Winning!
Electoral Adjudication and Dialogue in Social Media

November 30, 2020

Abstract

This article introduces the concept of *adjudication* to define the act of granting or denying ownership of an outcome to individuals or groups in social media. We extend existing models of political dialogue to explain differences between winners and losers on social medial when elections are adjudicated. We use Twitter data on four elections in Argentina (2019), Brazil (2018), United Kingdom (2019), and the United States (2016). Our findings show an increase in event salience upon adjudication, followed by a more extensive dialogue among winners and disengagement among losers. Further, we show differences in the network structure of dialogue, with dialogue in winning communities displaying a wider periphery and dialogue in losing communities being more hierarchical and more uncivil. We identify the causal effects of *adjudication* using a regression discontinuity design.

Keywords: Dialogue | Content Activation | Social Media

Introduction: A Tale of Two Elections

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity" (Dickens, 2000). Election night, when one candidate is declared the winner of the electoral contest while other candidates recognize defeat, is a momentous occasion in democratic representation (Nadeau and Blais, 1993). As voters adjudicate victory to one of the parties or candidates, supporters rejoice or commiserate together. In politics, as in sports, winners celebrate and engage each other while losers quietly empty the scene (Hollander, 2014). In this article, we introduce a theory of event *adjudication* and describe the effects of winning (and losing) on social media engagement and dialogue.

Our research presents a theory of how discourses propagate in social media when voters, judges, or nature, adjudicate victory to one of the interested parties. Election night is but one example, where voters adjudicate victory to a candidate or party. However, the logic extends to areas such as judicial decisions, news fact-checking, and sports. As the moment of adjudication approaches, salience and social engagement peaks. In social media, winners become more active while losers quiet down.

The consequences of winning or losing have been extensively discussed in the literature, as losing elections has an effect on regime legitimacy (Moehler and Lindberg, 2009), satisfaction with democracy (Anderson et al., 2005; Blais and Gélineau, 2007), and political trust (Anderson and LoTempio, 2002). However, less is known about the effect of electoral results on dialogue, a significant theoretical problem we address in this article.

As we will show, adjudication patterns provide critical information about information drift ("are election results updated by voters prior to adjudication?"), about network structure ("do high-degree *influencers* matter?"), and the prevalence of uncivil discourses on social media ("how winning/losing affect civility in social media?").

Network effects are particularly relevant. As dialogue among users in the winning community spikes, network exchanges become more horizontal and the relative importance of network authorities declines. Lin et al. (2014) describe a similar phenomenon in their analysis of "rising tides or rising stars", where high salience events increase the production of tweets by infrequent users as well as the concentration of information on high in-degree authorities (pg.5). This generates a dual dynamic of "rising tides" of information (more debate) as well as "rising stars" (more homogeneous information).[1] Our research describes differences between winners and losers, which diverge in engagement by authorities, engaged partisans, and episodic users.

To test the proposed model, we present a regression discontinuity design modelling *time-to-retweet* as our dependent variable. We present substantively sounding results of our proposed theory using Twitter data from presidential elections in the United States (2016), Brazil (2018), Argentina (2019), and the United Kingdom (2019). Results show meaningful and politically meaningful differences explained by how electoral adjudication under distinct institutional environments shape information flows in social media dialogue.

1 Connections to the Existing Literature

The proposed theory of event adjudication is built upon and provides new insights to three established literature in political science and communication. Before introducing our model of adjudication, we discuss here how our theory relates to, and differs from, existing research on campaign dialogue (Kaplan, Park and Ridout, 2006; Simon, 2002), critical events and content activation in social media (Lin et al., 2014; Pride, 1995),

[1] Whereas Twitter networks are hierarchical in nature, dominated by *star* structures that display few nodes with high in-degree and many nodes with low in-degree, adjudication alters the authority patterns of the winning and losing communities. As lower-degree users disengage from the losing communities, authorities are expected to command a larger share of the conversation. By contrast, as lower degree users celebrate in the winning communities, authorities command a lower share of the conversation.

and the winner-loser gap in electoral studies (Anderson et al., 2005; Curini, Jou and Memoli, 2012; Nadeau and Blais, 1993).

Existing theories of issue ownership and political dialogue purport that candidates should never "talk to each other" but rather that they should "talk past each other". Because *talking* about an issue or event raises its salience among voters (Fournier et al., 2003), candidates are expected to talk about issues on which they are perceived to have an advantage (Kaplan, Park and Ridout, 2006; Simon, 2002). Republicans should talk about taxes and democrats about entitlements. Labor candidates in the UK should talk about employment while the conservatives focus on crime. As salience increases, however, dialogue emerges. Candidates talk "past each other" on low salience issues or events, but campaigns are forced to present competing narratives when salience increases, because failing to address important issues becomes evidence of *tone deft* or out-of-touch politics. After a major economic crisis, everyone talks about the economy. After 9/11, everyone talks about terrorism.

In political dialogue models, issue *advantage* and issue *salience* jointly determine the extent to which parties communicate with voters and engage in political dialogue.The existing literature, however, understands issue advantage as a performance trait that is acquired over time. While in models of issue "ownership" performance advantage is acquired over time,[2] we consider in this article the consequences of event *adjudication*, where control is granted instantaneously to one of the interested parties.

While there are significant similarities in the model of event adjudication we propose in this article, there are two critical differences that carry substantive theoretical implications for social media dialogue. First, the proposed theory has implications for dialogue that takes place upon winning an event (such as an election) rather than seeking to explain the election's result. This approach separates our work from previous

[2]For an excellent analysis of changes in party positions on issues see Karol (2009). For a general discussion on issue advantage, see Vavreck (2009).

research focused on social media behavior and strategic interactions between politicians and users (Barberá et al., 2019; Rossini, 2020; Theocharis et al., 2016). Event adjudication reflects expressive changes in dialogue rather than the strategic intent of parties to promote distinct issues. Indeed, participants in an election, a trial, or a game of chance are not hoping to change the attention of current users to distinct events, nor do they benefit electorally from raising the salience of a different event.

Second, because users are not raising the attention of the event for electoral gains, our model of event adjudication reflects differences in enthusiasm upon adjudication. The proposed model engages with theories of political behavior that have described how "enthusiasm" increases engagement while "anger" reduces engagement (Banks, 2014; Mason, 2016). Because there are asymmetries in "enthusiasm" and "anger" among leaders and followers, our analyses have implications for the study of network activation in political dialogue after adjudication.

The model of adjudication and dialogue we describe in this article also connects to the notion of *critical event* (Lin et al., 2014; Pride, 1995), which focuses the attention of the public when an event consequences and redefines a situation. As in the critical event theory, adjudication induces a change in dialogue that redefines the interpretation of the event. However, adjudication links the interpretation of the event to the narratives and fortunes of the winner. Different from the notion of "critical event", salience precedes adjudication and dialogue changes to a different extent among users that align with the winner or the with the loser. By contrast, critical event theory redefines the situation for all individuals affected by the event. In particular, we show how adjudication as a critical event explain changes in the hierarchy of debates in social media, and makes winner and loser users and high and low-authorities behave differently upon adjudication.

Finally, the model of adjudication connects to a significant literature on the winner-

loser gap (Anderson et al., 2005; Curini, Jou and Memoli, 2012; Nadeau and Blais, 1993), concerned with the effect of losing elections on trust in the government and satisfaction with democracy. Recent research has pointed to the importance of information for calibrating how elections shape the perceived legitimacy of democracy among losers (Lelkes, 2016). As noted by Lelkes (2016), increases in available political information accentuates findings from the winner-loser gap scholarship. There is also research showing that voters who support the loser of an electoral contest are considerably more likely to perceive fraud than those who support the winner (Beaulieu, 2013; Taber and Lodge, 2006). We expand this important scholarship on electoral studies to the field of political effects of social media. Across the four elections under scrutiny in this paper, the winner-loser gap renders distinct levels of activation and engagement, and as will be discussed in greater detail in the section on *toxic dialogue*, these reactions are driven by an increase in toxic discourse among losers, and decrease among the winner group.

While there are clear connections to existing research in Communication and Political Science, no theory that we are aware of models dialogue and disaffection at the time of a event is adjudicated in the real world and proposes a general theory to explain their effects on on-line political behavior. We take on this task in the next section, describing the logic of voter adjudication in social media.

2 A Model of Political Dialogue and Adjudication

In the last twenty years, political science scholars have established a robust literature showing that voters who support the winner of an electoral contest report higher levels of trustworthiness, satisfaction with democracy, and perceptions of democratic legitimacy than those who support the losers (Anderson et al., 2005; Anderson and LoTempio, 2002). Micro-level studies of voters' perception have shown changes in attitude before and after elections, with losers consistently reporting more negative views of demo-

cratic governance than those who supported the winners (Blais and Gélineau, 2007). More recently, Hollander (2014) showed larger negative assessments among individuals who mistakenly expected their preferred candidate to win the contest ("surprised voters") while Lelkes (2016) show wider differences among voters exposed to news that anticipated a different electoral outcome.

In this article, we extend existing models of the winner-loser gap to understand social media engagement and social networks' topologies when elections are adjudicated. Different from the existing research, we propose in this article that behavioral changes in social media engagement also result in changes in social media network structure. We explain such differences by a mechanism explained by Lin et al. (2014), who have shown that increases in attention in social media networks simultaneously affect user engagement ("rising tides") as well as the importance of higher authority nodes ("rising stars"). The result, we show, is that the enthusiasm of winners and the disengagement of losers results affects how social media content propagates.

In what follows, we introduce readers to our model of electoral adjudication, which describes how the reporting of electoral results shapes attention and engagement by the winners and losers of the electoral contest. We distinguish three different social media states (or periods) characterized by an (i) increase in overall social media engagement ("state of dialogue"); an (ii) information drift, where different disclosure rules allow voters to anticipate the likely winner ("pre-adjudication"); and (iii) a discontinuity premium, where winners and loser in social media change both the level of dialogue as well as the network properties of such dialogue ("post-adjudication").

