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Semantic Networks of Election Fraud: Comparing the Twitter Discourses of the U.S. and Korean Presidential Elections

Jongmyung Lee ^{1,†}, Chung Joo Chung ^{2,†} and Daesik Kim ^{3,*}

¹ Department of Media & Communication, Kangwon National University, Chuncheon 24341, Republic of Korea; journaleest@kangwon.ac.kr

² Department of Media & Communication, Kyungpook National University, Daegu 41566, Republic of Korea; cjchung@knu.ac.kr

³ Department of Political Science and Diplomacy, Kyungpook National University, Daegu 41566, Republic of Korea

* Correspondence: daesik.kim@knu.ac.kr

† These authors contributed equally to this work and should be considered co-first authors.

Abstract: Traditional news outlets, such as newspapers and television, are no longer major sources of news. These media channels have been replaced by social platforms, which have increased in value as information distributors. This change in communication is an underlying reason for the election fraud controversies that occurred in the United States and South Korea, which hold high standards of democracy, during similar periods. This study investigates a model for sharing political disputes over social networks, especially Twitter, and illustrates the influence of political polarization. This study examines Twitter content around the presidential elections in the United States and South Korea in 2020 and 2022, respectively. It applies semantic network analysis and structural topic modeling to describe and compare the dynamics of online discourse on the issue of election fraud. The results show that online spaces such as Twitter serve as public spheres for discussion among active political participants. Social networks are key settings for forming and spreading election fraud controversies in the United States and South Korea, with differences in content. In addition, the study applies large-volume text data and new analytical methods such as the structural topic model to examine the in-depth relationships among political issues in cyberspace.

Keywords: election fraud; political communication; presidential elections; comparative analysis; Twitter



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1. Introduction

One similarity between the 59th United States (U.S.) presidential election in 2020 and the 22nd South Korean presidential election in 2022 concerns the proliferation of false or exaggerated accusations of *election fraud*. Allegations of fraud emerged in the South Korean presidential election, with various districts revealing the same vote count discrepancies and the National Election Committee (NEC) demonstrating poor voting management in the COVID-19 situation. In the United States, fraud allegations raised the issue of similarly careless management in the mail-in voting process in relation to COVID-19. These accusations are commonly observed in elections worldwide, but why was this phenomenon especially prominent in the most recent major elections in South Korea and the United States, where democracy thrives? One reason for this phenomenon is the spread of political information through social media platforms such as Twitter.

Before discussing Twitter, changes in consumption behavior related to political issues must be discussed. According to the Digital News Report of Reuters (2022), the decline in people's confidence in the news is an overall trend. The concept of *post truth* in the news media has seemingly increased in response to COVID-19. For example, Gallup (2022) reported a 36% trust in the news media in the United States in 2021. The decline in

traditional news consumption is accelerating, with consumers switching to online news and rejecting traditional news media. Moreover, a selective avoidance of news is observed in many countries, especially among voters in their 20s and 30s and individuals with low levels of education. One reason for this phenomenon may be the complexity of the current news media format, necessitating the simplification and contextualization of complex political phenomena in the news media.

Changes in the form of news access are also worth noting. For example, the direct consumption of news through websites and apps has reached 23%. News is accessed through social media, web searches, and mobile aggregators for individuals aged 18–24 years. Gallup (2022) responses from 2016 demonstrated that 6% of the surveyed individuals used social media to find out about social events, and 8% used it to access CNN. Similar results were found in a 2021 report by the Pew Research Center (Walker and Matsu 2021): Facebook (31%) and Twitter (13%) were cited as the regularly used social media platforms for obtaining news. Moreover, 55% of the responses indicated that people consumed news from these sources and that 23% of American adults used social media platforms. In addition, more than 30% of responses reported a certain degree of trust toward Twitter, which is much higher than the general trust toward social media (27%).

An opinion column by the *New York Times* (Edsall 2022) discussed political polarization in the United States and introduced a scale, with 0 indicating friendly interactions and 4 indicating hostile relations among different political groups. It stated that the nation tends to be extremely hostile, with a political polarization of level 4. This number differed among the majority of democratic countries in the 3-point range; Northern and Western Europe revealed less than a 1.5-point gap. South Korea is also experiencing political polarization and has seen an increase in hostile political discourse in response to a series of events: the impeachment of the president from the Conservative Party in 2016, the election of the presidential candidate from the Democratic Party after the impeachment, and the election of a Conservative Party candidate in 2022. A critical aspect is that the political polarization is worsening with the increasing distrust in traditional media and trust in new media in the political context (Lee 2021).

