Approaches and methods for the study of social media in political communication

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The role of social media in political communication

Given the distributed, multi-platform media environment across which news outlets and citizens alike share and discuss political events, social media are ever-present in contemporary politics. Consequently, the study of social media's role in political communication is now well-established across media and communication studies, information studies, as well as political science – as is evidenced by the production of multi-disciplinary volumes such as the *Routledge Companion to Social Media and Politics* (Bruns et al 2016). While researchers in areas like computer-mediated communication (CMC), social network analysis and internet studies were among the first to study social media use (boyd & Ellison, 2007), the political uses and implications of social media are increasingly of interest and concern across the spectrum of social science disciplines. This widespread interest has proceeded alongside the ongoing embedding of social media platforms and practices in the machinery of politics, and the near-ubiquity of social media use among the populations of many nations. However, the specific social media *platforms* are not ubiquitous, with Facebook and Twitter popular in many parts of the world but irrelevant in China, where social media activity revolves around instant messaging apps like WeChat and, to a lesser extent, the microblogging platform Weibo.

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Most familiarly to scholars of political communication, social media plays a significant role in formal (electoral and state-based) politics. There has been a huge amount of study of the use of social media in the Obama campaign, for example. Following a well-worn tradition, media and communication scholars follow and evaluate the use of these new forms of political communication and mediation by political candidates and office-holders, particularly during election campaigns (for an overview, see Baldwin-Philippi, 2017). As the 2017 US Presidential campaign and political events in 2017 have shown, the business models, algorithmic operations and politics of platforms have become ever-more problematically entangled with the politics of the state and the operation of democratic processes such as elections.

While the role of the internet in electoral campaigns, deliberative democracy and 'e-government' has been very well established since the 1990s, one of the distinctive features of social media is the way it produces convergences between popular culture and everyday life on the one hand, and the more formal spaces of politics concerning governments and elections, which are more traditionally understood as the objects of 'political communication', on the other. This leads to new fields of study concerning 'everyday politics' in social media (Highfield, 2016), including the role of vernacular internet cultural forms like memes and animated gifs in public politics (for examples, see Milner, 2016).

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The role of social media in new social movements and political activism has been a relatively new and dynamic area of research (for an overview, see Poell & van Dijck, 2017). There has been intensive attention played to the role of social media within the broader media ecology in the events collectively and colloquially known as the Arab Spring (Bruns, Burgess & Highfield, 2013); as well as the new forms of civil rights protest and activist culture associated with the #occupy movement (Gerbaudo, 2017), the social media elements of the black civil rights movement organised around the hashtag #blacklivesmatter (Freelon et al., 2016) and a range of feminist or environmental campaigns.

Twitter and the rise of 'hashtag studies'

Twitter is especially popular as a site of study for the relationship between social media and politics. Arguably, Twitter has been of particular interest to researchers because of its relative openness in terms of data access, and because of its multi-lingual and multi-national take-up. Indeed, it was of interest to us when we

applied for funding for the study reported in this collection of articles, because it was popular in both Australia and Brazil, and in both countries it was used alongside Facebook for formal political communication and organised activism, as well as for informal or everyday political engagement.

The relevance of Twitter to studies of political communication is partly due to the platform's communicative affordances (like short tweets, network structures that can be ephemeral rather than relationship-based, and its real-time character), which suit 'newsiness', discussion and debate. Twitter is also extremely popular with both journalists and political actors like campaigners, activists and politicians. But it is largely because of the platform's research affordances, especially the relative openness and accessibility of the Twitter API, that it has been so attractive to social science researchers equipped with the capability to undertake data-driven analyses using digital methods. It is important to note however that there are significant challenges posed to researchers in the area of data access as Twitter's business model and technical governance structures have tightened up around open access to its data, and this situation is continuing to worsen (Burgess & Bruns, 2015; Puschmann & Burgess, 2014).