State of Dialogue

Consider a *state of nature* where an event is recognized as salient by all participants (*shared attention*) and where interested parties expect to be recognized as having an advantage. We define the moment prior to electoral adjudication as a "state of dia-

logue", implying that all interested parties have an incentive to talk about the standing event. As in Kaplan, Park and Ridout (2006), the dialogue here is described narrowly as individuals engaging on the same topic but does not imply that they are answering to each other.

We consider the "state of dialogue" as the *status quo* and, thereby, expect adjudication as a decision that grants a standing performance advantage to one of the interested parties. Failures in adjudication revert back to the "state of dialogue", meaning that the adjudication is not recognized by at least some of the contestants, and interested parties are willing to continue talking about the event. Failure to adjudicate also indicates that event salience does not decline and it may, in fact, increase. For example, consider an election that is perceived by the loser as fraudulent. In such a situation, adjudication is rendering moot and losers do not disengage.

Before adjudication, dialogue is solely explained by the salience of an event (Lin et al., 2014). As salience increases or decreases, so does attention to the event (and dialogue) by social media users. Prior to adjudication, we expect differences in attention by different groups that are only explained as the result of anticipation, as users may have different prior expected probabilities of winning. We define differences in anticipation as *information drift*, which will be discussed later in this article.

Event Adjudication

We define adjudication as the moment when a candidate, party, or group is granted *ownership* of an *event*, where ownership describes a performance advantage that is declared by an *adjudicator* and is widely accepted by participants.

In our model, the *adjudicator* is recognized as the sole authority that decides who wins and who loses a contest or event, with decisions accepted as biding by all participants. A judge in legal proceedings, the voters in an election, or "nature" in a game of chance, are examples of adjudicators that decide who wins and who loses. We assume

that those authorities are recognized before adjudication takes place. The decision of the adjudicator could be reported by any number of individuals, such as the winner, the loser, the media, among others. For example, Mauricio Macri recognized defeat in the 2019 Argentine election, but we consider voters as the adjudicators and Mauricio Macri as the bearer of the news.

Information drift

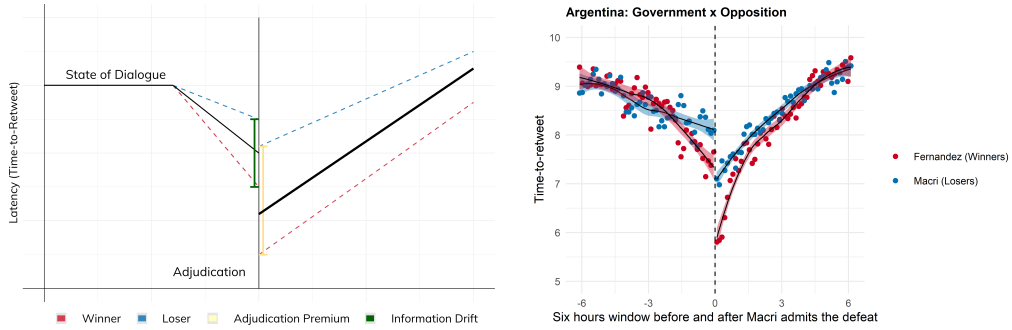
As noted above, failures in adjudication will result in users reverting to the state of dialogue. Fraudulent elections, biased justices, and "cheating" in nature's adjudication (games of chance) are all events that induce outcomes which revert to the state of dialogue.

The opposite is true about information drift, where anticipation by the winners and losers will increase engagement among likely winners and decrease it among likely losers. Staggering election results, which allow voters to update expectations over time, provides an example of rules that facilitate information drift, energizing likely winners and silencing likely loser before adjudication is realized.

Information drift, therefore, results in users updating ownership of the event before the decision of the adjudicator is made public. Information could leak to the public, as experts report on the likely vote of justices, publishing credible surveys prior to an election, as well as the myriad of information markers that allow users to credible anticipate an outcome.

The logic of Voter Adjudication

We begin our description of event adjudication by considering electoral contests, where the final determination of event ownership rests in decisions made by voters on Election Day. In an election process, contestants are certified by an electoral authority and the validity of the adjudicator, the voters, requires trust in the rules of the electoral



(a) Theory (b) Macri PASO Election

Figure 1: Adjudication and Latency. Figure 1(a) describes the expected decline in latency, faster Time-to-Retweet, when electoral victory is adjudicated. Figure 1(b) describes the observed evolution of Time-to-Retweet in the observational data, Mauricio Macri defeat on October 11, 2019.

process to be expected in free and fair elections.

Theoretically, the logic of electoral adjudication begins with users in a state of dialogue, as shown in Figure 1. As voting places close and the tally begins, anticipation reduces latency in social media sharing. Therefore, in our data, we expect time-to-retweet to decline, reflecting higher levels of user engagement. In Figure 1, therefore, more engagement and dialogue is indicated by a declining score in the y-axis, as lower latency means faster engagement.

H_1: Prior to adjudication, *latency* in dialogue is the result of shared attention (Lin et al., 2014), with supporters of the different candidates maintaining high levels of engagement.

Figure 1(a) also describes the effect of information drift on the latency of social media sharing, with likely winners increasing engagement at a faster rate than likely losers. The expected information drift is, we argue, a function of how credible and abundant is the data that is available to anticipate the winner of the election before adjudication takes place. As we will show, this information drift can be estimated from observational data, providing researchers with evidence of changes in the odds of winning that result

from differences in electoral institutions and rules.

H_2a: Information drift will reduce *latency* in dialogue among winners at a faster rate than among losers, as shared attention (Lin et al., 2014) increases faster for the former and slower for the later.

H_2b: Information drift will be more pronounced in high information environments, under staggered elections rules and less restrictive reporting laws, reducing *latency* and increasing dialogue as we approach adjudication.

Upon adjudication, Figure 1(a) describes an expected discontinuity, with both winners and losers increasing their intent to share the results of the election (lower latency or time-to-retweet). We expect a larger discontinuity among winners, controlling for the information drift that may decrease the value of adjudication. Finally, users will revert back to the initial state of dialogue, as the salience of the event declines.

H_3a: Adjudication will produce a sharp reduction in *latency* and an increase in dialogue.

H_3b: Adjudication will produce a "rising tide" among winners, with a more pronounced reduction in *latency* among low in-degree users (more active periphery).

H_3c: Adjudication will produce a disengagement among lowers, with a less pronounced reduction in *latency* among low in-degree users (more active periphery).

In Figure 1(a), the green vertical line before adjudication describes the difference between the likely winners and losers, the *total information drift*, just before adjudication. The vertical yellow solid line immediately after adjudication, on the other hand, describes the differences between the winners and losers when election results are made public. We label the discontinuity after adjudication as the *total adjudication premium*.

Each of these different parameters can be empirically estimated and compared across election events, allowing us to understand how accepted is the adjudicator (divergence in dialogue), how sharp is the disclosure of the election results (low information drift),

as well as the magnitude of disaffection on among losers (total adjudication premium). Each of those parameters of interests, therefore, allows researchers to better understand social media behavior on Election Day.

Figure 1(b) provides a vivid example of our model of adjudication, with twitter data collected during the electoral loss of President Mauricio Macri in Argentina, on October 11 of 2019. Figure 1(b) evaluates adjudication, with a window of 6 hours before and six hours after President Macri admits electoral defeat.

We may use Figure 1(a) to understand the behavior of the data in Figure 1(b). On the left side of Figure 1(b), we see a slow decline in latency that is the sole result of increased salience. Users that are aligned with the future winner (Fernandez) or loser (Macri), increase dialogue and engagement as we approach adjudication. One hour prior to adjudication, however, we see evidence of information drift, where the soon-to-be winners and losers update their beliefs and their time-to-retweet diverges. The PASO election of 2019 provides a narrower drift than other election nights, as President Macri recognized defeat at 9:20 PM, before any electoral results were disclosed by the Electoral Authority (DINE).

As President Macri recognized defeat, we see a sharp discontinuity among winners and losers, with a larger drop in time-to-retweet among those that celebrate (*enthusiasm*) and a lower discontinuity among the losers (*disaffection*). Of course, this is a relatively trivial result, as we always expect enthusiasm among winners and disaffection among losers. However, we call the attention of readers to the value of understanding the magnitude of the information drift and the importance of the adjudication premium, which are of extraordinary comparative value to understand information propagation and dialogue in social media.

Finally, over time, salience declines as well as the *enthusiasm* or *disaffection* by users, which prompts us back to a state of dialogue, subject to the overall salience of the event

after adjudication and to the circadian rhythm of social media usage.

3 Adjudication Results in Four Elections: Johnson, Macri, Bolsonaro, and Trump

The theory of event adjudication we describe above, connects models of dialogue and social media engagement at the time that ownership of an event is granted to one of the parties in contention. The value of the proposed model, we argued, is both as an analytic theory that describes engagement in social media and also, more important, in how it opens the possibility of comparing adjudication events in structured ways. This includes the comparative study of different election processes as well as its relationship to adjudication in judgments and games of chance.

In this section we compare adjudication processes in four different electoral events in the United Kingdom, Argentina, Brazil, and the United States; with attention two different groups of users (high-level authorities and low-level authorities) that speak to the relationship between network structure and dialogue. In the first two cases, we will show, there is little in the way of information drift. In the last two cases, Brazil and the United States, staggered disclosure of electoral results provide for more significant information drift. In all four cases, we compare (and explain) differences in adjudication, the total information drift, and the total adjudication premium.

Four Election Nights

We ordered the four election nights to reflect the insights of our theory, ordered from the one with the lowest information drift–the United Kingdom–to the one with the longest information drift–the United States.