Our current research question concerns the major discourses on Twitter during the Korean and U.S. presidential elections. We review which issues in the discussion are composed of networks and what topics and terms are determined through them. We examine the form of acceptance and sharing of news according to changes in the consumption of political issues and social media, where polarized political arguments are distributed. The election fraud accusations in relation to the presidential elections in the United States and South Korea are extreme. This study focuses on social media, especially Twitter, where election fraud claims are available, and analyzes the assertions of politicians, verifications from traditional news media, and the personal claims of Twitter users.

Accordingly, this study first reviews the literature, explains the historical flow of election fraud and the emerging contexts in the new media era, and summarizes the meaning of the political conversations on Twitter. After a methodological explanation of the collection and analysis of Twitter data, we present the results in terms of the frequency of major word appearance, network clusters, and topic modeling. Finally, the implications of the study are explained in the discussion and conclusion.

2. Literature Review

2.1. Election Fraud: Political Controversies and Issue Consumption in the New Media Era

During the 2020 U.S. presidential election, former vice president Joe Biden, the Democratic candidate, emerged victorious. The voter turnout was the highest in 120 years, with two thirds of the electorate participating (Schaul et al. 2020). However, the losing side, including President Donald Trump and his campaign, the media outlets that supported his candidacy, and his supporters, made false claims of election fraud (Abilov et al. 2021). The polls showed that approximately 34% of individuals in the United States did not believe in the results of the 2020 presidential election because of this propaganda (Montanaro 2020).

Eventually, on 6 January 2021, supporters of President Trump occupied the United States Capitol in an unprecedented manner to stop the certification of the presidential election. Social media platforms, especially Twitter, played a major role in spreading the propaganda, which resulted in violence, including deaths (Ferrara et al. 2020; Ott 2017).

Republican-backed or right-leaning politicians and pundits have proposed false claims of election fraud to justify their presidential candidate having lost. For example, they spread controversy over unsubstantiated assertions regarding mail-in ballots. The winner of the U.S. presidential election is determined based on the number of votes from ballots submitted during the early and election-day voting processes. In the case of early voting, voters fill out and submit their ballots at a voting site or use mail-in voting. They then mark their ballots before election day and send them back or hand-deliver them to the Election Commission to successfully vote through mail-in voting. Approximately 33 million registered voters, or 23% of the electorate, submitted mail-in ballots in the 2016 U.S. presidential election.

The use of mail-in ballots increased in the United States during COVID-19. In the 2020 election, 46% of the electorate voted by mail, while 27% voted on election day (Pew Research Center 2020). Regarding the voters that supported the Republican candidate, President Trump, 37% voted in person on election day, 30% delivered votes in person at a voting site, and 32% mailed in their ballots. Among the Democratic voters for Vice President Biden, 17% voted in person on election day, 24% voted early and delivered their votes in person, and 58% voted by mail. Republicans and Trump supporters claimed that the “election was stolen” with the statistics.

President Trump argued that the 2020 presidential election was stolen from him and other Republican candidates who had lost their respective elections. Subsequently, the hashtag #StopTheSteal appeared online, promoting the Stop the Steal movement. Moreover, unsubstantiated claims of duplicate voting via mail-in ballots and a hacked voting machine spread online. As a result, supporters of President Trump violently stormed the U.S. Capitol on 6 January 2021 to stop the election certification (Childs et al. 2022). In January 2021, a significant proportion of online political discourse on Twitter was classified as unhealthy. The majority of unhealthy conversations included hostile and antagonistic content. These strongly negative topics from the online discourse were unfavorable toward President Trump (Kovacs et al. 2022).

Meanwhile, in South Korea, similar allegations were made regarding the upcoming elections at approximately the same time as the U.S. presidential election. The first recorded incidence of this phenomenon was during the National Assembly elections on 15 April 2020, where rumors of pre-voting manipulation spread. The opposition and ruling parties closely competed on election day, but the latter was far ahead in votes before the day itself. One false claim was that the ruling party manipulated the vote difference. Another incorrect accusation was that the pre-voting ballot box was changed and that the NEC manipulated the ballot counting system.

Accusations of election fraud then spread online, similar to those that occurred in the United States. The malfunction of a ballot-counting machine was also a critical allegation, similar to the claim of a hacked voting machine in the United States. Politicians, the media, and social media, during various elections worldwide, have disseminated these types of allegations since the implementation of democracy.

