

# Polarization, Partisanship and Junk News Consumption on Social Media During the 2018 US Midterm Elections

[COMPROP](#) DATA MEMO 2018.5 / NOVEMBER 1, 2018  
[comprop@oii.ox.ac.uk](mailto:comprop@oii.ox.ac.uk)

Nahema Marchal  
Oxford University  
[nahema\\_marchal@oii.ox.ac.uk](mailto:nahema_marchal@oii.ox.ac.uk)  
[@nahema\\_marchal](https://twitter.com/nahema_marchal)

Lisa-Maria Neudert  
Oxford University  
[lisa-maria.neudert@oii.ox.ac.uk](mailto:lisa-maria.neudert@oii.ox.ac.uk)  
[@lmneudert](https://twitter.com/lmneudert)

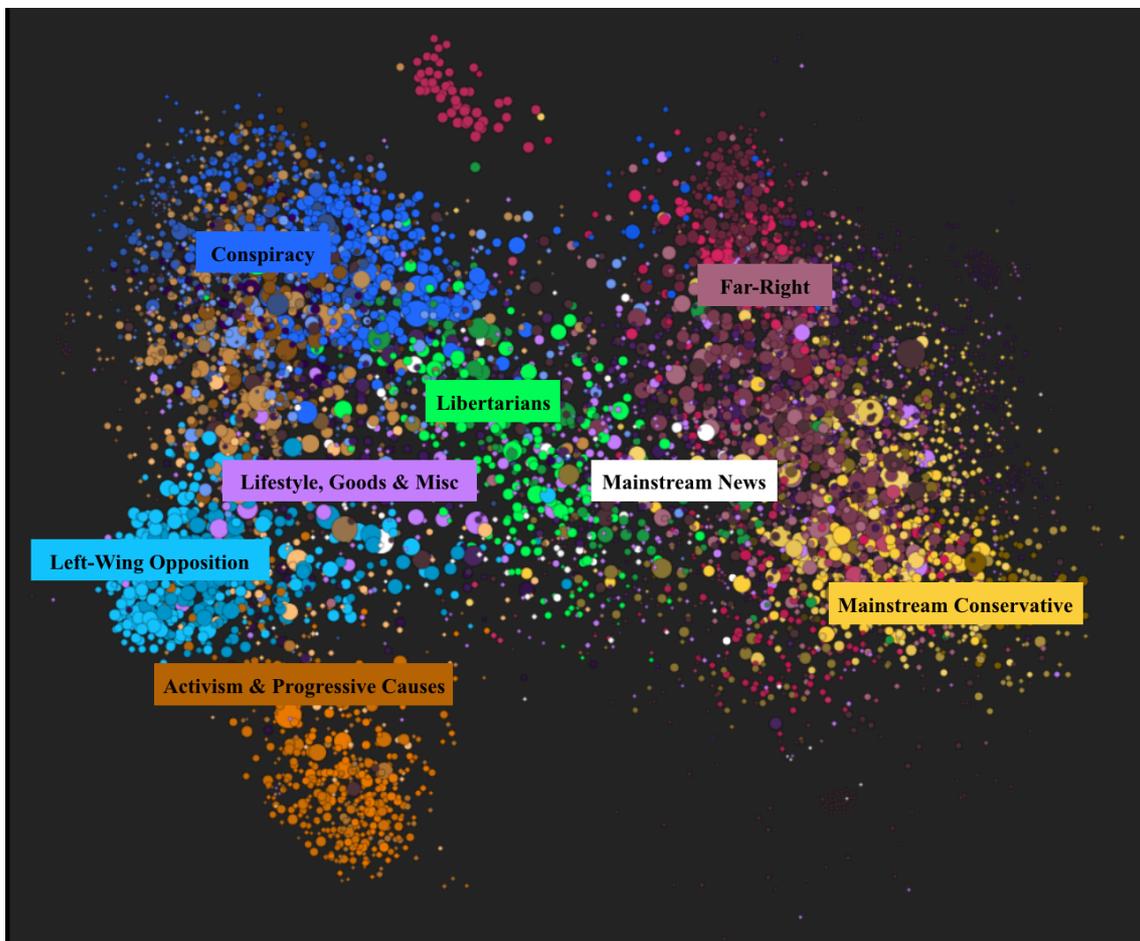
Bence Kollanyi  
Oxford University  
[bence.kollanyi@oii.ox.ac.uk](mailto:bence.kollanyi@oii.ox.ac.uk)  
[@bencekollanyi](https://twitter.com/bencekollanyi)