The United Kingdom, Argentina, Brazil, and the United States, held Presidential elections on December 12 of 2019, October 11 of 2019, October 7 of 2018, and Novem-

ber 8 of 2016, respectively. Arguably, the UK election of 2019 was among the most meaningful elections in a generation, as it was expected to ratify or dispute the Brexit referendum and grant or deny Brexit negotiating authority to Boris Johnson. Therefore, there is little doubt that shared attention was collectively focused on the election. As important for this article, as a result of the *Representation of the People Act 1983*, enforced by the *Office of Communications (Ofcom)*, all media outlets are prevented from publishing news that forecast the result of the election and an excellent official exit poll provides rapid adjudication of victory to candidates on election night.

In the cases of Argentina and Brazil, we selected the first *round* of the Presidential Election, when voters have limited information on the likely outcome of the race. The first round of the Argentine presidential election of 2019 was the *Open and Simultaneous Presidential Primary Election*, known by its acronym *PASO*. This is a compulsory national election where all adult citizens are required to cast a vote. Different from the second round of October 27, the *PASO* provides a mechanism to select presidential nominees. However, all important Argentine candidates ran unopposed in 2019, in what was *de facto* the first of a three-round presidential race.[3] The timeline of the Argentine election was short and relatively simple, with voting ending at 6PM and results expected to be reported starting at 9PM by the National Direction of Elections (DINE). On election night, however, a slower than usual tally of the votes meant that by 10:20PM the dashboard of the election authorities was still showing no data. At 10:32 PM, President Mauricio Macri recognized defeat still with no electoral results being reported to the public. Within the hour, the official numbers began to be reported to the public.

[3]While the Argentine general presidential election of October 27 could also provide an interesting case, voters knew in October 27 that Alberto Fernandez defeated Mauricio Macri by a wide margin in the PASO election. Our theory considers information drift as critical to understanding changes in dialogue, where voters anticipate the likely results. Therefore, the first round of the election (P.A.S.O.) provides a case that is comparable to the first round in Brazil and to the general election of Donald Trump in the United States.

The first round of the Brazilian presidential election on October 7 of 2018 is also a compulsory election where all adults are required to vote. As in the case of Argentina, failure to vote is met with a legal fine or the requirement to justify a no-vote, something that will often consume a fair amount of time. Results of the Brazilian election are known within three hours of closing of the ballot boxes, as a single e-vote device is used in all 32 states. The timeline of the Brazilian is even shorter than in Argentina, with voting ending at 6PM and partial results expected within the hour. On election night, notice of a convincing victory by Jair Bolsonaro were reported immediately after the closing of the ballots. Just two hours later, at 8:02 PM, with 96% of the votes tallied, Bolsonaro was leading the second most voted candidate, Haddad, by almost twenty points. As in Argentina, the race was defined by a significant larger margin than anticipated by most pollsters. Finally, at 22:04 PM Bolsonaro gave a victory speech to his supporters.

The fourth and final election, the United States Presidential Election, is a single round contest where all registered voters have the option to cast a vote. The winner is decided by a majority of electoral college votes, with reporting taking place over many hours, as each State reports their own results. A long tally with staggering results allows more significant information drift, compared to the cases of Argentina or Brazil. On November 8 of 2016, critical battle ground states were reported over the course of several hours, beginning with the critical victory of Trump in Ohio at 10:39 PM Eastern Time, followed by reported victories in Florida (10:53 PM), North Carolina (11:14 PM), and Pennsylvania (1:35 AM). Finally, at 2:35 AM Hillary Clinton called Donald Trump to congratulate him on his victory, which was given ample space in the media. Different from the cases of Argentina and Brazil, the US reporting of election results is considerable longer, allowing voters to update their expectations on the likely winner. As we will show, this is clearly visible in the increasing difference in

the time-to-retweet of Democrats and Republicans on Election night.

Data Collection

To analyze adjudication and dialogue, we followed the same procedure in all four countries. First, we collected a large sample of tweets from the beginning of the Election Day until one day after the election (6,7 million tweets from the UK, 6,7 million tweets from Argentina, 4.9 million tweets from Brazil, and 5,2 million tweets from the US).[4] We filtered singletons (one time users), retain only those tweets posted in the country's language, and retained the primary connected cluster of each country. These primary connected clusters contained, in all four cases, the main political networks that were politically engaged. Using *random.walk* community detection in *igraph* (Csardi, Nepusz et al., 2006), we identified the main political groups as well as the two most important political communities. In all four cases, those communities corresponded to the top two candidates. The Supplemental Information File provides the list of the top 30 users in each of the communities, which were validated by the authors to ensure the had the leading authorities of the candidates' communities.

While we use the full primary connected network to estimate the communities of the politically engaged users in Twitter, the analyses of engagement use a 12 hour window, six hours before and six hours after adjudication. Therefore, we use all the network data to identify the community of the users, to benefits from a larger sample, but study political dialogue at the time of adjudication.[5]

[4]We collected data accessing both Twitter Streaming and Restful APIs. The later allows the public to access a temporary repository of tweets that includes a large sample of all tweets published during the week prior to the query; while the streaming API lets users capture tweets in real time. We use words like the main candidates and main parties' names, as well as the countries names to collect data on both sources. We use the Python base program *Twarc* to access the APIs, see .

[5]See the Supplemental Information File (SIF) for further details on the countries' networks

The Statistical Model

To determine the effects of event adjudication, we use an interrupted time series analysis, a variety of regression discontinuity designs (RDD) in which the running variable is time (Morgan and Winship, 2015). Twitter data is ideal for our approach because of the granularity and high-frequency of tweets. Our primary parameter of interest is the change in social media users' behavior upon adjudication.

The RDD models use *time-to-retweet* as dependent variable. This variable captures changes in latency on users' behavior before and after adjudication and uses the number of seconds elapsed from the time a tweet is posted by a user to the time it is retweeted by a second user .[6] Previous research has extensively used *time-to-retweet* to understand heterogeneity on content propagation, news sharing, and activation on Twitter. (Aruguete and Calvo, 2018; Lee, Agrawal and Rao, 2015; Stieglitz and Dang-Xuan, 2013). The time of the event adjudication is the cut-off of the regression model. Our parameter of interested approximates the changes at the time of the adjudication, when the cut-off is equal to zero, on *time-to-retweet*. We used a set of news reports to estimate the precise moment of adjudication for each case.

Regression discontinuity models assume that effects are continuous at the cutoff. When dealing with time as a running variable, the continuity assumption requires that no omitted variable that systematically affects the outcome - *time-to-retweet* - also changes upon adjudication. Given that we have the precise minute when Adjudication was granted, and consider data only six hours around the cutoff, it is reasonable to assume that this assumption holds. The granularity of the data together with the precise measurement of the event makes the identification strategy highly plausible. The Supplemental Information File provides a set of tests to verify the continuity assumption, including placebo checks with the running variable, and methods to estimate

[6]To normalize the variable, we use the log of time-to-retweet in the statistical models.

inconsistent patterns on anticipatory behavior among the users before the adjudication. Overall, the results ensure the internal validity of the RD design.

To estimate the models, we follow the recommended setting of using non-parametric local linear regression (LLR) to approximate the treatment effect at the cutoff point (Calonico, Cattaneo and Titiunik, 2014; Gelman and Imbens, 2018). We employ a local polynomial with one degree to fit two separate regression functions above and below the cutoff Adjudication, with the treatment effect set as the difference in the limits of the cutoff. In other words, we model the intercepts from each direction. We employ triangular kernel weights and employ a data-driven search to select an optimal bandwidth for the estimation. To address potential bias on the treatment effects due to approximation errors, we report the robust treatment effects and confidence intervals developed by Calonico, Cattaneo and Titiunik (2014). To ensure results are robust to different modeling choices, we further present a variety of model specifications in the supplemental information file (SIF).

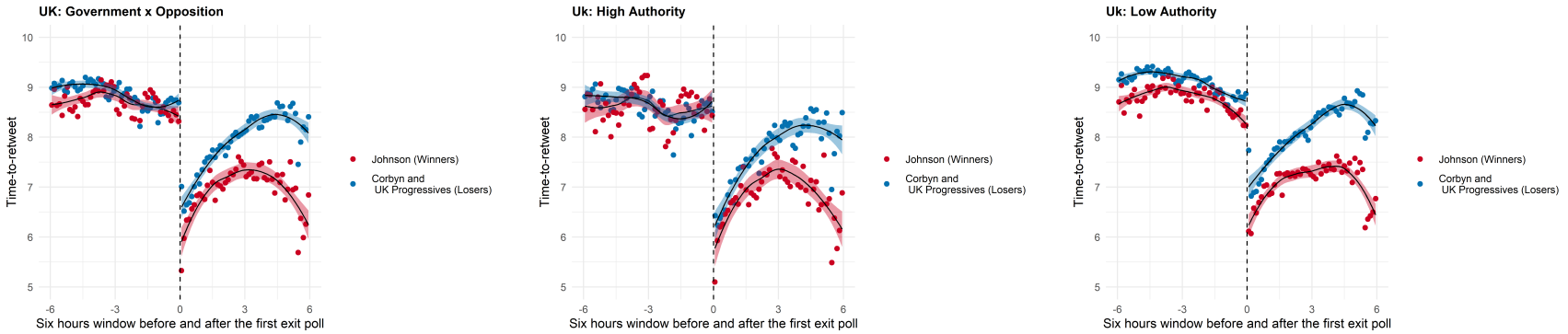
A potential threat to the validity of the models relates to the concept of information drift. Since some might anticipate the event adjudication, users may change their behavior before the adjudication is announced. Given that we expect the effects of adjudication to increase users' activity, any anticipation of the treatment is likely to go on the same direction. Therefore, it would underestimates treatment effects, meaning the true effects of adjudication are likely even stronger. More importantly, the information drift that attenuates such discontinuity is theoretically important and part of the model discussion. Therefore, anticipation is treated as a theoretical parameter - information drift - rather than an estimation challenge for the model.