South Korea changed its election rules to ensure voting access while preventing the spread of COVID-19 in the 2022 presidential election. Some changes aimed to provide voting access to patients with COVID-19 without violating the secret voting principle. These altered rules and unprofessional handling of ballots, such as the moving of ballot papers using baskets and boxes, provided a means for nefarious individuals to promote overall distrust in the voting process. Despite the apology of the NEC and attempts to resolve the controversy, opposition forces and social media users responded with claims of election denial. These were backed by the claim that the controversy was a repeat of the 2020 National Assembly elections.

The advent of the Internet and the generalization of mobile devices are the main factors that led to changes in the media environment. The so-called daily-life communications in the online space and the expansion of network-orientated discussions have created a new aspect of social media (Aalberg and Curran 2012). Moreover, news media consumption patterns have changed through the diversification of media channels.

One example is the increase in the use of online services instead of traditional media as major news sources (Masip et al. 2018). An estimated 57% of individuals aged below 34 years and 64% of those aged under 24 years consume news from online channels. In the United States, 49% of news consumers use mobile devices. Thus, the pattern of news consumption has changed from traditional media, such as newspapers and broadcasting, to social media in a mobile environment (Schröder 2015).

The diversification of the media environment and news consumption has weakened partisan characteristics (Williams and Carpini 2001), and polarization has intensified with the availability of certain online news choices (MacDougall 2005; Stroud 2008). The concept of news consumption through social media assumes that similar-minded individuals share news and post information according to their political beliefs. Audiences limit their consumption of unwanted information and news content that they find to be in conflict with the political forces they support, which is the mechanism of an *echo chamber* (Pariser 2011; Williams et al. 2015).

This echo chamber effect can be weakened by exposing oneself to different political positions on social media, where individuals of various political beliefs gather (Mitchell et al. 2016). However, 59% of participants reported stress when engaging in a political debate. Thus, exposure to various political agendas does not lead to participation in online discussions (Yardi and Boyd 2010).

Another argument is that news consumption based on various social media sources encourages exposure to fake news and unconfirmed news sources (Nelson and Taneja 2018). In a media environment where news consumption can be accidentally mediated through social media (Fletcher and Nielsen 2017), passive news users are less likely to access news from sources besides popular news based on Internet usage algorithms and search engine recommendations. By contrast, the so-called heavy users of social media can access various news sources in their timelines and feeds, which can lead to new political agendas.

Political news consumption from many media sources also has negative effects. When a high amount of news is available in various formats, information overload occurs, resulting in suboptimal choices in processing news information (Pentina and Tarafdar 2014). Nevertheless, the personalization of social media experiences, such as *filter bubbles* (Pariser 2011), further strengthens one's existing views and restricts one's exposure to challenging beliefs. In this paradox of news consumption, paying attention to political news perception and processing in a new media environment is necessary.

2.2. Political Conversations on Twitter

Research has been conducted in various fields including social media, marketing, and political communication because of the increasing number of Twitter users. Results have demonstrated that Twitter functions at the level of posting information and opinions and as a dialog space for defending positions or discussing controversial issues (Honeycutt and Herring 2009). Twitter is an important space for election predictions in politics (Jungheer 2014; Tumasjan et al. 2010, 2011).

Based on models adopted for political bias and prediction through political blogs and websites, Tumasjan et al. (2011) examined election and political predictability in the context of Twitter. Another study by Tumasjan et al. (2010) also explored the role of Twitter as a social media platform that functions as an online discussion space, including the relationship between Twitter and the offline political landscape, the party preference of individual accounts, and the development of election predictions through Twitter.

Jungheer (2014) analyzed the message characteristics of Twitter, which functions as a space for political communication. Tweets contain political commentary and are influenced

by the political landscape. Discussions of Twitter's political influence are drawing more attention to the periods of political campaigns and elections. Politicians use Twitter as a channel for communicating their positions and arguments to the electorate, mobilizing their supporters, and generating media attention (Bennett and Segerberg 2013; Jungherr and Jürgens 2013). Twitter is used as a powerful tool for delivering an agenda and establishing public support through various media platforms in political situations (Lee and Kang 2013).

Contrary to the literature on the role of social media platforms as political public spheres, other studies have demonstrated that Twitter functions as a medium of political polarization (Conover et al. 2011; Gruzd 2012). Twitter intensified polarization during the 2010 U.S. midterm elections, revealing a partisan structure of political networks. Through retweets and references, politically motivated individuals share, interact with, and integrate information that fits their political positions. The results could serve as statistical evidence of the echo chamber effect. Simply put, ideologically classified individuals can be polarized through the consolidation of their political positions.