Philip N. Howard  
Oxford University  
[philip.howard@oii.ox.ac.uk](mailto:philip.howard@oii.ox.ac.uk)  
[@pnhoward](https://twitter.com/pnhoward)

## 1. US Audience Groups on Facebook

Each node in this network (*Figure 1*) represents an account on Twitter. Each node belongs to both a broad group and a smaller cluster within that group. A cluster is a collection of nodes with a shared pattern of interest while a group is a collection of clusters that are politically, culturally, or socially similar. The size of each node is proportional to the number of other nodes that follow it on Twitter. The color of each node is based on its parent cluster. *Figure 1* is the full color visualization of the US audience groups we found on Facebook

**Figure 1: Full Illustration of US Audience Groups on Facebook**



*Source: Authors' calculations from data sampled 29/09/18-29/10/18. Note: Groups are determined through network association and our interpretation of the kinds of content these users distribute.*

The nodes are placed within the map using a Fruchterman-Reingold visualization algorithm. This works to place nodes on the map according to two principles: first, a “centrifugal force” acts upon each node to push it to the edge of the canvas; second, a “cohesive force” acts upon every connected pair of nodes to pull them closer together. Table 1 gives a full list of Twitter groups and associated clusters considered in this study.

Table 1 gives a full list of groups and associated segments considered in this study. Segments were labeled based on the pages and accounts affiliated with them. When the algorithm detected segments that were congruent, they received identical labels.

<b>Table 1: Groups and Segments for the Facebook Visualization</b>	
Groups	Segments
Activism & Progressive Causes	Animal Rights Anti-GMO Drug Law Reform Feminism LGBTQ Activism Marijuana Legalization Occupy Racial Justice Women's Rights
Left-Wing Opposition	Anti-Trump Memes US Anti-Trump
Conspiracy	Anarchist Conspiracy Anti-Media US Truthers Preppers & Survivalists
Far-Right	Anti-Immigration Defense Leagues Far Right Pro Gun Movement Far Right to Live Far Right Conservative
Left-Wing Opposition	Anti-Trump Memes US Anti-Trump
Libertarians	Libertarian Anarchists Libertarians
Mainstream Conservatives	Conservative Think Tanks Conservative Pundits GOP GOP State Parties Pro-Israel Conservatives
Lifestyle, Consumer Goods & Misc	Consumer Brands DIY Brands Food Inspiration US Navy & Army Spirituality
Mainstream News	US Mainstream News Outlets

*Source: Authors' calculations from data sampled 29/09/2018 - 29/10/2018*

## 2. Heterophily Index

For every pairing of groups within a network map, a value of heterophily can be calculated. This is a measure of the level of connection between the groups. In order to determine this a ratio is calculated between the actual ties between two groups, compared to the expected ties between the groups if all the accounts in the map were evenly distributed. The natural log of these ratios is then taken, along with a zero correction to create a balanced index and to ensure that all values are displayed in a positive form.

$$Ratio\ of\ Ratios_T = \frac{\frac{Connections_{pairing}}{\sum_{all\ pairings} Connections}}{Connections_{pairing}}}{\frac{Connections_{pairing}}{\sum_{all\ pairings} Connections}}$$

Expression A: Ratio of Two Ratios

This heterophily index is therefore created through a ratio of two ratios. This ratio reveals whether two nodes have about the proportion of links they should have given its size. This is displayed in Expression A, where a pairing of groups is calculated as having a measure of connections in balance with its share of all the connections.

Half the distribution of possible values from this ratio of ratios ranges from 0 to 1 (corresponding to disproportionately small share of connections in a group given its size) and the other half ranges from 1 to +infinity (a disproportionately large share of connections in a group given its size). However, by taking the natural log of the ratio of ratios the index will become more balanced: from -infinity to 0 becomes less than proportionate share, and from 0 to +infinity becomes more than proportionate share. For example, take a three-group network (A, B and C). If nodes in group A have a total of ten connections, and there are ten nodes in each group, then the expected connections between A and B will be 3.33. If, in reality, the nodes in group A actually have all ten connections to nodes in group B then this connection is stronger than expected. The heterophily score for groups A and B =  $10/3.33 = 3.0$ . The natural log of this is then taken along with a zero correction across the range of heterophily values.

A greater heterophily index indicates a denser pattern of connections between the two groups. It is important to note however that these scores indicate only first order connections, not second or third order connections. The pairwise Heterophily scores for the Twitter groups are given in Table 2.