Adjudication Results

Using the data and models described above, we estimate twelve regression discontinuity models. The parameters of interest of the adjudication model are measured at the

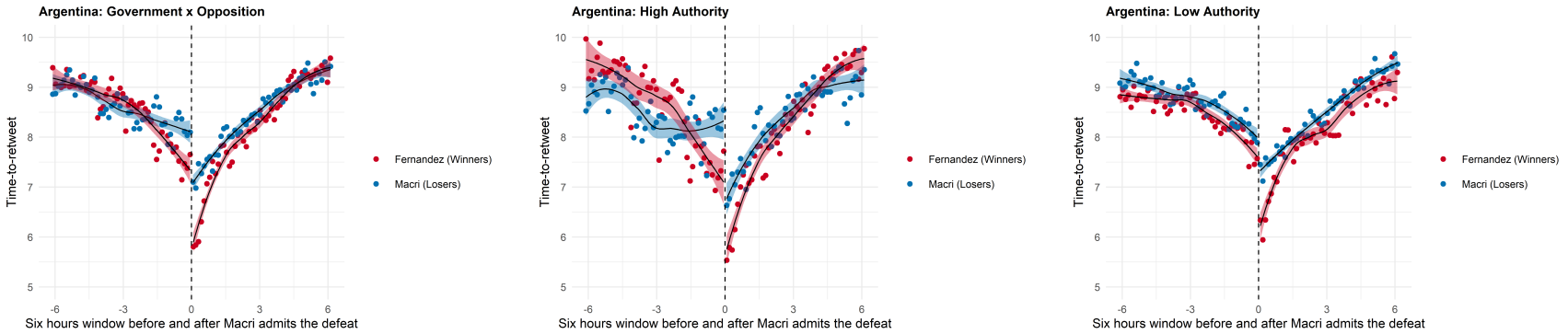
time that the early count of the UK is reported by the media, at the time that Mauricio Macri acknowledges defeat on national television (Argentina), at the time the first exit-polls indicated the victory of Jair Bolsonaro and Boris Johnson (Brazil and UK), and when it is made public that Hillary Clinton called Donald Trump to congratulate him on his victory (United States). In all four cases, those are the defining moments of adjudication as they make clear for voters the winner of the night, and they coincide with the highest level of engagement by users.

Figures 2, 3, 4, and 5 provide vivid images of the adjudication process in all four countries. The vertical axes reports the log of the time-to-retweet, with lower values indicating that users are more engaged (lower latency). The horizontal axes have a range of twelve hours, six hours before and after adjudication. We use a LOESS smoother fit separately before and after adjudication. To make visualization easier, we binned the data over time. Readers can readily observe how the behavior of users emulates (and how it differs) from the theoretical model in Figure 1(a).



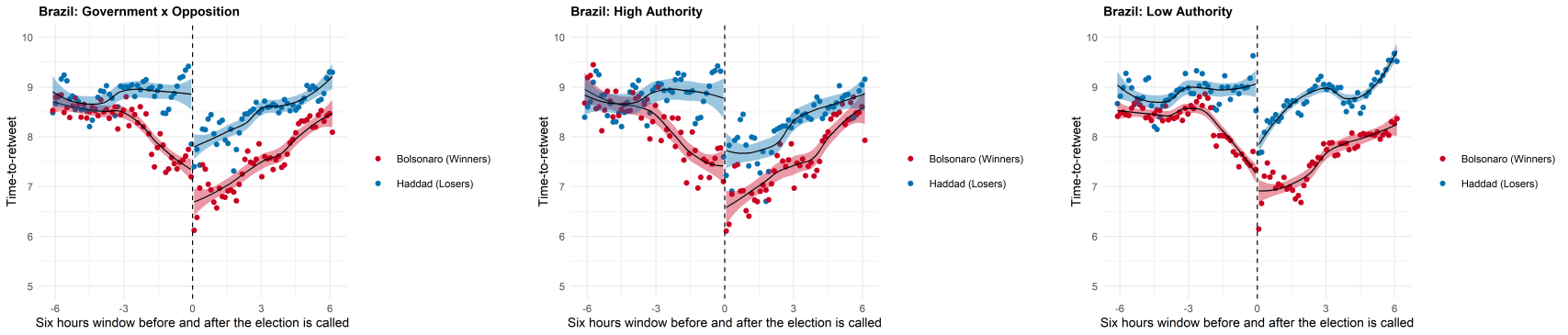
(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Figure 2: Time-to-Retweet in the UK Election. Centering on December 12, 2019, at 5:00 PM, local time , when the firs Exit Poll is released.



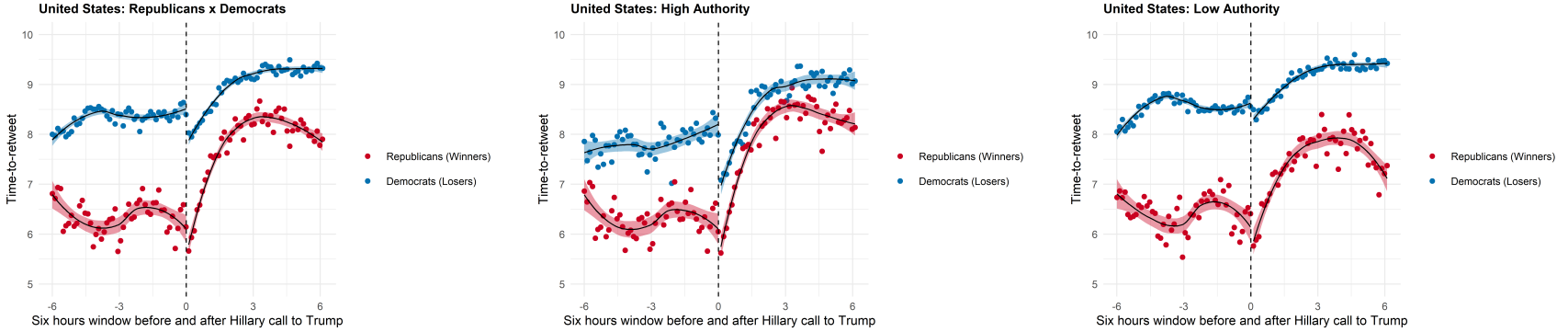
(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Figure 3: Time-to-Retweet in the Argentine Election. Centering on October 12, 2019, at 11:21 PM, local time, when Mauricio Macri gives his concession speech.



(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Figure 4: Time-to-Retweet in the Brazil Election. Centering on October 7, 2018, at 7:04 PM local time, when the first exit poll is released.



(a) Winners vs Losers (b) High Authority Users (c) Low Authority Users

Figure 5: Time-to-Retweet in the US Election. November 8, 2016, at 2:35 AM Eastern Time, when Hillary Clinton calls Donald Trump to congratulate him on his victory.

Let us first consider Figures 2 and 3. They present the overall adjudication plot on the left side, 2(a) and 3(a); estimates for tweets published by high in-degree users(above the log-median number of followers), 2(b) and 3(b); and by low in-degree users (below the log-median number of followers), 2(c) and 3(c).

As said before, we ordered figures from those with the lowest information drift (the UK and Argentina) to those with the highest drift (Brazil and the US). Figure 2(a) shows a pattern where shared attention is increasing before adjudication (declining slope) and winners and losers are equally engaged (state-of-dialogue) H_1. We also document a large discontinuity premium for the UK case, with Johnson supporters more active than Corbyn supporters upon adjudicationH_3a. An interesting feature of the data is that attention is larger among low-authority supporters of Boris Johnson even before adjudication, as described by the "rising tides" logic (Lin et al., 2014).

Figure 3(a) is identical to Figure 1(b) in the theory section, with a very small information drift and a sharp discontinuity at the time that Mauricio Macri acknowledges defeat in the PASO election. As noted in our prior discussion of this graph, electoral results had not been formally relayed by the National Electoral Directorate (DINE), which resulted in continued social media dialogue until half an hour before adjudication. As the campaign of the opposition candidate Alberto Fernandez begins to report that they have won convincingly, users that support him begin to more actively tweet messages and retweet each other. The information drift of the last half hour is then followed by a large adjudication premium at the time of Macri's news conference.

Figure 3(b) and 3(c) show similar behavior, with similar information drifts before and after adjudication. However, it is worth highlighting how high in-degree users of the losing community (blue line) have lower latency than low in-degree users of the losing community, as expected in H_3a. Readers can appreciate that in the initial *state of dialogue* shown in Figure 2(b), authorities supporting Macri garner more engaged

responses than those of Fernandez, as expected in H_3b. Meanwhile, the opposite is true among low authority users in Figure 2(c), as expected in H_3c. In other words, low-degree users are more engaged with each other among the winners and less engaged among the losers. This feature of the graphs speaks directly to differences in social media networks that will be reported and discussed in Table 1 later in this section. In all, engagement is more dependent on high in-degree nodes (authorities) among losers and more reflective of low in-degree enthusiasm among the winners. The result is engagement that is more hierarchical among losers and more horizontal among winners.

The Bolsonaro election provides an example of an election that allows for more information drift before adjudication, as results of the election at the state-level were reported to the public for over two hours. These results allowed voters to update their predictions about which candidates, aligned or not with Bolsonaro, were winning the sub-national elections. With a higher information drift we also observe a smaller adjudication effect in each of the communities compared with the UK and Argentinian cases. It is interesting to know that the state-of-dialogue that precedes adjudication remains almost flat until the closing of the voting places, which happens almost three hours before the adjudication of the election. Figure 4(a) shows how, immediately after that, the pro-Bolsonaro users begin to engage while the losers disengage; therefore, providing us with a clear example of information drift. A small up-swing three hours prior to adjudication, when voting ends, shows the immediate effect of the "*boca da urna*" that is reporting by the media indicating a likely victory by Bolsonaro.

As in the case of Mauricio Macri, Figures 4(b) and 4(c) show higher sensitivity among low-authority users, who more readily disengage when losing and more actively retweet each other when wining. As in the case of Mauricio Macri, we can visually observe the network of the losing candidate as becoming more hierarchical while the opposite is true among supporters of the winner.