Gruzd's (2012) study of the 2011 federal election in Canada suggested a certain degree of political polarization, but Twitter, as a social media platform, offers a benefit in the form of ideological intersections between political parties. Parsons (2010) argued that political hostility on Twitter could depolarize emotions by inducing a decrease in negative attitudes. However, approximately 40% of party support on Twitter is negative or hostile, and this negative interaction encourages a reduction in political intentions, which can be considered a weakening of political decision making (Hopmann 2012). The political landscapes on Twitter can contribute to the formation of a public forum by exposing conflicting issues in a way that confirms the existence of different supporters.

Polarization promoted by Twitter has been observed in South Korea (Hahn et al. 2013; Hwang 2013; Jung 2022). For example, Hwang (2013) conducted a content analysis of 1200 Twitter accounts that followed traditional news media accounts and revealed a tendency to spread information based on homogeneity. This finding is contrary to the initial expectations that the emergence of various platforms for news consumption amid changes in the media consumption environment would lead to diversified information exposure. In other words, homogeneous diffusion and reinforcement of messages through social media are achieved.

The tendency to polarize has also seemingly hindered the cohesion of political discourse during the COVID-19 pandemic (Jung 2022). In 2021, Twitter presented different contents in South Korea during the prominent discourse from the ruling and opposition parties on COVID-19 vaccines. The main content from the supporting group of the ruling party was associated with vaccines and vaccination; in contrast, that of the opposition party emphasized the side effects of vaccines. In addition, criticism of the government's vaccine policy was observed.

However, the current study does not discuss the situation in which the spread of unverified claims encouraged controversy over vaccine side effects. Instead, we intended to identify the characteristics and problems of the spread of political discourse on social media platforms when supporters of a political position carry out the process of message distribution and reproduction on Twitter.

3. Methods

3.1. Data

This study analyzed political claims on Twitter, which is the most active social media platform for political discourse. Specifically, the subject of analysis corresponded to the false claims related to the elections in South Korea and the United States. We searched Twitter using the key term *election fraud*. For Korea, the analysis period was approximately 60 days, from 5 March to 16 May 2022, given that the presidential election in Korea was held on 9 March 2022. For the United States, the analysis period is also about 60 days, covering the fraud controversy related to the presidential election from the start of voting on 5 November 2020 to the U.S. Capitol riots on 6 January 2021. The reason for this timeline is

that the relevant discussions were focused on President Trump's claims of election fraud at the beginning of the election and the Capitol riots, which ended violently. The final dataset included 7,923,884 tweets regarding the 2020 U.S. presidential election and 106,313 tweets regarding the 2022 South Korean presidential election. The analysis of Twitter texts used the native language of the countries where the elections were held: English for the U.S. presidential election and Korean for the South Korean presidential election. Both datasets included original tweets and retweets.

3.2. Semantic Network Analysis

Network analysis was performed to examine major topics and semantic networks for political discourse on Twitter. This method demonstrates the relationships between the components of meaning such as words. Importantly, the generation, distribution, and reproduction of information and knowledge are established through social media such as Twitter in a knowledge ecosystem. We focused on semantic network analysis, which identifies the structural characteristics of knowledge networks by investigating vast amounts of social media information. In this study, in addition to the examination of the characteristics of the human structure in network analysis, we conducted semantic network analysis to describe the connection structure of information and its characteristics.

First, we performed network analysis by analyzing the frequency and rank of words through text mining and the semantic network in terms of the relationship between keywords (Ahn and Chung 2016). In the text-mining process, we extracted refined words based on natural language processing, which included a cleanup of punctuation, the exclusion of unmeaningful words, and lemmatization. Semantic analysis, as a method of social network analysis, allows for an understanding of keywords and their surrounding structures (Chung and Park 2010). Moreover, semantic network analysis reveals rankings according to the frequency of major words; thus, we identified semantic associations and network structures in a wide range of data. We focused on the connections and relationships between keywords, which occur in the network structure built through nodes and links and their interactions. We conducted network centrality analysis to identify the relation between nodes and to measure their location and influence as centrality indicators.

Measuring the degree of centrality in social network analysis, particularly on Twitter, enables the weighing of each relation and the observation of the influence of centrality on definitions (Kretschmer and Kretschmer 2010). The degree of centrality measures the number of connections to a node and the strength of such connections and uses geometric means to analyze the number of degrees and the sum of the relations of the node according to the mean value. The best measure of centrality is the eigenvector, which is the highest eigenvalue in the adjacency matrix (Bonacich and Lloyd 2001). Eigenvector centrality is meaningful because it identifies not only the number of times a node is connected but also its importance and connectivity (Kwon 2017). Finally, the CONvergence of iterated CORrelation (CONCOR) analysis is a method that allows the current study to explore the structural equivalence of networks, which can be visualized through UCINET V6 software (Borgatti et al. 2002).

