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Social network influence on consistent choice

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ABSTRACT

Social networks tend to shape our view about the world. Our study conducts and empirical analysis of social network dynamics using Twitter data. We ask whether social networks influence voting decisions, and determine whether or not people make consistent choice based on their tweets. We collect Twitter data on a daily basis, with dynamic social network measurements before, during, and after the 2012 Presidential election. We use lexicographical analysis to check if ideological keywords are present in a user's tweets, and if the overall sentiment on this issue is positive or negative. We utilize this data to determine how people should have chosen an outcome, which may conflict with an individual's observed declaration of political ideology. We are able to determine what percentage of the population made a consistent choice based on their Tweets during the 2012 presidential election. Additionally, we examine the social network structure in Twitter and how it affects voting. We illustrate that an individual's political ideology is influenced by their network.

1. Introduction

Social networks shape our views about politics and political candidates; they are an important component in the study of political networks and political selection behavior.[1] In this paper, we study the influence of social networks on the consistency of voter choice. We conducted our study by utilizing Twitter data before, during, and after the 2012 presidential election to determine if individuals are consistent in their political inclination. To do this, we made a list of the fundamental political ideological beliefs of the two major political parties. This list was created by a comparison of the Republican (RNC) and Democrat (DNC) web-pages[2] and the 2012 presidential debate topics. We label these specific political issues, *political attributes*, in order to separate them from the cornucopia of other issues. We define political attributes as a numerical measurement of political ideology.

Based on individual sentiment toward each political attribute, we are able to divide individual's choices into two categories; consistent and inconsistent. We define consistent choice as when person *i* votes in line with his/her political beliefs. Our interpretation of consistent choice is related to the notion of correct voting[3] as described by Lau and Redlawsk (1997). For example, an individual who tweeted pro-gun sentiment and tweeted that he voted Democrat would have made an

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[1] See Lau and Redlawsk (1997), Sokhey and Djupe (2011), Fowler et al. (2011), and Sokhey and McClurg (2012).

[2] Please see www.gop.gov and www.democrats.org/.

[3] Voting correctly is a concept from political psychology that means a vote decision "that is the same as the choice which would have been made under conditions of full information", Lau and Redlawsk (1997). Correct voting is further defined as a person has voted correctly if they voted the same way they would have voted if they have perfection information about the candidate's positions.

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inconsistent choice; as Democrats were pursuing harsher gun control laws. Using this strategy, we established that 64% of individuals in our sample would make a consistent choice with respect to the 2012 campaign issues.

The analysis of social media and individuals' sentiment is important in order for us to gain insight into the population's views about politics. The literature regarding the analysis of individual sentiment with regard to politics is wide. Stieglitz and Dang-Xuan (2013) proposed a social media analysis method for political context. Their framework summarizes relevant issues from the perspective of political institutions. Go et al. (2009) introduced an approach for sentiment classification of Tweets. These messages were classified as either positive or negative with respect to a query term. Pak and Paroubek (2010) discuss techniques for linguistic sentiment analysis of Tweets. There has been a large amount of research in the area of sentiment classification in large texts; however, there has been a comparatively little research in the area of phrase level and sentence level sentiment classification.

Our research is in line with Tumasjan et al. (2010), who studied the context of the German federal election; they found that Twitter is used as a forum for political discussion and that Tweets can reflect offline political sentiment. Tumasjan et al. (2010) found that by simply counting the number of tweets mentioning a party can indicate the election's outcome. They also find that when both parties are mentioned; they are in proportion to real-life political draws. For our sample, we cannot say that this is the case. We would suggest that more understanding of the sample is necessary to use them as a "voting machine." Simple count methods mentioning the parties do not necessarily reflect the election's outcome as is apparent in our study. We believe it is important for researchers to understand the context in which individuals talk about the parties.

Some of the most fundamental concerns about democratic politics involve information; who has access to it, how do individuals get it, and of what quality and type is it? The answer to each of these questions invariably involves other people; see Sokhey and Djupe (2011). By using publicly available Twitter data we are able to see which users have access to information; we measure the dispersion of this information via social network structure. Several studies have looked at the impact of social networks and their structure on political participation and correct voting. Campbell (2013) incorporate social networks in order to understand the factors that lead individuals to express their voice in the democratic process.

Following the work of Watts (2014) and Sokhey and McClurg (2012) we incorporate the measurements of the social network structure into our model. We investigate how network structure impacts individual choice. This is done by regressing the social network structure (SNS), individual sentiment about economics, politics, and opinions/beliefs on average consistent choice. We learn that the overall magnitude of the social network structure influence is positive; thus increasing the consistency of an individual's (political) choice. Specifically, in-degree and eccentricity centrality significantly increase an individual's ability to make a consistent choice, whereas, out-degree centrality hampers an individuals ability.

Citizens minimize information costs by seeking political guidance from other individuals who have assumed the costs of acquiring and processing political information, see Ahn et al. (2007). We explore the structure of a communication network, Twitter, to help us identify how this affects political choices. It has been shown that low levels and uneven social distribution of political knowledge in the mass public cause opinion surveys to misrepresent the mix of voices in a society, see Althaus (1998). We, on the other hand, have chosen natural observation. Our results are based on natural observations of individuals' tweets rather than survey data. This method allows individuals to act normally as well as allowing us to be relatively unobtrusive. The techniques used in our study allow us to bypass misrepresentation when collecting data on mass pubic political knowledge. Converse (1964) discusses the differences in the nature of belief systems held on the one hand by elite political players and, on the other hand, by the masses that appear to be numbered within the spheres of influence of these belief systems. We make use of the differences in belief systems to quantify consistent choice within a network.

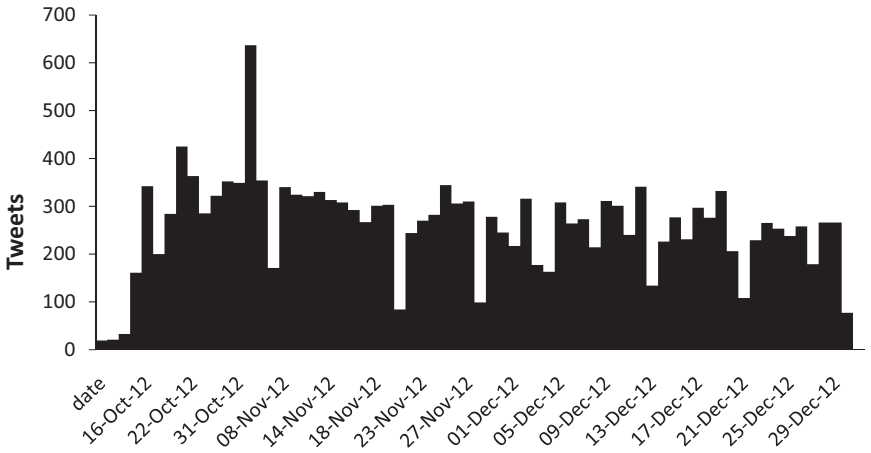

Fig. 1. Number of tweets over time.