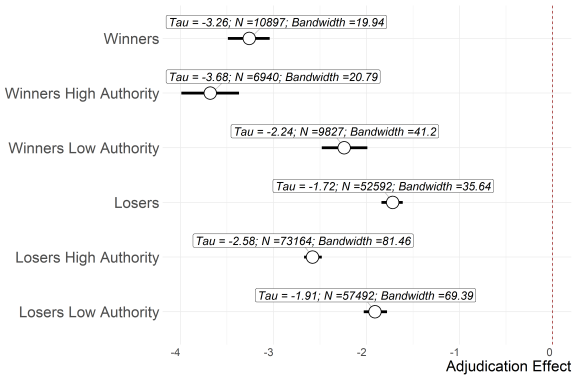
Finally, results from the US election provide consistent evidence of a long adjudication cycle, with staggered results that allow voters to constantly update the winner of the race. The lengthy process of counting votes in the United States allows both communities to slowly diverge. Indeed, the state-of-dialogue is outside of the six hour window and the ebbs and flows of the State results that are reported to the public explain smaller shifts in engagement as we approach adjudication. Once adjudication takes place, however, we can see a rapid decline in engagement.

A result that is worth highlighting is that, different from the Argentine and Brazilian cases, the winner and loser communities never fully return to the state of dialogue in the US and in the UK. As we described earlier, this is likely due to the fact that both the UK and Trump elections were ones that provided a true final determination, as both in Argentina and Brazil the winner of the election had to still win a second time. Both Alberto Fernandez and Jair Bolsonaro would win their next race comfortably, closing the election cycle in their respective countries.

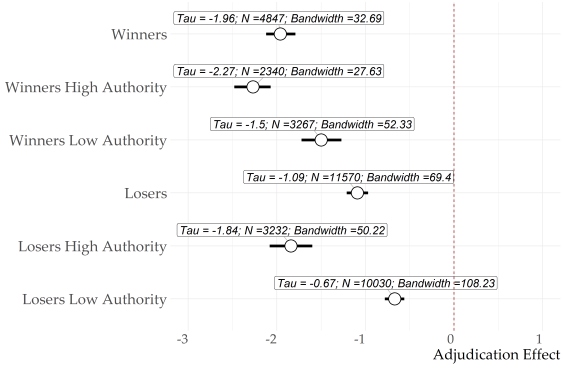
Next, we present the main results of the paper from the regression discontinuity designs. The models present robust point estimates and confidence intervals, and uses the data-driven bandwidth selection method proposed in Calonico, Cattaneo and Titiunik (2014). While figures 2 to 5 introduce to reader visually to our main results, figure 6 provides a precise interpretation of our findings. As in Figures 2 through 5, winners exhibit larger treatment effects on all the four elections compared to losers. Electoral adjudication increases engagement among winners and reduces latency on election related topics. Results show, as expected, that high in-degree authorities exhibit greater treatment effects for winners and losers as well in the majority of the four election cases.[7] The effect is larger in particular when information is scarce and drift is not observed before adjudication (UK and Argentina).

Table 1 presents the numerical results for the information drift and adjudication

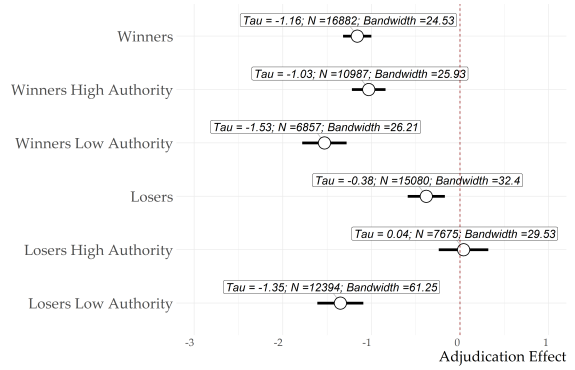
[7]The exception here is the Brazilian case in which authorities among the losers show no effect



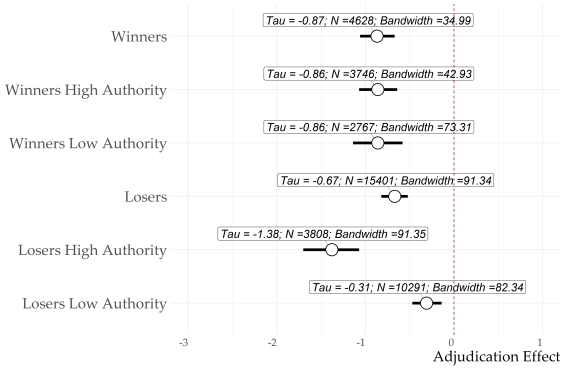
(a) UK Election



(b) Argentina Election



(c) Brazil Election



(d) US Election

Figure 6: Adjudication Effect at cutoff estimated with local linear regression with triangular kernel and MSE-optimal bandwidth. The figure reports 95% robust confidence intervals for the point estimates (Calonico, Cattaneo and Titiunik, 2014)

Table 1: Adjudication in Four Cases: Information Drift and Adjudication Premium

Condition	UK		Argentina		Brazil		United States	
	Informational Drift	Adjudication Premium	Informational Drift	Adjudication Premium	Informational Drift	Adjudication Premium	Informational Drift	Adjudication Premium
Winners x Losers	−0.46	−1.92	−0.46	−1.32	−0.76	−1.45	−1.99	−2.15
High Authority	−0.51	−0.12	−0.57	−1.01	−0.42	−1.40	−1.84	−1.34
Low Authority	−0.60	−2.29	−0.52	−1.36	−1.67	−1.84	−2.20	−2.69

Premiums across all four cases. The quantities are estimated using the parameters retrieved from the twelve regression discontinuity models. As it was described in Figure 1(a), we measure information drift as the difference between winners and losers on the left side of the cutoff. By contrast, we measure adjudication premium as the difference between winners and losers on the right side of the discontinuity.

A greater negative information drift indicates that losers are disengaging before adjudication. Meanwhile, a greater negative adjudication premium the difference between winners and losers upon adjudication.

Results show a much larger information drift in the elections won by Trump (-1.99) and Bolsonaro (-.76), and a much smaller information drift in the elections won by Johnson and Fernandez (-.46). As discussed earlier in this article, the difference in information drift in the US and Brazil is due to the stagered reporting of the results. Meanwhile, both in the UK and in Argentina, election results were reported within a very short period of time.

Another interesting result reported in Table 1 is that the overall adjudication premium is larger in the United States and in the UK, which held conclusive elections. By contrast, effects were smaller in Argentina and Brazil, which still had a general election (Argentina) and a run-off (Brazil).

More important, in all four cases we see that the total adjudication premium is significantly larger among low authority users and smaller among high authority users H_3b and H_3c. This is reflective of the more hierarchical nature of dialogue among losers

and the more horizontal dialogue among winners. In other words, upon adjudication, disengagement is more prominent within low-authority losers and in the periphery of the networks, while the high-authority users' overall keep similar levels of engagement. The largest network effect is in the UK, where the adjudication premium is orders of magnitude as large among low authority users. While the proportional network effect in Argentina and Brazil is similar, although the absolute value is larger in Brazil.

4 Extensions

The analyses of the previous section introduced readers to four cases of electoral adjudication, where voters made the final determination of who the winner was. We favored one central mechanism for the differences in engagement, with increases in engagement among winners and decreases among losers that are driven by *enthusiasm* and *anger*, respectively. We explore this mechanism via a study of toxicity in the content of the tweets shared by Democrats and Republicans on the night of the election. Then, in the following subsection, we provide a comparative example of adjudication in Sports, where "nature" makes the final determination of who the winner is.

Toxic Dialogue and Adjudication

Results of the 2016 Presidential Election in the United States showed Democrats increasingly disengaged. The opposite was true of Republicans, who were more eager to communicate with each other, as reflected by lower latency in sharing social media posts.

In a recent article, Liliana Mason stated that "Partisan emotions tend to arise in response to political actors or messages that have the power to affect the ultimate status of a person's party—whether the party wins or loses (Mackie, Devos and Smith, 2000). Threats to a party's status tend to drive anger, while reassurances drive enthusiasm."(Mason, 2016) Mason provides experimental evidence to show the effect of

anger, which is defined as an emotional response to a perceived threat to the status of the group (Page 5). In similar vein, Groenendyk and Banks (2014) note that strong partisans overcome collective action constraints and engage in politics because they are activated by strong emotions such as *anger* and *enthusiasm*.

To evaluate whether losers are activated by anger we take advantage of recent developments in text analyses that measure the level of toxicity in user comments. We consider the sample of twelve hours around adjudication in the Donald Trump victory and score each tweet by their level of *toxicity*. To this end, we use Google's API *Perspective*, a content moderating tool that is the industries' standard for automatic detection of toxic content in written comments. Perspective uses a convolutional neural net model to score the toxicity of an input text. Toxic is defined as "a rude, disrespectful, or unreasonable comment that is likely to make one leave a discussion.". The model was built using millions of comments from the internet, using human-coders to rate the comments on a scale from "very toxic" to "very healthy", and using this large data as training information for the machine learning algorithm. We uploaded the content of the tweets in twelve hour windows and compare the differences in toxicity among Democrats and Republicans. Compared to manually coded dictionaries and supervised machine learning algorithms, the Perspective API and other deep learning models' have exhibited high accuracy on tasks like content classification and the detection of uncivil comments, therefore, providing a cost-effective off-the-shelf method for researchers working with big data (Georgakopoulos et al., 2018; Kreiss, Lawrence and McGregor, 2018).