3.3. Structural Topic Modeling

This study applied structural topic modeling (STM) to classify topics among keywords. We used large-scale data; thus, major topics needed to be found through inference algorithms instead of manually analyzing the relations between associated words. Specifically, the process of inferring nonvisible variables within observed variables, which is performed using latent Dirichlet allocation during topic modeling, enhances the understanding of the overall theme and ratio within the issue and the distribution of words contained within the subject (Blei and Lafferty 2009; Blei et al. 2003).

This research explored an overall tendency by deriving critical words regarding the main subject of election fraud through the keyword frequency analysis performed earlier. Then, we examined potential topics based on the probability of simultaneous appearance

between related words through topic modeling. To determine the number of topics, we tested different numbers of topics, from 5 to 20, and selected those with the lowest residuals. The topic name was derived from the main keywords and context.

This study conducted STM to investigate the further implications of online discourse on accusations of election fraud. In addition to social network analysis, which was explained in the previous section, STM adds another dimension to the analysis. Different candidates for the U.S. and South Korean presidential elections were incorporated into the model to observe which topics were salient. STM assumes that topics can be linked to one another and take covariate values, which may influence the distribution of the topics and word tokens that compose these values (Roberts et al. 2014).

In our research, we also added candidate information as metadata. The dataset excluded documents that do not mention the candidates, that is, Donald Trump or Joe Biden for the United States and Seok-yeol Yoon and Jaemyung Lee for South Korea. Each tweet was labeled with the candidates' last names. We found 1,895,201 and 32,209 documents for the U.S. and South Korean elections, respectively. Lastly, we considered the number of topics based on cohesiveness and exclusivity scores and selected 20 and 10 topics for the U.S. and South Korean elections, respectively.

4. Results

The main results of the Twitter network analysis for the South Korean and U.S. presidential elections related to the term *election fraud* are as follows. We used UCINET's route to compute the cohesion measures and extract social network analysis, including the network density and centralities. The average degree values for the U.S. and South Korean presidential elections were 98.76 and 72.66, and their density values were 0.998 (i.e., occurs in 99.8% of co-occurrences) and 0.734, respectively.

Table 1 presents the top 50 keywords among the major cited keywords on Twitter on topics associated with the term *election fraud* in the United States. In terms of frequency, the top 10 keywords are *election, fraud, Donald Trump, vote, voter, evidence, claim, president, Republican, and people*.

Table 1. Top 50 keywords associated with the issue of electoral fraud in the United States.

#	Words	Frequency	Rank	Degree	Rank	Eigenvalue	Rank
1	election	6,221,791	1	10.56	2	0.347	2
2	fraud	5,694,191	2	10.63	1	0.351	1
3	Donald_Trump	2,376,843	3	7.468	3	0.256	3
4	vote	1,111,014	4	4.903	5	0.173	5
5	voter	1,084,378	5	6.176	4	0.221	4
6	evidence	841,559	6	4.321	6	0.162	6
7	claim	706,566	7	4.236	8	0.156	7
8	president	597,109	8	4.112	9	0.148	8
9	Republican	567,186	9	3.463	13	0.117	16
10	people	457,378	10	2.792	21	0.104	20
11	Georgia	446,383	11	2.649	27	0.093	29
12	state	443,185	12	4.241	7	0.131	10
13	Joe_Biden	435,879	13	3.41	15	0.116	17
14	America	420,884	14	2.577	29	0.096	26

Table 1. Cont.

