**Change in Twitter users'** **political affiliation, echo chamber, and homophily after Elon Musk's acquisition**

**Social Media & Political Affiliation:**

Platforms on social media have developed into reliable sources for exchanging ideas, opinions, and knowledge. People utilize social media at their places of employment and in their offices to express their views to followers, co-workers, or the general public. The considerable amount of data produced by this information exchange can be used to reveal a user's profile. Additionally, publishing information publicly indicates people's political affiliation, which can be awkward in public and at work. Twitter is one of the most extensively used and favored social media sites since it allows users to freely discuss and voice their opinions on various subjects across all cultures and communities. Research on Twitter data is continuously improving to extract information and patterns from public information via the Streaming API. Researchers focus on real-time detection, prediction, and cheap computational approaches to address classification issues (Dean, 2016; Hussein, 2018).

Global political conditions change frequently. The opposition and other groups with divergent political philosophies present the government with numerous obstacles. Similarly, a person whose political identity is made public may encounter several obstacles and biases at every turn. Political discourse has evolved as a result of social media. Everyday users have a louder voice in the online public realm thanks to likes, retweets, shares, and memes.

It is a persistent difficulty in computational social science and natural language processing to categorize social media users according to their political allegiance (Conover et al., 2011; Cohen & Ruths, 2013; Sylwester & Purver, 2015; Wong et al., 2016). Sociolinguists are also interested in how language reflects political identification (Hall-Lew et al., 2010; Labov, 2011). However, these two research communities take somewhat different approaches to determining political identification.

Large-scale computational work has typically concentrated on categorizing Twitter users according to linguistic and social network traits. In contrast to Cohen and Ruths, who employed a broad feature set containing words, Conover et al. used unigrams (without punctuation) and social networks (Conover et al., 2011).

**Echo Chamber:**

Echo chambers have become a topic of discussion in democratic nations' political debates. There is rising concern that as people's perspectives on political matters become more divided, they will not hear the opposing side's arguments but instead surround themselves with people and news sources that solely present their viewpoints. The current concerns raised by Facebook and former US presidents are telling. The democratic deliberative process may be hampered if echo chambers exist (Sunstein, 2009). The phrase refers to circumstances in which individuals "hear their voice," or, more specifically, in the context of social media, circumstances in which individuals consume content that represents the same point of view that individuals themselves hold or express. A variety of online media, including blogs (Gilbert et al. 2009), forums (Edwards, 2013), and social networking sites (Barberá et al., 2015), have been found to have echo chambers. Previous research has attempted to measure how prevalent echo chambers are online. For instance, in the context of blogs, Gilbert et al. (2009) investigate the comments on a collection of political blogs and discover that the comments overwhelmingly support the author of the blog article.

Similar results were obtained by Lawrence et al. (2010), who discovered that partisan bloggers interact with blogs that share their narrow range of political viewpoints. An et al. (2014) analyzed political news users' activity on Twitter. They discovered that "90% of the users [directly follow] news sources of only one political leaning," but "their friends' retweets lead them to diversify their news intake." (Bakshy et al., 2015) evaluate the extent to which Facebook users with claimed political allegiances read cross-cutting content, that is, content that users with opposing political allegiances mainly post. The three levels of content consumption analyzed are prospective exposure, which includes all content shared by a user's friends; (ii) exposure; and (iii) engagement, which consists of all content a user clicks. The study discovers that users engage with less cross-cutting content despite being exposed to a substantial amount of it, a choice that is consistent with the hypothesis of biased assimilation (Lord et al., 1979). In this essay, we investigate the presence and composition of echo chambers in conversations on Twitter. The user's shared opinion and the "chamber," or the social network surrounding them, enabling the opinion to "echo" back to the user as others share it, are the two main components through which we approach the subject. Users' shared content items are the source of the opinion, and the social network that supports it is what makes it possible for it to spread. If the political slant of the content that users receive from the network and the content, they share is congruent, then an echo chamber is present. Since there is no agreement on a formal definition in the literature, we choose this one because it is sufficiently broad and effectively reflects the core of the phenomenon. In this article, we suggest methods to detect the presence of an echo chamber utilizing both the read/shared material and the network that allows the content to spread. We study content consumption and production jointly at the level of individual users, in contrast to many prior studies that concentrate on measuring only content consumption to quantify the echo-chamber effects. We look at how various content profiles correlate with the network position of users.

**Homophily:**

Homophily, which is described as the propensity of similar people to develop relationships with one another, is the process through which this fragmentation of political speech functions (McPherson et al., 2001). Most often theories of cognitive dissonance and selective exposure are proposed as possible explanations for this phenomenon (Festinger, 1954). These theories contend that when information that supports one's beliefs is supplied, people feel good. People frequently experience stress and pressure to fit in when confronted with opposing viewpoints.