Figure 6 presents a visual representation of the toxicity scores before and after adjudication. It is worth considering Figure 6 in concert with the adjudication results in Figure 4. As we noted before, adjudication in the US Presidential Election is preceded by a lengthy tally were voters constantly update their expectations about the

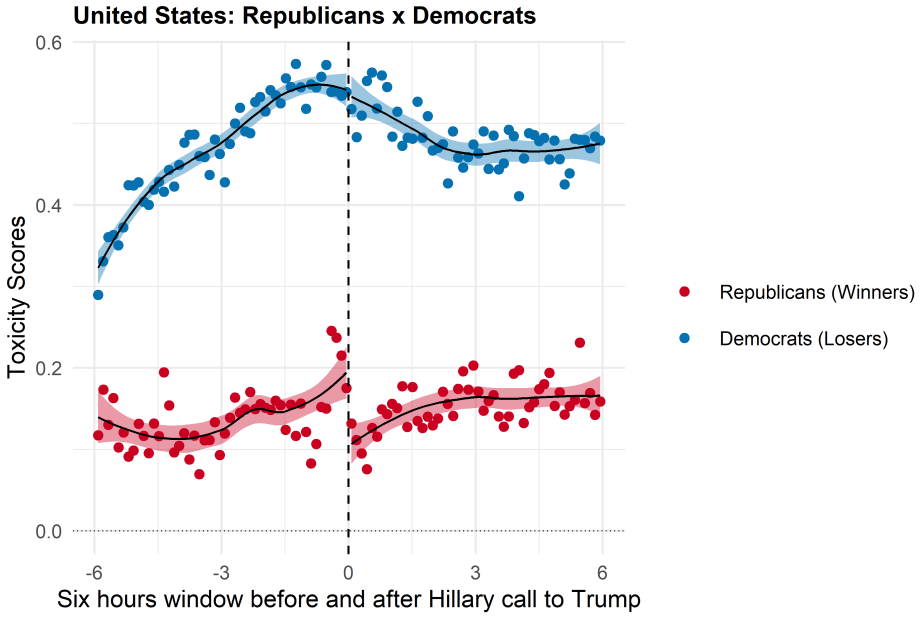


Figure 7: Toxicity Scores reported by *Perspective* on the text of the Tweets of the US Presidential Election. Lower values indicate less toxicity in the text of the tweets. Adjudication describes the moment that it is made public the congratulatory call from Hillary Clinton to Donald Trump.

likely winner. Figure 6 is revealing, as it shows that the increasing enthusiasm by the winners is accompanied by higher toxicity scores for the loser. As shown in Figure 6, the difference in toxicity grows monotonically as we approach adjudication. While the average toxicity score among Republicans was close to .15, this value was close to three times higher among democrats. Because the *toxicity* scores by *Perspective* have a range between 0 and 1, the increase from .32 to .58 in the toxicity score of democrats at the time of adjudication is both statistically and substantively significant. The strong information drift makes adjudication effects for the winner negligible, yet it is also telling the sharp discontinuity in toxicity among Republicans at the time of adjudication.

Through the adjudication theory, our analysis provides some new sounding dynamics about changes in uncivil discourse in social media. Previous research has indicated that the 2016 Presidential election as the most negative on the record (Fowler, Ridout and

Franz, 2016), with a strong prevalence of uncivil comments towards the candidates, in particular toward Hillary Clinton (Rossini, 2020). Yet by focusing on the critical event of the election night, our findings give a slightly distinct picture; we show that as the election tally proceeded, democrats become increasingly more uncivil, while republicans, upon winning, surprisingly become less toxic.

In all, the information gathered from the text of the tweets is both informative and consistent with differences in anger and enthusiasm that drive activity by Democrats and Republicans at the time of adjudication. Not only is there clear evidence of information drift in the time-to-retweet of both communities, but there is also evidence that the information that explains this information drift reflects different emotions by partisans that support each candidate.

5 Concluding Remarks

In this article, we introduce readers to a model of event adjudication and dialogue in social media. We focus on the moment in which one party is granted a performance advantage by an adjudicator, such as voters, justices, or nature. We test our model on four recent elections, and show how that after elections are called, the winner-loser gap forms an crucial on-line dimension, still unexplored before our work. Users' engagement change upon the electoral adjudication, the losers increase the use of toxic messages upon learning of their defeat, and activation becomes more hierarchical in the periphery of the network among low-authority users.

The model of event adjudication and dialogue proposed here has clear theoretical implications for scholars interested in social media engagement. We argue that attention to an event determines a state-of-dialogue and that, as winners and losers anticipate adjudication outcomes, they engage or disengage from dialogue with each other.

The theory of adjudication is predicated of the fact that winners and losers will

react with enthusiasm and anger to positive or negative election results. Differences in institutional rules and procedures, we argued, allow information to leak at different rates and explain variations in information drift and adjudication.

The proposed model provides a blueprint for scholars interested in understanding how information affects engagement, showing that the four elections under scrutiny had results that were anticipated to a different extent. Information drift and adjudication premiums, we argue, should facilitate structured comparisons between adjudication events.

Extensions of the proposed model to judicial decisions, fact-checking, and sports are among the most promising future developments of a theory of adjudication and dialogue. In addition, we invite future research to explore the effects of adjudication using field and on-line experimental data in order to disentangle behavioral mechanisms behind winner-loser gap in social media. Adjudication and dialogue, we think, are major areas of theoretical development at the intersection of Communication Studies and Political Science. As such, it is one area where future inter-disciplinary collaboration is particularly promising.

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Winning! Adjudication and Dialogue in Social Media

Supporting Information Files (SIF)

November 30, 2020

Contents

1 Treatment effect and results using alternative bandwidths

To ensure robustness of our findings, we present here the results using ad-hoc bandwidths for the our main cases of the paper. We present results using intervals of five minutes from the adjudication up to two hours before and after the event. Figure 1 indicates that the results in the main paper are not driven by the choice of the bandwidth. For all the models we report in figure 1, the vast majority of point estimates predict a decrease on time-to-retweet after adjudication – as we find in the main results of the paper. As it was reported in the paper, anticipation reduces the value of adjudication and increases information drift before the cut point.

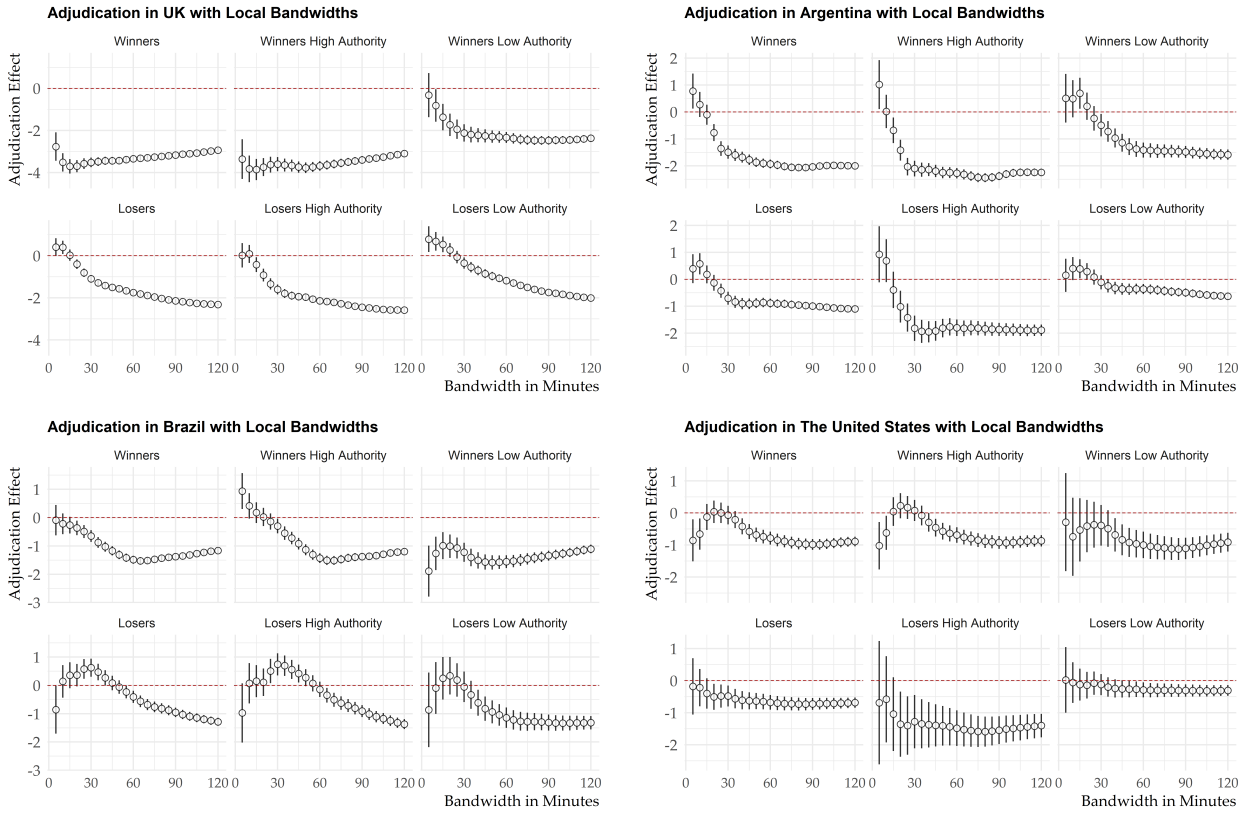


Figure 1: Adjudication in Elections using local bandwidths. The y-axis plot the robust estimates and 95% confidence intervals. In the x-axis, the figures presents the bandwidths

2 Placebo Checks

In all four cases, we have direct evidence and can observe the time at which the election is adjudicated. Therefore, concerns over treatment assignment are mitigated. Additionally, since our running variable is time, sorting across the cutoff is not a concern – as it happens to be in other empirical applications using regression discontinuity designs. However, a methodological challenge with time data relates to the validity of the event adjudication compared to other similar shocks in our outcome variable over time. In this appendix, we provide placebo tests to address this potential concern.

For our test, we estimate the Adjudication model on the full set of observations -

without separating the data by communities - for every ten-minutes interval over six hours in the pretreatment data. Each interval is considered as a placebo cutoffs. To reduce computational costs, we use the same bandwidth of the true model to estimate the models in the placebo cutoffs – 43 minutes for the Argentinian case, 62 minutes for Brazil, 48 minutes for the United States, and 40 minutes for the UK case.