#	Words	Frequency	Rank	Degree	Rank	Eigenvalue	Rank
15	lose	385,219	15	2.841	20	0.118	14
16	ballot	367,764	16	3.325	16	0.107	18
17	allegation	358,286	17	3.542	12	0.127	11
18	official	336,063	18	3.46	14	0.125	12
19	result	321,200	19	2.609	28	0.095	27
20	breaking	307,685	20	3.641	11	0.123	13
21	Democrat	284,931	21	2.751	24	0.095	27
22	investigation	259,314	22	2.328	41	0.076	43
23	win	254,900	23	2.157	44	0.079	40
24	Michigan	242,209	24	2.999	19	0.101	22
25	widespread	241,577	25	3.892	10	0.142	9
26	court	239,413	26	2.748	25	0.101	22
27	massive	232,245	27	2.771	23	0.103	21
28	steal	227,254	28	2.38	33	0.083	38
29	senate	220,442	29	2.356	38	0.087	34
30	right	201,770	30	2.054	45	0.101	22
31	hearing	200,783	31	2.331	40	0.075	44
32	lawsuit	200,185	32	2.746	26	0.098	25
33	system	197,279	33	2.221	42	0.086	37
34	prove	188,611	34	2.367	36	0.087	34
35	news	187,522	35	2.787	22	0.088	32
36	campaign	185,701	36	3.315	17	0.118	14
37	watch	180,813	37	2.365	37	0.088	32
38	legal	178,014	38	3.113	18	0.105	19
39	crime	160,832	39	1.536	78	0.061	59
40	report	158,699	40	1.721	60	0.069	50
41	law	157,109	41	1.678	68	0.058	64
42	house	148,467	42	0.898	97	0.051	83
43	electoral	146,301	43	1.391	85	0.058	64
44	Pennsylvania	145,474	44	2.466	31	0.046	88
45	FALSE	143,083	45	1.899	51	0.057	69
46	Twitter	140,624	46	1.696	64	0.058	64
47	presidential	140,537	47	2.163	43	0.071	47
48	Arizona	140,275	48	2.566	30	0.048	86
49	change	139,312	49	2.342	39	0.09	31
50	party	131,173	50	1.77	55	0.074	45

Major keywords, such as the two presidential candidates, the *Republican Party*, *voters*, and *ballot*, appeared evenly. We assumed that the controversy related to President Trump's unsubstantiated claims in relation to the election in the state of Georgia was discussed on Twitter. In summary, the main themes of the critical keywords on Twitter for the U.S.

presidential election related to the term *election fraud* can indicate an interest in major candidates and primary suspicions.

The degree-of-centrality analysis showed that *fraud* was the most centralized word in terms of frequency, followed by *election*, *Donald Trump*, *vector*, *note*, *affordance*, and *state*, which ranked 12th. These keywords were followed by *claim*, *president*, and *widespread*, which placed 25th in frequency and 10th in centrality. *People*, *Georgia*, *America*, and *results* were high in frequency but low in centrality. In the case of the eigenvector, *the present*, *widespread*, and *state* ranked from 8th to 10th, respectively, which showed a difference from the centrality degree.

Table 2 shows the top 50 keywords among the major cited keywords on Twitter related to the term *election fraud* in South Korea. The top 10 keywords in terms of frequency were *election*, *fraud*, *voting*, *Jaemyung Lee*, *NEC*, *Suk-yeol Yoon*, *Bupyeong City*, *presidential election*, *vote*, and *Daegu*, in that order. Similarly, the central words *election* and *fraud* appeared most frequently, followed by *NEC*, which was the term associated with early voting and the keyword that led to the emergence of revoting arguments.

Table 2. Top 50 keywords related to fraud in the South Korean presidential election.

#	Words	Frequency	Rank	Degree	Rank	Eigenvalue	Rank
1	election	134,958	1	8.978	18	0.005	17
2	fraud	121,386	2	10.05	17	0.005	17
3	voting	41,327	3	5.812	20	0.002	28
4	Lee_Jaemyeong	20,487	4	4.777	25	0.002	28
5	NEC (National Election Commission)	19,431	5	3.803	34	0.002	28
6	Yoon Suk-Yeol	17,726	6	10.39	16	0.13	16
7	Bupyeong	14,827	7	5.327	21	0.001	50
8	presidential election	14,598	8	5.251	22	0.003	23
9	vote	14,058	9	3.453	42	0.002	28
10	Daegu	13,880	10	6.598	19	0.002	28
11	ballot box	13,540	11	5.023	23	0.001	50
12	people	12,398	12	3.682	36	0.003	23
13	early	11,718	13	3.368	44	0.001	50
14	count	10,476	14	2.319	64	0.001	50
15	elected	10,232	15	3.319	45	0.001	50
16	revoting	9857	16	3.144	48	0.002	28
17	Democratic Party of Korea	9830	17	3.838	32	0.003	23
18	ballot	9374	18	4.901	24	0.001	50
19	regime	8948	19	11.31	15	0.184	15
20	president	8746	20	4.635	26	0.004	20
21	petition	7735	21	3.318	46	0.001	50
22	power	7311	22	3.522	40	0.002	28
23	Roh Jung-hee	6543	23	3.628	38	0.002	28
24	protest	5494	24	2.039	81	0.002	28
25	Park Geun-hye	5426	25	12.97	14	0.241	14
26	improperly run	5340	26	3.404	43	0.001	50

Table 2. Cont.