A large proportion of Twitter studies relies on hashtags, keywords, or 'bundles' and combinations of these to source tweets relevant to a topic, issue or event. Especially at earlier phases of data-driven Twitter research in the fields of communication and politics, this was the only reliable way to get a sense of the public conversation around a particular event or topic; and many public conversations were mediated by hashtags, creating 'hashtag publics' of different kinds and with different communicative purposes (Bruns & Burgess, 2015). Even then, though, it wasn't always possible to capture all or even most of the conversation on any particular event, as the 'official' hashtags for specific events or topics took a while to emerge, or a number of alternatives remained operating in parallel. The role of hashtags and their usefulness for researchers has evolved significantly, as the platform has grown and there is less consensus among its user communities on the right hashtag or keyword to use, or whether to use them at all. Additionally, even if relevant hashtags were used consistently, it has always been the case that conversation threads could cross over from one topic to another.

Perversely, hashtags may also become less useful as topics become more widespread. This is because some events or issues are so globally significant

and far-reaching that the use of hashtags to refer to them seems redundant. For example, when David Bowie died in 2016, a huge volume of tweets that were concerned with his death did not contain a hashtag or even the name 'Bowie' – this particular celebrity death was understood to be such a common experience by posters that they clearly assumed they need not refer to it explicitly in order to convey their meaning – a common feature of very widespread 'social media events' (Burgess, Mitchell & Münch, 2018). It is therefore important that data-driven research approaches to political communication on Twitter move beyond 'hashtag studies', and consider other, more systematic and comprehensive, approaches as well.

Population-based approaches to studying politics on Twitter

Hashtag-based studies are able to investigate only a self-selecting subset of political discussion on Twitter: they capture only those tweets whose authors made the conscious choice to include a specific hashtag in their tweets; in practice, they usually also cover only those hashtags that the researchers themselves had become aware of before or during the political event being studied, ignoring minor or alternative other hashtags in their analysis. Within these limitations, such studies are undoubtedly useful; however, it is equally important to explore additional and alternative approaches that can extend or complement such hashtag-based analyses. One such approach is pursued in the present study.

Especially in the context of formal political events that feature a defined set of central actors - such as elections, referenda, parliamentary sessions, televised debates, etc. - a population-based approach can generate a very different perspective on the political uses of Twitter. In such contexts, a smaller or larger set of officially recognised actors - from the two remaining candidates in the final round of a presidential election process to the several hundred members of a national legislature, from the journalists moderating a televised debate to the press corps accredited to cover the national parliament - can be easily identified from official sources. For these actors, it is then possible to determine their official Twitter accounts (and other social media presences), to the extent that they exist, by drawing on their official profiles and/or available social media search functions. This is aided also by the tendency for official actors to seek verification of their

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accounts from Twitter, in order to distinguish such accounts from potential parody accounts that may also exist.

This results in a list that associates identified political actors with their Twitter handles, and which can then be used both to track the public tweets from those accounts, and any public tweets from ordinary Twitter users that @ mention or retweet these accounts. Here, this approach draws on a widespread practice amongst Twitter users - including ordinary users as well as professional journalists and institutional accounts - to mention politicians not simply by their name ("Donald Trump"), but instead by their official Twitter handle ("@ realDonaldTrump"). This practice is by no means universal, of course (a point that we return to below), and the datasets that result from this population-based approach are therefore also self-selecting, but experience shows that the dataset of tweets thus captured is substantially different from the hashtag-based approach outlined above, and therefore usefully complements that approach, illuminating a different range of political engagement and discussion practices on Twitter.

Indeed, most importantly it is likely that, in comparise explained variously by demographics, interests, technological aptitude, communicative and informational contexts, or external developments.

Methodological considerations

The present study pursues this population-based approach for a Brazilian context by tracking the tweets by and to a substantial number of Brazilian political and media actors, over more than one year. This creates a number of considerable methodological challenges that should be addressed here in some detail. First, the preferred source of comprehensive information on the public communicative activities by and around selected accounts on Twitter is of course the Twitter Application Programming Interface (API), which - within known limits - returns structured and well-ordered data on tweeting activities upon request. To retrieve both the tweeting activities of specific accounts *and* the tweets directed at those accounts (including @mentions and retweets), however, two different API calls must be made: one which tracks the activities of a set of Twitter accounts as identified by their unique numerical user ID, and a second which tracks mentions of those accounts by treating the account names as a set of keywords and capturing any tweets that contain these keywords.