Figure 2 presents the results. The true treatment effect (using the precise time of the Event Adjudication as the cutoff point) falls well outside the null distribution of the adjudication for the four cases. In the case of the election of Donald Trump, the true effect actually overlaps with one of the tails of the placebo checks; however, the true treatment does fall outside of the 99% lower bound of the null distribution. Taken together, the placebo checks demonstrate how the adjudication treatment effects are unlikely to be driven by a random unobserved shock in the running variable.

Notice that using all the data simultaneously adds noise to the data and yields a much more conservative estimate of the true effect. This is true for each community as well as for the aggregate effect. Estimates for each community can be requested from the authors, but are omitted from this SIF file for presentation purposes.

Consistent with the theory presented in the article, information drift in the United States and Brazil reduced the value of adjudication. However, placebo tests still show large and statistically significant effects that are not observed in other regions of the data.

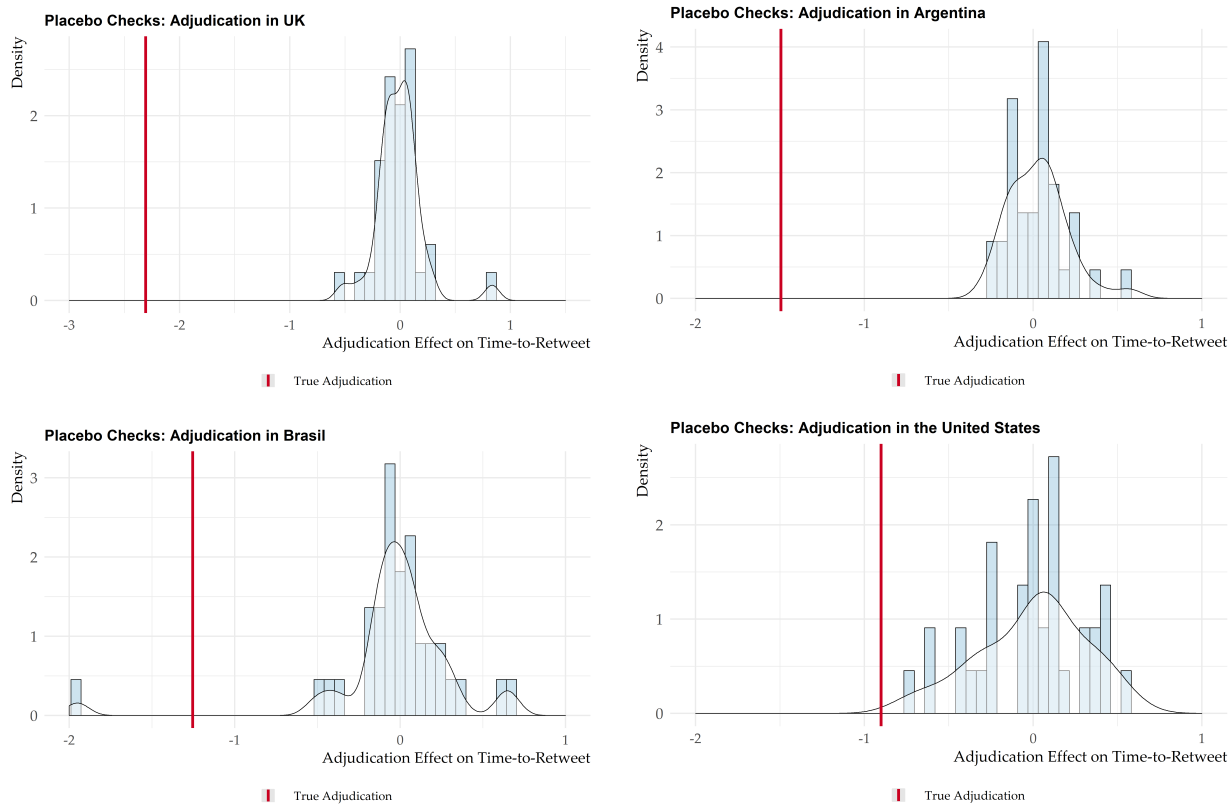


Figure 2: Placebo Checks for Adjudication in Elections. The red lines represent the Adjudication Effect using the true cutoff. The x-axis plot the robust point estimates using placebo cutoffs on every ten minute up to 6 hours in the pretreatment data. In the y-axis, we plot the density distribution for the adjudication effects in the null distribution.

3 Anticipatory Behavior

As we discuss in the paper, anticipation in the adjudication is likely to occur under some conditions. For example, in the United States, the staggered release of election results allows voters to update their believes about the likely winners and losers of the election. For the estimation of the adjudication effects, anticipation is a threat only if the effects go counter to the expected direction of the coefficients. There are few political events that would result in social media users behaving opposite to the expected effect due to anticipation, such as fraudulent results or a very sharp change in the direction of the tally. Still, we provide a formal test of information drift that is inconsistent with the adjudication hypothesis.

We estimate the effects of adjudication using very narrow bandwidth - every one minute before the true event - for the interval of thirty minutes. By using this narrow interval in the running variable, the RD design loses in the consistency of the estimator, but it gains on identifying local changes in the outcome variable. If these narrow point estimates are - on absolute terms - larger than the treatment effect, we can assume users are reducing their activity on social media before the Event Adjudication – the intercept on the left side is greater. In other words, when adjudication is larger on extremely narrow intervals, users are anticipating the effect in the opposite direction of our hypothesis which represents a threat to the identification of our results. This pattern would be a indicative that the point estimates of the main paper overestimate the effects of Event Adjudication.

Figure 3 presents the results. We do not observe anticipation leading to higher time-to-retweet in any of the four cases. If anything, in the cases of Brazil and the United States, users anticipate the results, as we expected, decreasing time-to-retweet, which indicates the effects of adjudication are likely larger than those identified in the main paper.

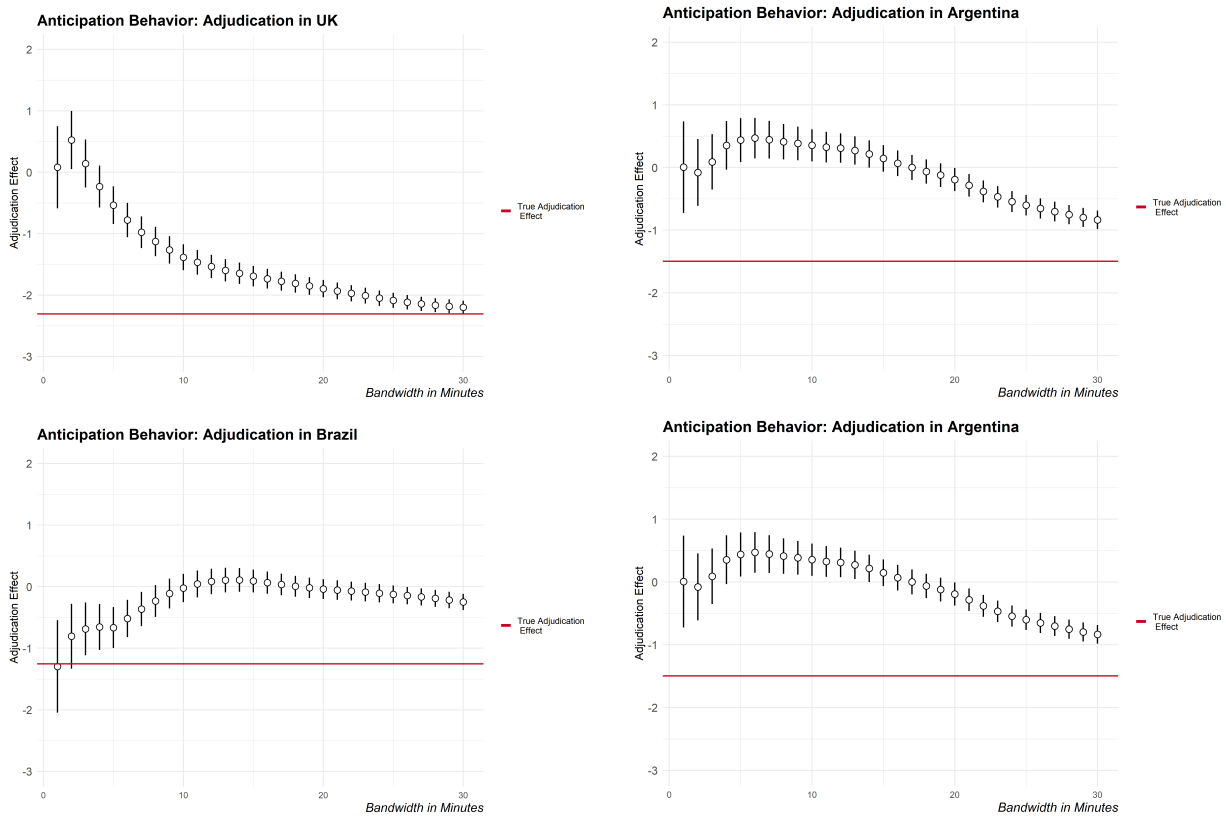


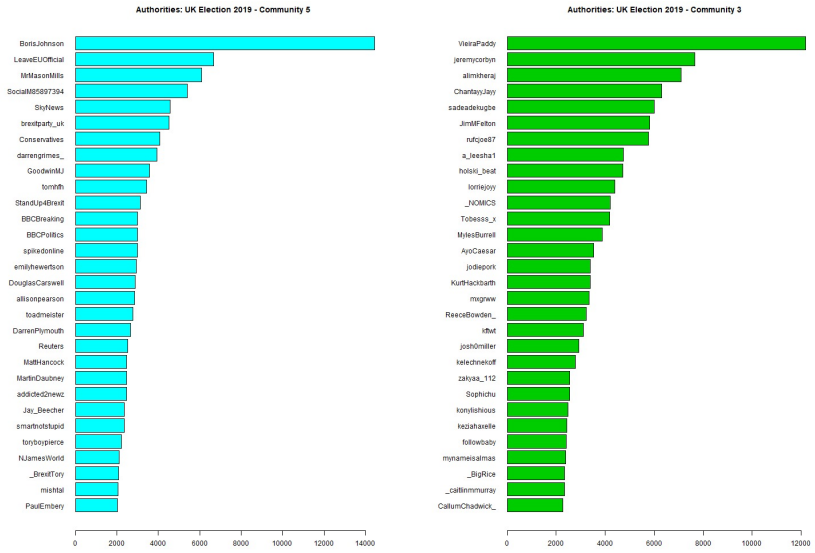
Figure 3: Anticipation of the adjudication effects. The red lines show the adjudication effect using the optimal bandwidth. The y-axis plot the robust point estimates using narrow bandwidths on every minute before the Event Adjudication. If users are increasing time-to-retweet before the event, we expect the point estimates to be larger in absolute terms compared to the true effect.