**Table 2: Heterophily Indexes for Junk News Audiences Groups on Facebook**

Groups	Activism & Progressive Causes	Conspiracy & Anti-Media	Hard Right	Left-Wing Opposition	Libertarians	Lifestyle, Consumer Goods & Misc	Mainstream Conservative	Mainstream News	Unclustered
Activism & Progressive Causes	3,1	1,1	0,1	1,3	0,8	0,5	0,1	0,9	0,5
Conspiracy & Anti-Media	0,0	2,9	0,3	0,0	1,9	0,7	0,1	0,5	0,4
Far-Right	0,0	0,0	2,9	0,0	0,9	0,5	1,6	0,5	0,9
Left-Wing Opposition	0,0	0,6	0,1	9,4	0,3	0,5	0,2	0,5	0,3
Libertarians	0,0	0,0	0,0	0,0	9,2	0,7	1,3	1,1	1,3
Lifestyle, Consumer Goods & Misc	0,0	0,0	0,0	0,0	0,0	1,6	0,7	0,8	1,1
Mainstream Conservative	0,0	0,0	0,0	0,0	0,0	0,0	3,5	0,9	2,0
Mainstream News	0,0	0,0	0,0	0,0	0,0	0,0	0,0	3,1	0,9
Unclustered	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	4,3

*Source: Authors' calculations from data sampled 29/09/2018 - 29/10/2018*

### 3. List of Twitter Hashtags Tracked

**Table 3: Hashtags for Data Collection on Twitter**

<i>Category</i>	<i>Hashtags</i>
Democratic Party	#democrats, #democrat, #dems, #bluewave, #bluewave2018, #voteblue, #winblue, #flipitblue, #bluewavecoming2018, #bluewaveiscoming, #bluetsunami2018, #dem, #uniteblue, #bluetsunami, #votebluetosaveamerica, #votegopout
Republican Party	#republicans, #voteredtosomeamerica, #gop, #walkaway, #voterred2018, #republican, #voterred, #redwaverising, #walkawayfromdemocrats2018, #redwaverising2018, #redwave, #votedemsout, #rednationrising, #redwave2018, #voteblue2018, #votedemout
General	#midterms, #midterms2018, #midtermelections, #2018midterms, #whenweallvote, #earlyvoting, #getoutthevote

*Source: Authors' calculations from data sampled 21/09/2018 - 30/09/2018*

### 4. Clustering Algorithm for Determining Groups and Clusters

In order to generate clusters and groups for each map it is necessary to employ a clustering algorithm. This involves first building a bipartite graph between nodes in the map and the rest of the social medium in question. This bipartite graph provides a structural similarity metric between nodes in the map. This was then used in combination with a hierarchical agglomerative clustering algorithm in order to cluster a map into distinct communities. This is a 'bottom up' approach whereby each observation starts in its own cluster, and pairs of clusters are merged as one moves up the hierarchy. Twitter maps are clustered based on follower-relationships, since mention-relationships have been shown to overemphasize the news cycle and salient external events. Facebook networks are clustered based on page likes.

### 5. Junk News Classification

These sources deliberately publish misleading, deceptive or incorrect information purporting to be real news about politics, economics or culture. This content includes various forms of propaganda and ideologically extreme, hyper-partisan, or conspiratorial news and information. For a source to be labelled as junk news at least three of the following five characteristics must apply:

- **Professionalism:** These outlets do not employ the standards and best practices of professional journalism. They refrain from providing clear information about real authors, editors, publishers and owners. They lack transparency, accountability, and do not publish corrections on debunked information.
- **Style:** These outlets use emotionally driven language with emotive expressions, hyperbole, ad hominem attacks, misleading headlines, excessive capitalization, unsafe generalizations and fallacies, moving images, graphic pictures and mobilizing memes.
- **Credibility:** These outlets rely on false information and conspiracy theories, which they often employ strategically. They report without consulting multiple sources and do not employ fact-checking methods. Their sources are often untrustworthy and their standards of news production lack credibility.
- **Bias:** Reporting in these outlets is highly biased and ideologically skewed, which is otherwise described as hyper-partisan reporting. These outlets frequently present opinion and commentary essays as news.
- **Counterfeit:** These outlets mimic professional news media. They counterfeit fonts, branding and stylistic content strategies. Commentary and junk content is stylistically disguised as news, with references to news agencies, and credible sources, and headlines written in a news tone, with bylines, date, time and location stamps.

Table 4 gives a list of the top 30 junk news sources used for this analysis.