We first established a set of Brazilian Twitter accounts to be tracked, therefore, and generated a list of their Twitter account names. We then utilised the command-line tool *t* (Michaels-Ober, 2014) to systematically query all of these accounts for their full public profile information, including their user IDs. *t* uses the users/lookup API request to generate a comma-separated list of profile metadata which contains the user IDs; while the present study did not utilise any profile information other than the numerical user IDs themselves such metadata could be further explored to determine various patterns across the account population studied here, including account creation dates, tweeting rates, following behaviours, etc. Hanusch & Bruns (2017) pursue this approach - without also tracking and analysing their tweets - for a population of nearly 4,200 Australian journalists' accounts to establish common patterns of self-presentation on Twitter within this professional group.

For the present study, we then employed the open-source *Twitter Capture and Analysis Toolkit* (*TCAT*), developed by the Digital Methods Initiative at the University of Amsterdam (Borra & Rieder, 2014), to track the tweets by and to our population of accounts. Because of the need to capture both tweets by and to our list of accounts, this necessitated the creation of at least two *TCAT* instances: one running in 'user sample' mode to track the list of numerical IDs generated by *t* and capture all tweets posted by these accounts, and a second running in 'keyword track' mode to track the list of Twitter account names and capture all @mentions and retweets of these accounts posted by other users. This is because a single instance of *TCAT* cannot operate in both modes at the same time. (Studies interested only in posts by *or* tweets to a selection of accounts would be able to operate only one *TCAT* system in the appropriate tracking mode, of course.) In this context, it is also important to note that - due to the current limitations of the Twitter API - a single *TCAT* 'user sample' instance can only follow up to 5,000 distinct user IDs, while a single *TCAT* 'keyword track' instance can only track up to 400 distinct keywords; to track a larger population of accounts it is therefore also necessary to operate multiple *TCAT*s that cover different subsets of the overall population. The present study did not exceed either of these limits, however.

Even the tracking of a limited number of user IDs and account names may still result in a dataset of very significant proportions, however, if the accounts are highly active or receive a substantial amount of @mentions and retweets.

This is especially likely if - as in our present case - the population of accounts to be tracked contains a number of very high-profile actors (political leaders, celebrities, sporting stars, etc.) who are frequently the target of @mentions or whose tweets are often widely retweeted by their followers; such dynamics are also considerably more likely to be present for globally recognised actors or for accounts operating in nations with a large domestic Twitter userbase. A second significant methodological challenge is therefore related to the processing and analysis of the very large datasets gathered using *TCAT*. We addressed this challenge by exporting our datasets into the powerful cloud-based data storage and processing solution *Google BigQuery*.

Beyond the limited analytical capabilities built into *TCAT* itself, the toolkit offers a number of key data export functions. The 'export all tweets from selection' function generates a comma- or tab-separated values file that contains the captured tweets and their associated metadata (such as the unique numerical tweet ID, the posting date and time, and the posting account) and serves as the base dataset for any further analysis. Additionally, two further export functions provide comma- or tab-separated values files that generate additional data from the tweet texts themselves: 'export hashtag table' results in a list of the hashtag(s) associated with each tweet in the dataset, while 'export mentions table' provides a list of the account(s) mentioned in each tweet and also identifies whether each mention was a retweet or an ordinary @mention. These two additional tables can be joined with the main tweets table by using the numerical tweet ID as a unique identifier, a property which we utilise in *BigQuery*.

