

Spreading and influence of fake and traditional fact-based news in Twitter

Alexandre Bovet^{1,2}, Hernán A. Makse³

1) naXys and Department of Mathematics, University of Namur, Rempart de la Vierge 8, 5000 Namur, Belgium.

2) ICTEAM, Université catholique de Louvain, Avenue George Lemaître 4, 1348 Louvain-la-Neuve, Belgium
alexandre.bovet@unamur.be

3) Levich Institute and Physics Department, City College of New York, New York, New York 10031, USA

While misinformation and propaganda have existed since ancient times, their importance and influence in the age of social media is still not clear. Here, we characterize and compare the spread of information from websites containing fake news with the spread of information from traditional news websites on the social media platform Twitter using a dataset of more than 170 million tweets covering the five months preceding election day and concerning the two main candidates of the 2016 US presidential election [1].

We identify 30 million tweets containing a URL directing to a news outlet, sent by 2.2 million users. We classify news outlets among the top 250 shared domain names as spreading fake news and traditional news, from right to left, based on a list of news outlets curated by independent fact-checking and bias ranking organizations. We find that 25% of the tweets linking to news outlets points to websites containing fake or extremely biased news and that automated accounts diffusing fake news are much more active than the automated accounts diffusing other types of news. We analyze the information diffusion networks by reconstructing the retweet networks corresponding to each type of news. We find that the networks of user diffusing fake news have a higher average degree and a less heterogeneous degree distribution than traditional news diffusion networks. Influencers of each news network are identified using the collective influence algorithm [2]. While influencers of traditional news outlets are journalists and public figures with verified Twitter accounts, most influencers of fake news and extremely biased websites are unknown users or users with deleted Twitter accounts. We use a causal modeling [3] to understand the influence of the top news spreaders' activity on the supporters' activity, identified with a machine learning approach [4]. We reveal that influencers of traditional news are driving the activity of the most part of Twitter while fake news top spreaders are, in fact, mostly following the activity of Trump supporters (see Fig. 1).

Our investigation [1] provides new insights into the dynamics of news diffusion in Twitter, namely our results suggests that fake and extremely biased news are governed by a different diffusion mechanism than traditional center and left-leaning news. Center and left leaning news diffusion is driven by a small number of influential users, mainly journalists, and follow a diffusion cascade in a network with heterogeneous degree distribution which is typical of diffusion in social networks [5], while the diffusion of fake and extremely biased news seem to not be controlled by a small set of users but rather to take place in a tightly connected cluster of users that do not influence the rest of Twitter activity. Our results reveal that Twitter activity is mainly driven by traditional center and left leaning news outlets.

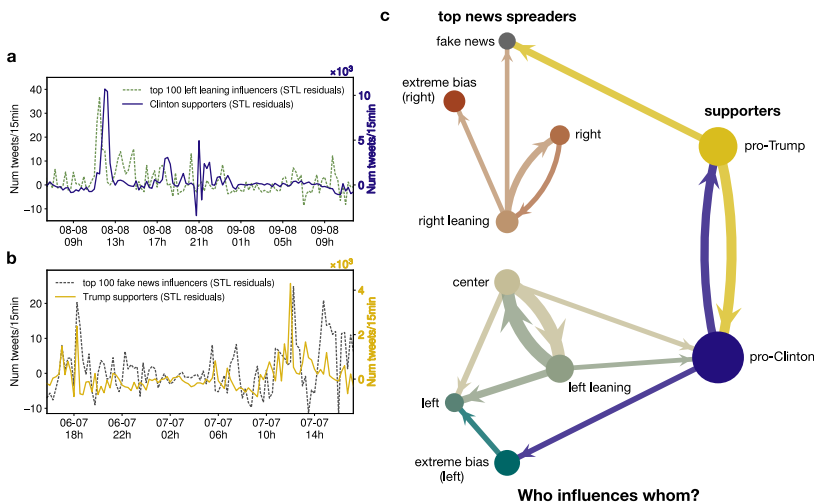


Figure 1. Causal network reconstruction between top news spreaders and supporters activity. (a),(b) Activity time series corresponding to the top left leaning news spreaders, the Clinton supporters, the top 100 fake news spreaders and the Trump supporters. Peaks in the left leaning news spreaders activity (yellow, dashed) tend to precede peaks in the activity of Clinton supporters (blue). (c) Graph showing the maximal causal effects between the activity of the top 100 news spreaders of each media category (left) and the activity of the supporters (right) computed over the entire five months. Arrows indicate the direction of the maximal causal effect (> 0.05). The width of each arrow is proportional to the strength of the causation. The center and left leaning top news spreaders are the news spreaders that show the strongest causal effect on the supporters activity.

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