#	Words	Frequency	Rank	Degree	Rank	Eigenvalue	Rank
27	management	5320	27	3.817	33	0.001	50
28	Moon Jae-in	5294	28	2.148	72	0.003	23
29	Korea	5207	29	2.312	65	0.002	28
30	allegation	5155	30	2.47	59	0.001	50
31	reformation	4961	31	13.41	12	0.254	12
32	voter	4894	32	2.213	70	0	84
33	Rhee Syngman	4866	33	2.539	56	0.001	50
34	manipulation	4826	34	2.052	79	0.003	23
35	Kim Gun-hee	4802	35	13.22	13	0.251	13
36	personnel	4690	36	13.62	11	0.26	11
37	real estate	4674	37	13.66	10	0.261	10
38	abolition	4626	38	13.69	9	0.262	9
39	assist	4581	39	13.71	8	0.263	7
40	transition committee	4576	40	13.75	7	0.263	7
41	nullification	4574	41	4.065	30	0.005	17
42	serviceperson	4538	42	13.78	6	0.264	6
43	Department of Defense	4528	43	13.8	4	0.265	1
44	salary	4524	44	13.79	5	0.265	1
45	take the plate	4512	45	13.81	3	0.265	1
46	small business	4506	46	13.81	2	0.265	1
47	transfer tax	4505	47	13.81	1	0.265	1
48	murderer	4165	48	2.42	60	0	84
49	confirmed	4076	49	2.045	80	0.001	50
50	prosecution investigation	4058	50	2.014	83	0.002	28

In addition, similar to the situation regarding Georgia in the United States, this study confirmed that keywords related to the spread of election fraud claims in Bupyeong City in South Korea were major keywords on Twitter during the presidential election in the country. Overall, for the South Korean presidential election, this study derived two main themes from the major keywords on Twitter for the term *election fraud*: (a) raising suspicions about the two candidates and (b) interest in the region. However, the difference between the presidential elections in the United States and South Korea in terms of the specific practice of manipulating the number of early votes, which exceeded the general claims of the allegations, is mentioned in the Twitter discourse.

Regarding the centrality degree of the South Korean presidential election, words outside the top 30 appeared in the frequency rankings. The list of words begins with *transfer tax* (47th), followed by *small business*, *take the plate*, *Department of Defense*, *salary*, *serviceperson*, *transition committee*, *assist*, *abolition*, and *real estate*. Attitudes toward election fraud allegations in the South Korean presidential election focused more on *election* than *fraud*.

Simply put, the main issues surrounding the 20th Korean presidential election were the controversies regarding the subjects of transfer tax, real estate, and the candidates' pledges. We posited that the controversy over allegations of fraud focused more on the essential issues of the election than on the centrality of the discussion. In the case of eigenvalues, the

words ranked first to fifth and from *transfer tax* to *the Department of Defense* are the same in terms of the degree of centrality.

Figure 1 presents the results of the semantic network analysis of the U.S. presidential election, which suggest eight implications:

1. Issues such as allegiance and legal battles in lawsuits and in court over unsubstantiated claims that election technology firm Dominion Voting Systems defrauded the elections in favor of President Biden were raised by lawyer Rudy Giuliani for Sidney Powell and President Trump;
2. Lindsey Graham, a U.S. senator and chair of the influential Senate Judiciary Committee, mentioned the topic of election fraud in Arizona and asked President Trump to discard legally sent ballots;
3. President Trump's insistent refusal to confirm the electoral college as a voting system for the U.S. presidential election, Senator Mitch McConnell's confrontation with President Trump, the claim of a sealed election, and issues related to President Biden's victory;
4. President Biden trailing by 88% in Michigan, which was the "key to victory", and taking the lead at the last minute, expert analyses, various testimonies about fraud, and witness issues;
5. President Biden's victory in Nevada, a key swing state, and the Republican landslide in Texas were used to raise unsubstantiated claims of election fraud;
6. Breaking news about President Biden's last-minute upset in Pennsylvania and the decision of the Supreme Court to deny President Trump's motion for a preliminary injunction to stop the certification of voting results in Pennsylvania;
7. Various controversies, questions, legal battles in the Supreme Court, and fake news surrounding Russia and the United States that caught the attention of President Trump's supporters and highlighted fraud allegations throughout the U.S. presidential election; and
8. Issues surrounding false accusations by Fox News and the investigations conducted by the Department of Justice and the FBI.