Due to the size of the Brazilian Twittersphere and the public visibility of the account population we focussed on, our tracking of Brazilian accounts captured some 25 million tweets and resulted in over 25GB of raw data - well more than could be effectively processed and analysed using conventional desktop solutions. This is not uncommon for major, long-term social media research projects observing large-scale communicative processes. Such datasets, then, require the use of advanced, cloud-based data solutions that shift the processing effort from the client to the server side; for our present purposes, we selected *Google BigQuery* from a range of similar solutions offered by competing providers. *BigQuery* offers a useful data upload interface that converts standard comma- or tab-separated value exports into database tables that can be queried using a

version of standard Structured Query Language (SQL) queries; this enables the comprehensive analysis of very large social media datasets using manual queries or dedicated client-side data analytics and visualisation tools.

For the present study, therefore, we uploaded the three files exported from *TCAT* (full export, hashtag export, and mentions export) into three database tables created in *BigQuery* following the process described in Bruns (2016). Using the same approach, we also created a further table not directly available from *TCAT*: here, we utilised a script available from Bruns (2016) to identify all URLs included in the tweet texts we had captured, and to resolve those shortened (*t.co*) URLs to their final destinations. This resulted in an additional datafile listing tweet IDs and the URLs contained in them, which we uploaded to a fourth *BigQuery* table.

The data contained in these tables could now be analysed with manual SQL queries initiated through the *BigQuery* Web interface; the structural logic for such queries is always an SQL 'left join' that connects the main 'full export' table with the three additional tables where a tweet ID in the main table is also present in one or more of the additional tables. However, the development and execution of such queries is time-consuming and prone to errors, as well as non-intuitive for researchers unfamiliar with SQL syntax; the use of a graphical front-end that connects to and automatically generates queries for *BigQuery* is preferable. A third component of our methodological setup is the use of such a tool, therefore: the high-end data analytics and visualisation software *Tableau*.

Tableau (2017) provides a standard data interface for the *BigQuery* service; after connecting to *BigQuery* and setting up the 'left join' relationships between the main 'full export' data table and the three additional tables uploaded to *BigQuery*, the data fields contained in all four tables are available for use in its graphical user interface (the full process for doing so is also described in Bruns, 2016). Compared to a manual querying of the *BigQuery* database, this enables a considerably more rapid exploration of the available data, generating analyses and visual representations of data patterns that offer substantial insights into the dynamics of tweeting activities by and to the account population being studied here.

It should be strongly noted in this context, however, that the end result of such exploration is not necessarily a mere quantitative representation of patterns in the overall, very large dataset of tweets: rather, such exploratory analysis can

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and should also be used specifically to identify particular subsets of the data that may benefit from much closer, qualitative or mixed-methods analysis. Such subsets could represent specific time periods exhibiting unusual activity patterns, notable groups of accounts (within the starting population, or amongst the ordinary users @mentioning and retweeting those selected accounts), or selections of tweets containing particular keywords or hashtags. Such subsets may in turn be exported from *Tableau* or directly from *BigQuery* as new datafiles to be subjected to close reading, manual coding, or other forms of further analysis outside of these initial analytics packages.

Our approach to gathering population-based datasets at large scale from Twitter connects three key toolsets, therefore: it gathers data through the Twitter API by using the *Twitter Capture and Analysis Toolkit* (*TCAT*); stores these data in the high-performance databases provided by *Google BigQuery*; and accesses these databases for processing and analysis in the graphical analytics solution *Tableau*. Alternatives for each of these tools may also be available, and could be preferable in different organisational and technological contexts; the overall three-step framework for the data gathering, storage, and processing setup that we have introduced here is likely to be replicated even if specific tools are exchanged for other alternatives, however. How this setup can be utilised in pursuit of specific research questions is outlined elsewhere in this collection.

Limitations of the population-based approach

As this and other studies have shown, the population-based approach can generate a range of valuable insights into patterns of Twitter activity that complement and advance well beyond existing hashtag studies; most centrally, of course, it enables an analysis of relevant public communication patterns that do not use the key hashtags related to the issue being discussed. However, the population-based approach is not without its own limitations, of course. In the first place, it depends on a meaningful selection of the population of accounts to be studied: the omission of accounts that are key to a particular topic or issue could considerably skew the subsequent analysis. Such accounts may still be present in the data gathered if they interacted directly with the population whose activities were being tracked (if they were involved in @reply discussions with or retweeted

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the tracked accounts, or were retweeted by them); however, this presence by association would not capture the entirety of such accounts' activities, of course. The limitations of the Twitter API, reproduced in Twitter capture tools such as *TCAT*, mean that it is usually prohibitively difficult to retrospectively gather additional data missing from the primary dataset; this makes it all the more important to begin from a very carefully constructed, comprehensive list of accounts to be tracked.