They will therefore be more likely to expose themselves to a consensus as well as material and conversation that support their initial viewpoint. Therefore, the selective exposure process results from people's propensity to reduce cognitive dissonance and, as a result, to form homogeneous groups by associating with people who share certain characteristics, such as beliefs, education, and social standing (Lazarsfeld & Merton, 1954). Common worldviews come from homophily. Homophily creates common political attitudes in the political sphere, which can lead to political polarization. "Homophily limits people's social environments in a way that has significant effects on the knowledge they take in, the attitudes they develop, and the interactions they have" (McPherson et al., 2001, p. 23). According to this line of reasoning, the "echo chamber" effect results from people's propensity to form homogeneous groups and associate with those who hold the same political beliefs. This is not a simple issue. According to Scheufele, Hardy, Brossard, Waismel-Manor, and Nisbet (2006), individuals have greater information needs the more heterogeneously embedded they are in a network. Additionally, political diversity in personal networks improves tolerance for opposing views and political understanding (Mutz, 1999). Contrarily, exposure to only like-minded individuals appears to be linked to the adoption of more radical opinions, which causes political division (Sunstein, 2001; Mutz & Martin, 2001). The issue of political homophily on the Internet has gained fresh relevance considering the recent growth of social networking sites (SNSs; Boyd & Ellison, 2007). This is because SNSs like Facebook and Twitter enable high levels of involvement and permit diffused and real-time talks without regard to a user's location (Rafaeli & Sudweeks, 1997). These elements—combined with SNSs' propensity to spread political (and other) content at high rates—mean that they have established themselves as significant platforms for political communication (Honeycutt & Herring, 2009; Williams & Gulati, 2009). SNSs tend to strengthen group cohesion and information dissemination, which tends to support both the public sphere scenario with low levels of homophily and the echo chamber scenario with high levels of homophily (Boyd & Ellison, 2007; Kwak, Lee, Park, & Moon, 2010). Twitter has become a particularly important tool for political communication.

This is because posts are automatically made visible to all users (unless otherwise specified), that content can be easily shared and quickly spread throughout the network by using the retweet function, and the system of hashtags and mentions enables the creation of public around discussions without the need for group creation, and that users can follow a specific account without the owner's consent. This means that, in addition to the reciprocal relationships that are typical of Facebook, Twitter also allows for the practice of following those who do not follow one back. According to Kwak et al. (2010), Twitter may both build "symmetric social graphs" based on symmetric relationships and "nonsymmetric interest graphs" based on nonsymmetric interactions. This makes it both a "social" and a "newsy" media (Ravikant & Rifkin, 2010). This implies that Twitter should, in theory, support both the scenario of the echo chamber and the public sphere.

**Network analysis:**

Researchers widely used network analysis to deal with text corpora culled from social media.

The polarization of the conversation on social media can be shown using network analysis, which emphasizes the network of retweets. However, it might also be used to create hashtags or topic networks that summarize conversations. Finally, it can also produce a semantic network in which the nodes are the words, and the edges are the co-occurrences of those terms in online items like tweets and posts.

1. Re-tweet networks: Focusing on the Twitter platform, Conover et al. (2011) show how the two types of interactions (retweets and mentions) can result in very different and frequently conflicting reactions through clustering of users and network analysis of 355 million tweets posted during the U.S. midterm elections. Retweeters typically engage in conversation with people who share their views. However, they are also employed to converse with others whose viewpoints differ, raising the likelihood of even acrimonious altercations.
2. Topic networks: Casara et al. (2020) create a network of 1000 tweets from Italian politicians to study the relationship between politicians and positive or negative attitudes toward immigration. In this instance, the graphs are produced following human coding of the tweets' topics using a method we will employ in this study.
3. Hashtag network: Suitner et al. (2020) analyzed the hashtag network about climate change in different years. In this instance, obtaining information from Twitter enables us to provide an accurate picture of the social media topic. For example, it is intriguing to see how, in this instance, we can identify the shift in the terms related to climate action by contrasting those semantic changes with actual societal events.
4. Semantic network: Grimmer and Stewart (2013) authored one of the most widely recognized articles regarding text analysis in the political sector. They created a comprehensive manual for automated text analysis. They highlighted how it could significantly lower the expenses of evaluating huge textual collections, concluding that automated text techniques could become a standard tool for political scientists. Rule et al. (2015) conducted a similar temporal comparison but used semantic network analysis in place of the hashtag network. In this instance, the researchers devised a method for locating relevant categories in textual corpora, such as terms, concepts, and linguistic shifts. By depending on terms' joint appearance over a specific text unit, they create categories using this co-occurrence-based text analysis technique. This project will employ a similar methodology, except instead of evaluating text from traditional media, it will analyze material from social media.

**STUDY QUESTIONS:**

The project's title highlights the core query of the entire investigation: "Change in Twitter users' political affiliation, echo chamber, and homophily". We acquired Twitter because it is important to the future of civilization to have a common digital town square, where a wide range of beliefs can be debated healthily, without resorting to violence. There is currently great danger that social media will splinter into far right-wing and far left-wing echo chambers that generate more hate and divide our society.

**Steps of the project:**

• Select data to build networks from different timeframes

• Identify left/right wings tweets (score based on hashtags/words?)

• Create multiple networks

• Compare changes in networks

**Data selection:**

• Identify central hashtags to left and right wings, consistent over time

• Identify timeframes to identify changes in the networks caused by Musk's acquisition and following directives

• Avoid timeframes that could impact results (e.g., election dates)

• Collect tweets and replies to the tweets

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