

Introduction

Political polarisation is not a simple buzzword in Turkey, but an everyday reality. This reality manifests itself in interpersonal relations. Many people cut themselves off from their relatives who support the opposing parties; and this happens not only on social media, but also in real life. As a result of this, friends become foes, couples drift apart, and marriages fail due to partners having different political views. For instance, one evening a man snapped and recorded his wife's allegedly 21 seconds of profanity towards the President and took the recording straight to a local prosecutor. A criminal case has been filed against his wife as a result of this recording.¹ Although this case might seem extreme, a recent report titled "Dimensions of Polarisation in Turkey"² also demonstrates the gravity of the situation and the profound consequences polarisation may have. In that particular study, respondents were asked to identify a party whose supporters they felt close to (own party) and a party whose supporters they felt most distant from (other party). Afterwards, these two points of reference were used to measure the dimensions of polarisation such as social distance, perceived moral superiority and political intolerance. Results of the research revealed that 79 percent of the participants did not want their daughters to get married to one of the supporters of the political party they felt most distant. While 74 percent of the participants indicated that they did not want to do business with one of the supporters of that political party, the percentage of those who did not want such supporters of the opposing party as neighbours was around 70 percent. 68 percent said that they did not want their children to play with the children of that political party's supporters. In addition, more than 80 percent of the respondents stated that their significant others, families and friends shared the same political opinions with them.

Two major studies should also be cited here for better understanding of the voters' profile in this polarised society after the 2017 Constitutional Referendum. On April 16, 2017, Turkey voted in a nationwide referendum on several proposed amendments to the Constitution, which included granting the President sweeping new executive powers. The results left the country sharply divided. 51.4 percent of the electorate (the "Yes" camp) voted in favour of the executive presidency, with a turnout of over 85 percent. The two studies conducted by IPSOS Social Research Institute³ and KONDA Research and

¹ [1] Reuters, February 23, 2016, "No regrets, says Turkish man who sued wife for insulting Erdogan"
<https://www.reuters.com/article/us-turkey-erdogan-insult/no-regrets-says-turkish-man-who-sued-wife-for-insulting-erdogan-idUSKCN0VX238>

² Dimensions of Polarisation in Turkey (Türkiye'de Kutuplaşmanın Boyutları) For the summary of the key findings:
https://goc.bilgi.edu.tr/media/uploads/2018/02/06/dimensions-of-polarizationshortfindings_DNzdZml.pdf
The research has been turned into a book: *Fanusta Diyaloglar* (Dialogues in a Bell Jar) Emre Erdoğan, Pınar Uyan Semerci, Istanbul Bilgi University, 2018.

³ Research on the Post-April 16 Constitutional Change Referendum
http://www.arastirmakutuphanesi.com/wp-content/uploads/2017/04/AnayasaReferandum_Sand%C4%B1kSonras%C4%B1_Rapor_Ipsos_19042017-FINAL.pdf

Consultancy company⁴ analysed the demographics, lifestyles, belief systems, voting behaviours and media consumption patterns of the YES and NO camps. In addition to the in-depth analysis of the rich data, the striking common result was how each partisan group created a social bubble for themselves excluding all possible opposing views and being exposed merely to affirmative views. This social bubble has started in real life, been extended to conventional media, and finally to social media. Ideological uniformity and partisan antipathy are especially visible during the referendum campaigns on social media. This paper studies the relationship between political polarization during the referendum campaign and Twitter usage. We tentatively suggest that there is a correlation between political polarization and engagement on Twitter.

Literature Review

“similarity begets friendship”
Plato in his 360 B.C play *Phaedrus*

“people love those who are like themselves”
Aristotle, *Rhetoric and Nichomachean Ethics*, 1934, p. 1371

Researchers familiar with Turkish society need no introduction on how Twitter usage has exploded throughout the country over the past few years. While the figures are not fully accurate, it is estimated that out of Turkey’s 79.14 million population, over 46 million are registered Internet users (We are Social 2016).⁵ According to Erdogan and Semerci (2018), one third of all Internet users in Turkey have a Twitter account. While only 15 percent of them frequently share political opinions on Twitter, almost half of the users never share their political opinions on that platform. Furthermore, 60 percent of the Twitter users say that they follow people who hold similar opinions to their own. Although there is a rich and established literature on Twitter usage in Turkey (see for example Saka 2016, 2018; Tüfekçi 2013, Tunç and Görgülü 2012; Yeşil et. al, 2017), there is no specific study that examines how political polarization existing in real life spills into the Twittersphere.