<b>Table 4: Top 30 Junk News Sources on Twitter</b>	
<i>Domain</i>	<i>Example URL</i>
100percentfedup.com	<a href="https://100percentfedup.com/kavanaugh-witch-hunt-backfires-internet-explodes-with-democrats-saying-theyll-be-voting-all-red-for-first-time-ever/">https://100percentfedup.com/kavanaugh-witch-hunt-backfires-internet-explodes-with-democrats-saying-theyll-be-voting-all-red-for-first-time-ever/</a>
americanthinker.com	<a href="https://www.americanthinker.com/articles/2018/09/kavanaugh_character_assassins_must_pay_in_november.html">https://www.americanthinker.com/articles/2018/09/kavanaugh_character_assassins_must_pay_in_november.html</a>
barenakedislam.com	<a href="http://barenakedislam.com/2018/09/28/backfire-democrats-walkaway-in-droves-following-kavanaugh-circus/">http://barenakedislam.com/2018/09/28/backfire-democrats-walkaway-in-droves-following-kavanaugh-circus/</a>
bigleaguepolitics.com	<a href="https://bigleaguepolitics.com/woman-who-confronted-flake-in-elevator-runs-soros-funded-organization/">https://bigleaguepolitics.com/woman-who-confronted-flake-in-elevator-runs-soros-funded-organization/</a>
breitbart.com	<a href="https://www.breitbart.com/big-government/2018/09/24/mike-pompeo-and-nikki-haley-slam-ludicrous-cnn-question-about-25th-amendment/">https://www.breitbart.com/big-government/2018/09/24/mike-pompeo-and-nikki-haley-slam-ludicrous-cnn-question-about-25th-amendment/</a>
cnsnews.com	<a href="https://www.cnsnews.com/news/article/terence-p-jeffrey/bls-americans-spent-more-taxes-food-clothing-combined-2017">https://www.cnsnews.com/news/article/terence-p-jeffrey/bls-americans-spent-more-taxes-food-clothing-combined-2017</a>
committedconservative.com	<a href="http://committedconservative.com/2018/09/06/republicans-should-use-mueller-doctrine-to-investigate-democrats/">http://committedconservative.com/2018/09/06/republicans-should-use-mueller-doctrine-to-investigate-democrats/</a>
dailycaller.com	<a href="https://dailycaller.com/2018/09/29/rand-paul-senate-doxx-probe/">https://dailycaller.com/2018/09/29/rand-paul-senate-doxx-probe/</a>
dailywire.com	<a href="https://www.dailywire.com/news/36413/walkaway-march-washington-frank-camp">https://www.dailywire.com/news/36413/walkaway-march-washington-frank-camp</a>
davidharrisjr.com	<a href="https://davidharrisjr.com/politics/kavanaugh-accuser-loses-susan-collins-vote/">https://davidharrisjr.com/politics/kavanaugh-accuser-loses-susan-collins-vote/</a>
gellerreport.com	<a href="https://gellerreport.com/2018/09/democrats-5x-refugees.html/">https://gellerreport.com/2018/09/democrats-5x-refugees.html/</a>
infowars.com	<a href="https://www.infowars.com/backfire-democrats-walkaway-in-droves-following-kavanaugh-circus/">https://www.infowars.com/backfire-democrats-walkaway-in-droves-following-kavanaugh-circus/</a>
libertyheadlines.com	<a href="https://www.libertyheadlines.com/limbaugh-kavanaugh-constitution-jurisprudence/">https://www.libertyheadlines.com/limbaugh-kavanaugh-constitution-jurisprudence/</a>
lifeneews.com	<a href="https://www.lifeneews.com/2018/09/25/if-youre-sick-of-the-lefts-attacks-on-brett-kavanaugh-get-out-and-vote-this-november/#.W6s31_6JA3s.twitter">https://www.lifeneews.com/2018/09/25/if-youre-sick-of-the-lefts-attacks-on-brett-kavanaugh-get-out-and-vote-this-november/#.W6s31_6JA3s.twitter</a>
michaelsavage.com	<a href="https://michaelsavage.com/is-dr-ford-deeply-tied-to-cia/">https://michaelsavage.com/is-dr-ford-deeply-tied-to-cia/</a>
newrightnetwork.com	<a href="https://www.newrightnetwork.com/2018/09/john-brennan-sociopath.html">https://www.newrightnetwork.com/2018/09/john-brennan-sociopath.html</a>
patriotsvotingcoalition.weebly.com	<a href="http://Patriotsvotingcoalition.weebly.com">http://Patriotsvotingcoalition.weebly.com</a>