Second, while the population-based approach captures a very different range of activities compared to the hashtag-based approach, neither is likely to result in an entirely exhaustive dataset of relevant tweets. Most centrally, as noted above, the population-based approach builds on the expectation that it is a widespread practice for Twitter users to refer to key actors (in politics and elsewhere) by their Twitter account names, rather than simply by their personal names - but this practice may not be equally common across diverse contexts. On the one hand, it is possible that the official account name of a political actor may simply not be widely known, that its correct spelling is difficult to remember, or that users may frequently mistake another account (especially perhaps a parody account deliberately set up to mimic the politician) for the actor's official Twitter presence. In such cases, users may prefer to spell out the politician's name in their tweets instead, or may misdirect their tweets to another account.

On the other hand, users may actively refrain from directly @mentioning a specific actor by their account name - for instance because they do not wish to direct additional public attention to a politician whom they oppose, or because they fear retribution, especially for critical statements. Such reluctance to @mention political actors could be especially pronounced for comparatively extremist accounts, for both those reasons: Twitter users with non-extremist views might want to avoid acknowledging the online presence of extremist elements, and may be worried about becoming targets for attacks by the extremists' supporters if they post public criticism of such political actors. At the same time, however, fringe political actors could also attract especially much activity from their supporters if those supporters see Twitter (and other social media platforms) as a valuable means for promoting their political views in the absence of sufficient - or sufficiently sympathetic - media coverage, while social media activity around mainstream actors who are already highly present in print and broadcast media

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might remain comparatively muted.

Which of these dynamics prevail in any given case is likely to be highly contingent on a variety of local contextual factors, including the current political situation, the demographics of Twitter adoption in a given country, and the extent to which political actors themselves are active using - and encouraging their followers to use - the platform for public political debate. These factors are likely to differ widely between countries (and even between states and localities) as well as over time. Out point here is not to suggest a particular, standard interpretation of the observable patterns in population-based datasets, therefore, but rather to emphasise that the patterns observed in the data gathered must always be interpreted against the background of the data gathering approach chosen - this is as true for the population-based datasets we have introduced here as it has been for the hashtag-based datasets which have dominated much of the existing Twitter research literature.

Finally, the underlying limitations of the Twitter Application Programming Interface upon which *TCAT* and similar data gathering tools build also bear repeating here. For the total collection of search terms being tracked by a single *TCAT* instance, the standard API will only ever return up to one per cent of the total current global volume of tweeting activity, and this can result in limitations to the data being captured. Such limitations are perhaps more immediately felt in hashtag-based data gathering approaches: if a major hashtag at a time of important breaking news is present in ten per cent of all current tweets, *TCAT* would still only capture up to one per cent of all current tweets, and therefore only one tenth of all the possible tweets containing the hashtag.

In most circumstances, it is comparatively far less likely that the total volume of all current tweets mentioning a specific population of accounts would represent more than one per cent of the global feed of tweets, especially if these accounts belong to rank-and-file politicians in relatively minor nations. However, population-based tracking approaches that include major world leaders, especially during moments of heightened tension - @realDonaldTrump and @HillaryClinton on election night, @dilmabr and @MichelTemer during the impeachment process and subsequent protests - may occasionally surpass the one per cent limit, and their resultant datasets will therefore be incomplete. This is unavoidable unless commercial data gathering tools are used instead of *TCAT*

or similar solutions, and - because the omission of tweets delivered by the API follows an essentially random selection - does not unduly skew the analysis of the incomplete datasets, other than resulting in a systematic underestimation of total tweet volumes during such times; however, it remains crucial that researchers identify and note such limitations as they present their analyses.

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