Research undertaken elsewhere often connect polarization to discussions on echo chambers, a situation wherein social media users have friends with similar political views on Facebook and follow like-minded people on Twitter (Garrett, 2009; Sunstein, 2009, 2018; Gainous and Wagner, 2014; Barberá *et al.* 2015; Bode and Vraga, 2015; Del

⁴ KONDA April’17 Barometer: April 16 Ballot box and Voter Analysis
http://konda.com.tr/wp-content/uploads/2017/04/KONDA_16Nisan2017SandikveSecmenAnaliziRaporu.pdf

⁵ <http://www.dijitalajanslar.com/internet-ve-sosyal-medya-kullanici-istatistikleri-2016/>

Vicario *et al.*, 2016; Heatherly *et al.*, 2016; Garimella *et al.*, 2018; Quattrociocchi *et al.*, 2016). In all these studies, echo chambers have been defined as ideologically congruent and homogeneous environments in which political views are not debated, but instead reinforced and amplified, paving the way to increased polarisation. An echo chamber can also be described as a place where people hear their own voice; yet are deaf to the realities of others. This situation ultimately damages the democratic ideals, and all the findings focus on concerns about echo chambers. (Stroud, 2010; Gainous and Wagner, 2014; Hodges and Stocking, 2015; Jungherr, 2016; Merry, 2016).

However, it is important to note that segregation created by echo chambers does not necessarily imply polarization, as two separated groups of people that share the same opinion can not be considered as polarized. Hence, in order for a population to be polarized, the opinions of the two groups should also be conflicting or opposed (Guerra, Meira Jr, Cardie and Kleinberg, 2013). Accordingly, one can define polarization as the social process whereby a social or political group is divided into two opposing sub-groups which have conflicting and contrasting positions, goals and viewpoints, with few individuals remaining neutral or holding an intermediate position (DiMaggio, Evans, Bryson, 1996). Sometime “bi-polarization” (Mäs and Flach, 2013) is also used as a synonym, to distinguish the term from group polarization, or the tendency for a group to make decisions that are more extreme than the initial inclination of its members (Sunstein, 2002; Isenberg, 1986). Periods leading up to elections or referendums are typical contexts wherein one encounters polarization, yet there a range of other issues known to induce similar reactions in societies. These include global warming (McCright and Dunlap 2011), gun control, same-sex marriage and abortion (Mouw and Sobel, 2001).

A growing body of literature suggests that political polarisation among the U.S. electorate has risen over the past two decades (Abramowitz and Saunders 1998, 2008, Hetherington 2001; Green, *et al.*, 2002; Layman and Carsey, 2002; Stonecash, *et al.*, 2003; White, 2003; Jacobson, 2004, 2005; Layman, *et al.*, 2006; Iyengar *et al.* 2012). Yet in these studies, polarization has been traditionally analyzed through the ideological stances of political parties, particularly in the context of the United States (Vaughn *et al.*, 2009). Furthermore, polarization is generally conceptualized on the basis of positions in ideological space (Hetherington, 2009). Commonly used measures of political polarisation are derived from those two premises, and therefore, conceptualize polarisation as two ideological blocks (i.e. parties) drifting apart on one political dimension, while increasing their internal agreement. This paper argues that an exclusive focus on ideological positions and the discourses created by these positions, does not capture all aspects of the term polarization. The term also has a behavioral component that manifests in the interactions between individuals. Accordingly, a more robust definition of polarization would have to comprise not only the ideological stances of the polarised set of individuals or parties, but also the interactions between them (Blau, 1977; Baldassarri and Bearman, 2007; Conover *et al.*, 2011; Gruzd and Roy, 2014). Applying

social network analysis (SNA) is one approach to studying polarisation from the vantage point of interactions.