pjmedia.com	<a href="https://pjmedia.com/trending/trump-heads-out-on-five-state-blitz-to-save-gop-majority/">https://pjmedia.com/trending/trump-heads-out-on-five-state-blitz-to-save-gop-majority/</a>
rawstory.com	<a href="https://www.rawstory.com/2018/09/michael-avenatti-reveals-now-representing-new-brett-kavanaugh-accuser-deborah-ramirez/#.W6hHTjrpTtU.twitter">https://www.rawstory.com/2018/09/michael-avenatti-reveals-now-representing-new-brett-kavanaugh-accuser-deborah-ramirez/#.W6hHTjrpTtU.twitter</a>
reverbpress.news	<a href="https://reverbpress.news/news/gop-pollster-admits-weve-lost-as-2-in-3-americans-see-through-tax-scam-spin/">https://reverbpress.news/news/gop-pollster-admits-weve-lost-as-2-in-3-americans-see-through-tax-scam-spin/</a>
theblacksphere.net	<a href="https://theblacksphere.net/2018/09/why-leftists-dont-want-blasey-fords-past-examined/">https://theblacksphere.net/2018/09/why-leftists-dont-want-blasey-fords-past-examined/</a>
thedailydigest.org	<a href="http://www.thedailydigest.org/2018/09/20/mayfield-carries-browns-to-first-win-since-2016/">http://www.thedailydigest.org/2018/09/20/mayfield-carries-browns-to-first-win-since-2016/</a>
thefederalist.com	<a href="http://thefederalist.com/2018/09/20/democrat-rep-says-boo-hoo-hoo-to-rape-threats-against-sen-susan-collins-staff/#.W6PmReV1930.twitter">http://thefederalist.com/2018/09/20/democrat-rep-says-boo-hoo-hoo-to-rape-threats-against-sen-susan-collins-staff/#.W6PmReV1930.twitter</a>
thegatewaypundit.com	<a href="https://www.thegatewaypundit.com/2018/09/it-was-all-a-democrat-plot-christine-ford-adviser-told-democrats-in-july-call-about-plot-to-take-down-kavanaugh-audio/?omhide=true&amp;utm_source=TGP+Communications&amp;utm_campaign=0e9907d94e-EMAIL_CAMPAIGN_09_21&amp;utm_medium=email&amp;utm_term=0_b3f16dae4d-0e9907d94e-16443351">https://www.thegatewaypundit.com/2018/09/it-was-all-a-democrat-plot-christine-ford-adviser-told-democrats-in-july-call-about-plot-to-take-down-kavanaugh-audio/?omhide=true&amp;utm_source=TGP+Communications&amp;utm_campaign=0e9907d94e-EMAIL_CAMPAIGN_09_21&amp;utm_medium=email&amp;utm_term=0_b3f16dae4d-0e9907d94e-16443351</a>
theoldschoolpatriot.com	<a href="https://theoldschoolpatriot.com/heres-why-the-democrats-will-lose-in-november/">https://theoldschoolpatriot.com/heres-why-the-democrats-will-lose-in-november/</a>
thepoliticalinsider.com	<a href="https://thepoliticalinsider.com/jerry-brown-donald-trump-something-needs-happen/?utm_medium=email&amp;utm_source=criticalimpact&amp;utm_campaign=TPI_breaking_newsletter_9_23_2018&amp;utm_content=889f45ea6fd3ce4ea6473c7b9fa19141&amp;source=CI">https://thepoliticalinsider.com/jerry-brown-donald-trump-something-needs-happen/?utm_medium=email&amp;utm_source=criticalimpact&amp;utm_campaign=TPI_breaking_newsletter_9_23_2018&amp;utm_content=889f45ea6fd3ce4ea6473c7b9fa19141&amp;source=CI</a>
truepundit.com	<a href="https://truepundit.com/details-surface-of-cory-booker-molesting-a-drunk-teenager-spartacus-past-catches-up-with-pompous-senator/">https://truepundit.com/details-surface-of-cory-booker-molesting-a-drunk-teenager-spartacus-past-catches-up-with-pompous-senator/</a>
truthfeednews.com	<a href="https://truthfeednews.com/trump-keeps-his-promise-and-drops-the-hammer-on-immigrant-welfare/">https://truthfeednews.com/trump-keeps-his-promise-and-drops-the-hammer-on-immigrant-welfare/</a>
ussanews.com	<a href="http://ussanews.com/News1/2018/09/27/report-trump-jr-calls-out-the-gop-in-his-praise-of-kavaugh-testimony/">http://ussanews.com/News1/2018/09/27/report-trump-jr-calls-out-the-gop-in-his-praise-of-kavaugh-testimony/</a>
zerohedge.com	<a href="https://www.zerohedge.com/news/2018-09-24/real-red-wave-republican-sentiment-soars-record-high">https://www.zerohedge.com/news/2018-09-24/real-red-wave-republican-sentiment-soars-record-high</a>

*Source: Authors' calculations from data sampled 21/09/2018 - 30/09/2018*