4 Communities

As reported in the article, the identification of users that aligned themselves with each of the candidates was done by first restricting the full sample of tweets to the primary connected clusters in each country. In all four cases, each cluster included the main political networks that were politically engaged during the elections. Using *random.walk* community detection in *igraph* (Csardi et al., 2006), we identified the main political groups as well as the two most important political communities. In all four cases, those communities corresponded to the top two candidates. Below we present the level of activity of the top

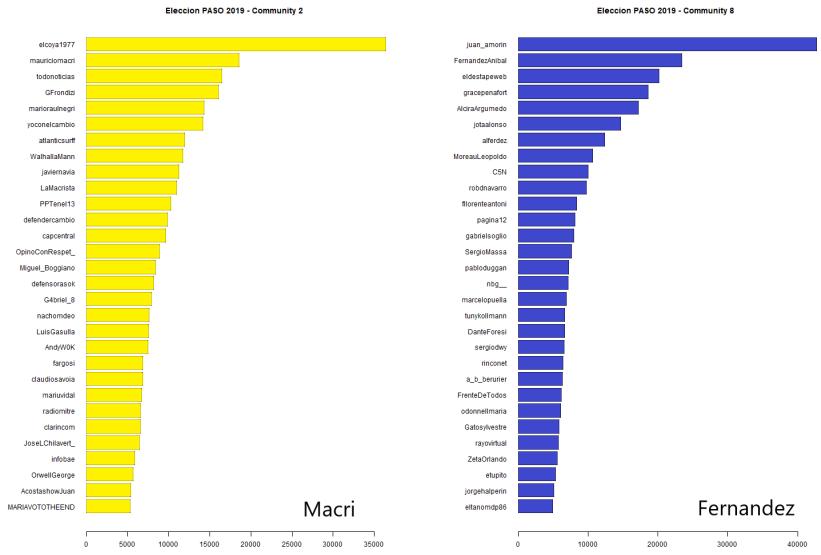
30 authorities (highest in-degree) in each of the communities. Close examination of the top authorities provide clear evidence that there is excellent community discrimination in the data. Experts in each of the four countries will quickly recognize the key social media influencers of each community.

Further, we compare the top authorities from these communities to the top 30 authorities of the UK election; the top 30 authorities of the Argentine election of October 27, 2019; the top 30 authorities of the Brazilian election of October 28, 2018; and the top 30 authorities of the Travel Ban protests in January of 2017 in the United States. In all four cases, community detection in these alternative datasets closely matches the ones captured on Election Night.



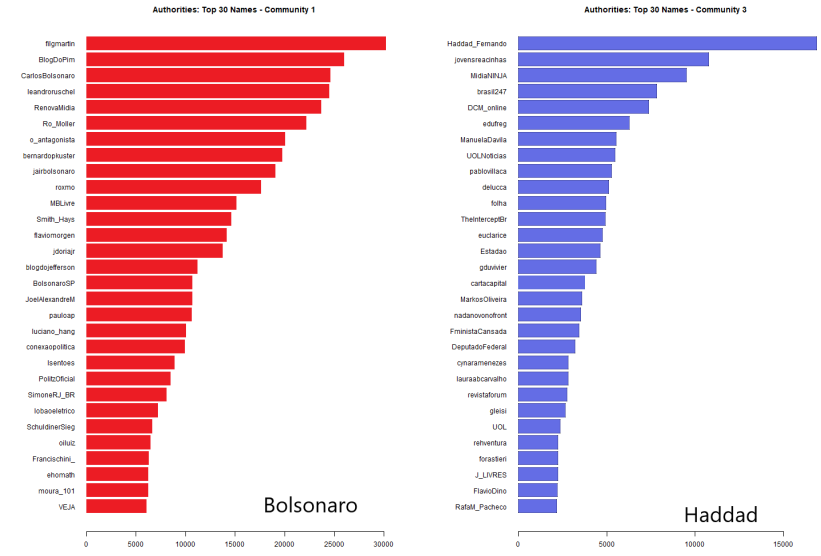
(a) Johnson (b) Corbyn

Figure 4: Community Detection in UK



(a) Macri (b) Fernandez

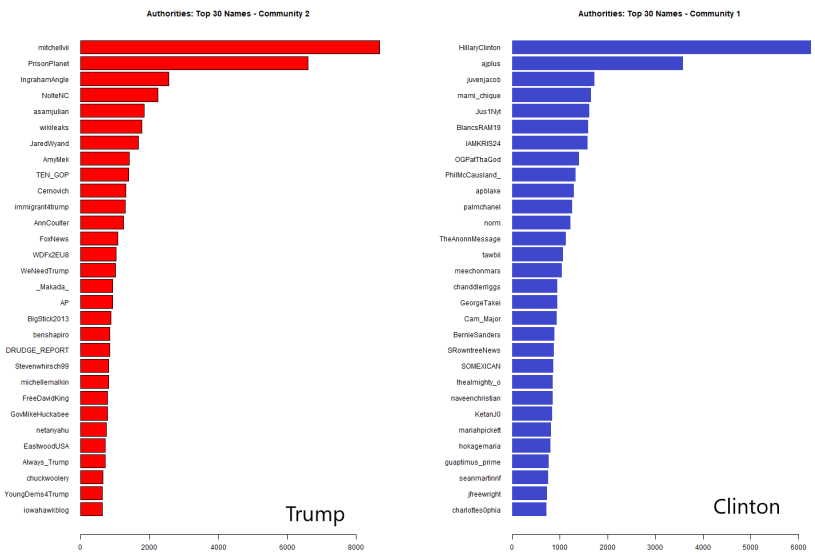
Figure 5: Community Detection in Argentina



(a) Bolsonaro (b) Haddad

Figure 6: Community Detection in Brazil

In all four cases we mapped the overall network distribution as well as the top 32 hashtags, validating the content of the messages. Figure 7 provides a summary description of the main communities for the Argentinian case, with Macri supporters on the right, Fernandez supporters on the left, and journalists and independents in the center.



(a) Trump (b) Clinton

Figure 7: Community Detection in Argentina

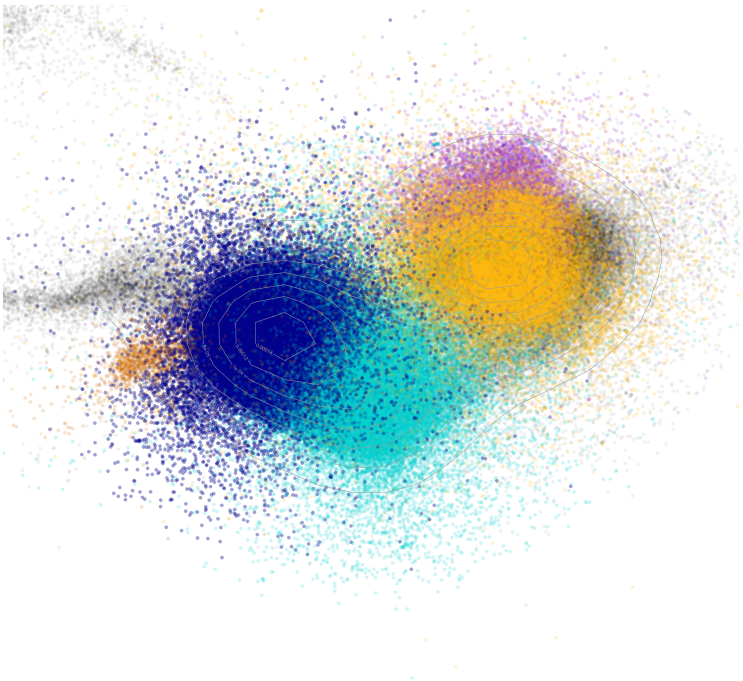
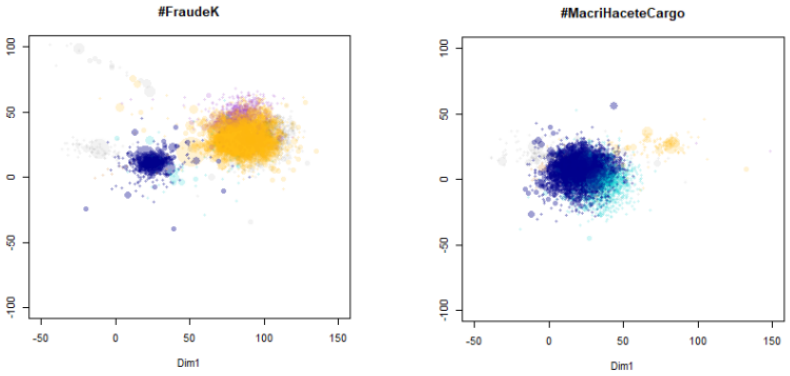


Figure 8: Basic Network Map: Macri Supporters (Yellow), Fernandez Supporters (Blue), and Media/Independents (light blue)



(a) Macri Supporters (b) Fernandez Supporters

Figure 9: Two Examples of Hashtag Activation in Argentina

References

Csardi, G., Nepusz, T., et al. (2006). The igraph software package for complex network research. *InterJournal, Complex Systems*, 1695(5):1–9.