Social network analysis focuses specifically on identifying and forecasting connections, relationships and influence among individuals as well as groups. It is mostly based on the visualisation of the “who is following who?” graph that highlights the structure of the network’s relationships (Grandjean, 2016). The SNA approach has proven to be particularly popular within the realm of Twitter research, with much of the empirical research focusing on the networks and patterns of interaction that emerge by an analysis of specific hashtags in which politicians are just among many other actors (Larsson and Moe, 2011; Small 2011; Burgess and Bruns 2012). Numerous studies that specifically investigate the politicians’ twittering behaviour are also based on social network analysis (Vergeer *et al.* 2013). Another use of social network analysis is concerned with measuring influence (i.e. Suh *et. al.*, 2010; Subbian and Melville, 2011; Willis *et. al.*, 2015), particularly in political communication (Stieglitz and DangXuan, 2012). It is also important to note that there also exists a massive body of literature on engagement and interaction among Twitter users including voters, politicians as well as candidates during various political election campaigns (Some of the studies are Yardi and Boyd, 2010; Dang-Xuan *et al.*, 2013; Sreekumar and Vadrevu, 2013; Bentivegna, 2014; Song *et al.*, 2014; Freelon and Karpf, 2015; Jürgens and Jungherr, 2015; Jungherr, 2016).

Network science defines polarisation a phenomenon wherein any given social network is composed of highly connected subgroups with weak inter-group connectivity (Conover *et al.*, 2012). Within such a framework, establishing a social link is either an endorsement or agreement on opinions to certain extent (Guerra *et al.*, 2013). Terms such as clusters or communities are used as synonyms to define groups of individuals connected to one another within specific networks or link topologies. Applying an SNA approach allows us to capture and analyse the interaction aspect of polarization within the context of the 2017 Turkish Referendum.

There is a growing number of studies utilizing the network approach to study polarization. Earliest studies were about segregation in links across political blogs (Adamic and Glance, 2005), website visits (Gentzkow and Shapiro 2011), political retweets on Twitter (Conover *et al.* 2011), article sharing and clicking on social media (Bakshy *et al.* 2015, Flaxman *et al.* 2016), and while more contemporary studies examine political homophily on Twitter (Colleoni *et al.* 2014, Halberstam and Knight, 2016). *Homophily*, is a well-established theory in sociology which posits that people tend to form connections with others who are similar to them in terms of characteristics such as socioeconomic status, values, beliefs and attitudes (Lazarsfeld and Merton, 1954). McPherson *et al.* (2001) summarizes numerous studies on homophily related to race, gender, social class and other socio-demographic variables in physical world. The advent of social media, however, takes this phenomenon to a different level on cyber space (Boyd and Ellison, 2007; Kossinets and Watts, 2009; De Choudhury, 2011; Bisgin *et al.*,

2012; Colleoni *et al.*, 2014; Boutyline and Willer, 2017; Passe *et al.*, 2018). This is because social media, especially Twitter, enables a high level of engagement and interactivity apart from allowing for real-time discussions without physical constraints (Rafaeli and Sudweeks, 1997; Kwak *et al.*, 2010).

Conover *et al.* (2011) made the first attempt to establish a correlation between homophily and political views. Based on a sample of 1,000 users, they found evidence that political networks on Twitter are highly segregated as users tend to retweet more from those users who share the same political affiliation. Feller, Kuhnert, Sprenger, and Welpé (2011) also reached similar results by examining the conversations surrounding German political parties during the 2009 federal elections. They found that political tweeters tend to be segregated according to shared political affiliation. Boutet, Kim, and Yoneki (2012) also investigated Twitter users' political affiliation based on the mention/retweet patterns and the segregation/contamination of retweets on Twitter during the 2010 UK general election. They revealed a highly segregated partisan structure and developed a classification method that party members were more likely to retweet material from their own party than material derived from other parties. While some studies uncover partisan differences in posting political content on social networking sites (Bode *et al.*, 2014; Gainous and Wagner, 2014), other studies reveal that ideology, in fact, explains these differences (Vraga, 2016). Vraga (2016) found that liberals are more likely to post political content on social networking sites compared to conservatives, whereas Barberá (2015) and Bond and Messing (2015) showed that social networks are definitely homophilous when it comes to political ideology. However, even though the literature on this subject is rich and many empirical studies that focus on the network level of particular countries during various elections exist (i.e. Conover *et al.*, 2011; Aragon *et al.*, 2013; Himelboim *et al.*, 2013; Garcia *et al.*, 2015), there is no study conducted about Turkey that uses social network analysis to study polarisation.

