee on the Use of Humans as Experimental Subjects Protocol 910465 and preregistered at https://aspredicted.org/ca3nm.pdf.

1. L. Huddy, L. Mason, L. Aarøe, Expressive partisanship: Campaign involvement, political emotion, and partisan identity. *Am. Polit. Sci. Rev.* **109**, 1–17 (2015).
2. S. Iyengar, Y. Lelkes, M. Levendusky, N. Malhotra, S. J. Westwood, The origins and consequences of affective polarization in the United States. *Annu. Rev. Polit. Sci.* **22**, 129–146 (2019).
3. M. Gentzkow, J. M. Shapiro, Ideological segregation online and offline. *Q. J. Econ.* **126**, 1799–1839 (2011).
4. E. Colleoni, A. Rozza, A. Arvidsson, Echo chamber or public sphere? Predicting political orientation and measuring political homophily in Twitter using big data. *J. Commun.* **64**, 317–332 (2014).
5. S. Flaxman, S. Goel, J. M. Rao, Filter bubbles, echo chambers, and online news consumption. *Public Opin. Q.* **80**, 298–320 (2016).
6. A. J. Stewart *et al.*, Information gerrymandering and undemocratic decisions. *Nature* **573**, 117–121 (2019).
7. B. Sinclair, *The Social Citizen: Peer Networks and Political Behavior* (University of Chicago Press, 2012).
8. D. DellaPosta, Y. Shi, M. Macy, Why do liberals drink lattes? *AJS* **120**, 1473–1511 (2015).
9. S. Currarini, M. O. Jackson, P. Pin, Identifying the roles of race-based choice and chance in high school friendship network formation. *Proc. Natl. Acad. Sci. U.S.A.* **107**, 4857–4861 (2010).
10. G. A. Huber, N. Malhotra, Political homophily in social relationships: Evidence from online dating behavior. *J. Polit.* **79**, 269–283 (2017).
11. A. Boutyline, R. Willer, The social structure of political echo chambers: Variation in ideological homophily in online networks. *Polit. Psychol.* **38**, 551–569 (2017).
12. J. Baron, J. T. Jost, False equivalence: Are liberals and conservatives in the United States equally biased? *Perspect. Psychol. Sci.* **14**, 292–303 (2019).
13. P. H. Ditto *et al.*, Partisan bias and its discontents. *Perspect. Psychol. Sci.* **14**, 304–316 (2019).
14. E. J. Finkel *et al.*, Political sectarianism in America. *Science* **370**, 533–536 (2020).
15. G. Eady, J. Nagler, R. Bonneau, J. A. Tucker, "Political information sharing and ideological polarization" (Midwest Political Science Association, Chicago, 2019).