Methodology: Developing a model to measure polarisation

In our case-study, the 2017 Turkish referendum, voters were presented with the choice of either voting for or against the proposed amendments to the constitution. Accordingly, the political campaign leading up to the referendum was divided into two camps. Both camps heavily relied on Twitter to broadcast their opinions to a wider audience and woo potential voters. Both #EVET (#YES) and #HAYIR (#NO) continued to be top-trending hashtags on Twitter for much of the period leading up to the day of voting. Building on this observation, we devised a data collection strategy based primarily around hashtags rather than keywords or particular accounts. A snowballing technique based on co-occurrence of hashtags was used to compile list of more than 150 hashtags associated with either the "Yes" or the "No" campaigns. This list of hashtags was entered into BilgiTCAT (Tweet Collection and Analysis Tool), a tweet collection platform adapted from the open-source TCAT software (Borra and Reider, 2014) and yielded a dataset of more than

5 million tweets. For this case study, we analysed over 1 million tweets sent out by 308,461 unique users on the day of the Constitutional Referendum (17.04.2017).

Research regarding the impact of the Internet on polarization suggests that there are two competing hypotheses (Lee, Choi; Kim C.; Kim, Y., 2014). The first one states that people tend to expose themselves to similar points of view and rather avoid dissimilar perspectives. As a consequence, they form more extreme opinions in the direction of their original inclination, which leads to both group and bi-polarization (Van Alstyne and Brynjolfsson, 2005). Tools such as filtering and recommendation systems built in social media are considered to amplify this tendency. According to the other hypothesis, the Internet enables people to encounter more diverse views and thus to have balanced opinions on different hot topics (Bimber 2008, Papacharissi 2002). Judging from Twitter usage habit and recent reports on polarization in Turkey, our null hypothesis is that the choice of either voting or against the proposed constitutional amendments would yield a polarized network on Twitter with two main clusters. In other words within the context of the referendum night, the results of our study will conform with the hypothesis that people tend to associate with either the YES or NO camps active on the Twittersphere and avoid interacting with individuals or content from opposing camps.

An important benefit of platforms such as Twitter is that they offer a range of different interactions, both amongst users and also between users and tweets. A study of polarisation needs to take several of these interactions into account. Accordingly, we propose to explore two main interaction types on the night of referendum: mention-based interactions between users, replies to another users tweets and interaction between users and hashtags. A mention network connects users if one has mentioned another in a post, including the case of tweet replies while interaction between users and hashtags occur when a user sends out a tweet containing the hashtag in question. The later type of graphs measure engagement of a user with a particular hashtag. The more a user engages with a hashtag, the stronger the relationship (weight) between the two nodes on the network. After experimenting with different figures, we decided to divide the volume of interactions on the basis of frequency. The first graph visualized frequencies more than 1 and less than 10. In other words, we looked at the engagement of users who had sent out more than 1 tweet on the day of the referendum and less than 10. The next layer looked at users who had tweeted more than 10 times and less than 100 on the day of the referendum. The final layer looked at users who had tweeted more than 100 times on the 16th of April.

When combined with mention graphs, these two layers compose a multiplex network, also known as a multimodal, multirelational or multivariate network, (Menichetti et al., 2014). Multiplex networks are a subset of multilayered networks: multiplex networks have one- to-one relationships between nodes across layers and multilayered networks have arbitrary connections across layers (Boccaletti et al., 2014). For bipartite graphs, we

used manual annotation to develop a colour scheme for the political affiliation of the hashtags (table 1).

Table 1: colour scheme for political affiliation of hashtags

Colour	Meaning
Vermillion: #e34234	“No” campaign
Cobalt Blue: #0047ab	Neither “No” nor “Yes” hashtags
Emerald Green: #50C878	“Yes” campaign
Zinc White: #bac4c8	Edge (interaction)

The network layers are visualized in Figure 1 and 2, using the Force-Atlas 2 layout algorithm (Jacomy, 2014).

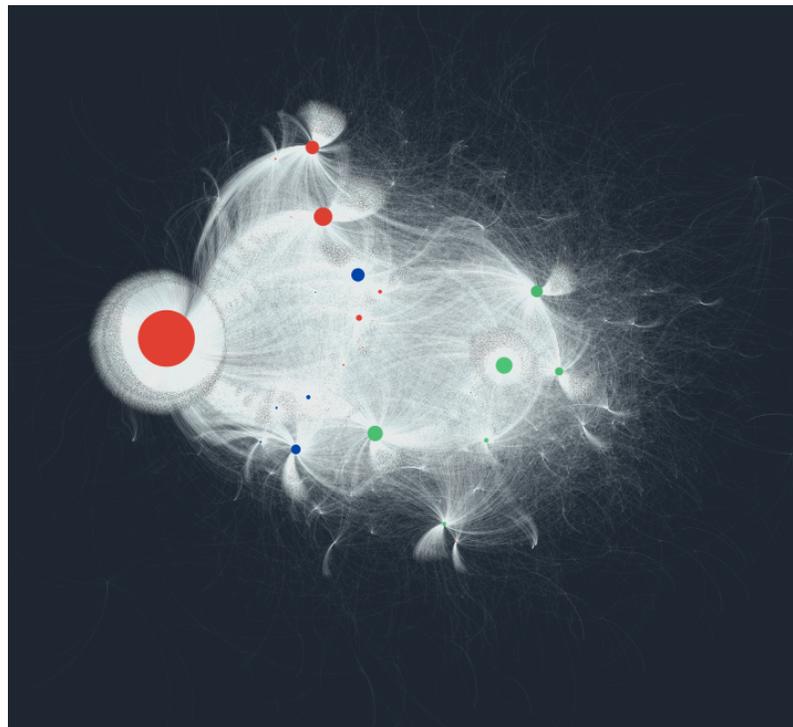


Figure 1a: Interactions of users who sent out more than 1 and less than 10 tweets on 16.4.2017

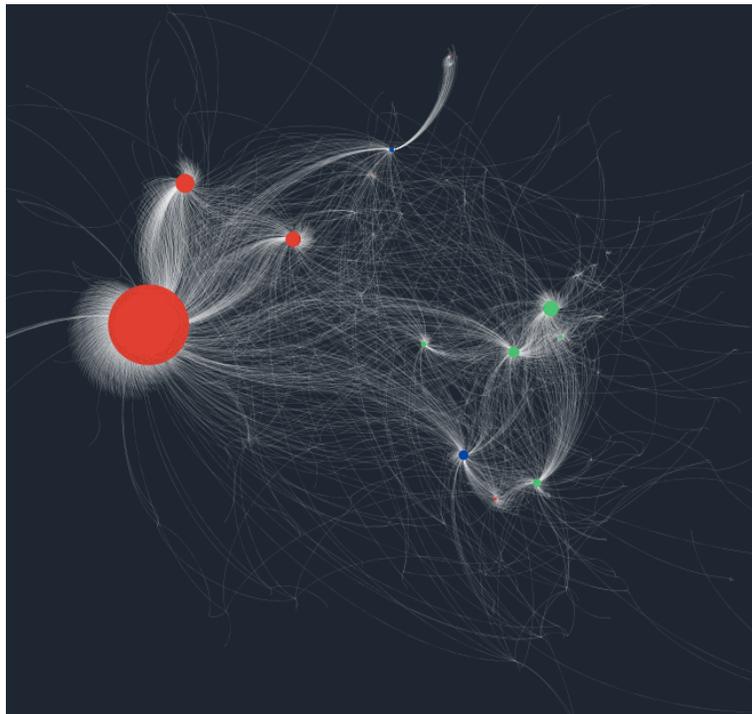


Figure 1b: Interactions of users who sent out more than 10 and less than 100 tweets on 16.4.2017.

An initial observation of Figure 1 seems to lend support to our null hypothesis: the network seems to be polarized along the YES/NO divide, while this pattern is not as clearly visible for the mention network (Figure 2). Accordingly, we need to resort to a technique that can quantify polarization rather than simply visualizing it.

There are multiple ways to detect polarisation within any given network, the most popular being modularity metrics (Newman, 2006). Modularity metrics are commonly used to measure the level of segregation of two groups within a network (Newman and Girvan 2004). Therefore, a network with high modularity indicates that the network may be divided into clusters having many internal connections among actors and few connections to the other group. A measure of modularity closer to 1 implies that all links are within groups, and >1 that all links are across groups. To track if polarisation occurred on the night of the referendum, we decided to apply modularity metrics to both mention graphs and to bipartite hashtag-users graphs.

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