Figure 2 presents the results of the semantic network analysis for the South Korean presidential election, suggesting five implications. The overall issues surrounding election fraud include NEC chairperson Roh Jung-hee, the head of the presidential election administration, allegations of poor pre-voting management, conspiracy theories, investigation by the prosecution, the involvement of President Moon Jae-in and the Blue House, threats to democracy, and the connection to the general election:

1. Former representative Kyo-ahn Hwang raising allegations of election fraud, including election manipulation during early voting, the filing of a lawsuit to invalidate the election, and issues related to the conservative People Power Party;
2. Reports of unidentified men and women carrying ballot boxes as part of election fraud activities in Bupyeong and Incheon, various pieces of evidence, petitions from supporters about the situation, and demands for answers;
3. The man who received a ballot again after pre-voting in Chuncheon and the ensuing inquiry, election nullification claim, and revoting;
4. Dictator and murderer Doo-hwan Chun and fears of war, comments by candidate Suk-yeol Yoon in support of Doo-hwan Chun, and confrontation with North Korea; and
5. The most important issues of the 20th presidential election were real estate, the abolition of the transfer tax, measures for small business assistance, military discussions by the Department of Defense, and changes in the ruling party.

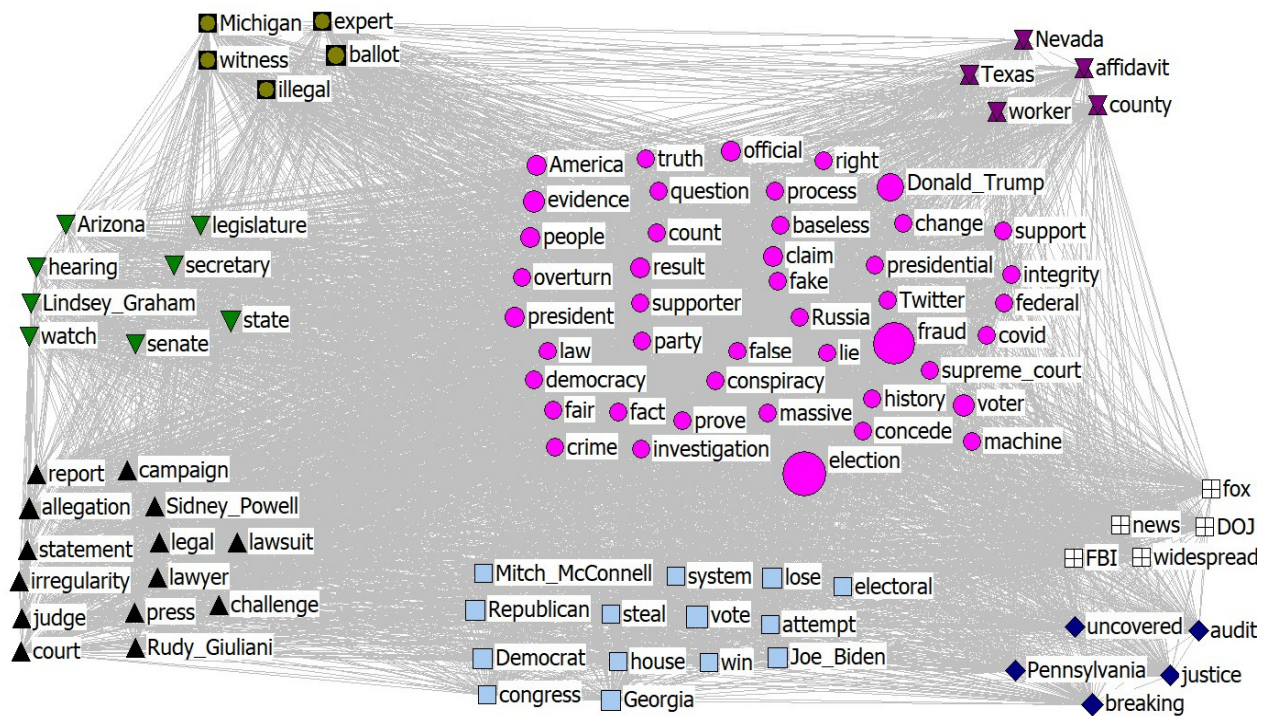


Figure 1. CONvergence of iterated CORrelation (CONCOR) networks of unsubstantiated claims of presidential election fraud in the United States. *Note:* the size of the concentric circles indicates the degree centrality among words. The thicker the line, the greater the number of links it represents.

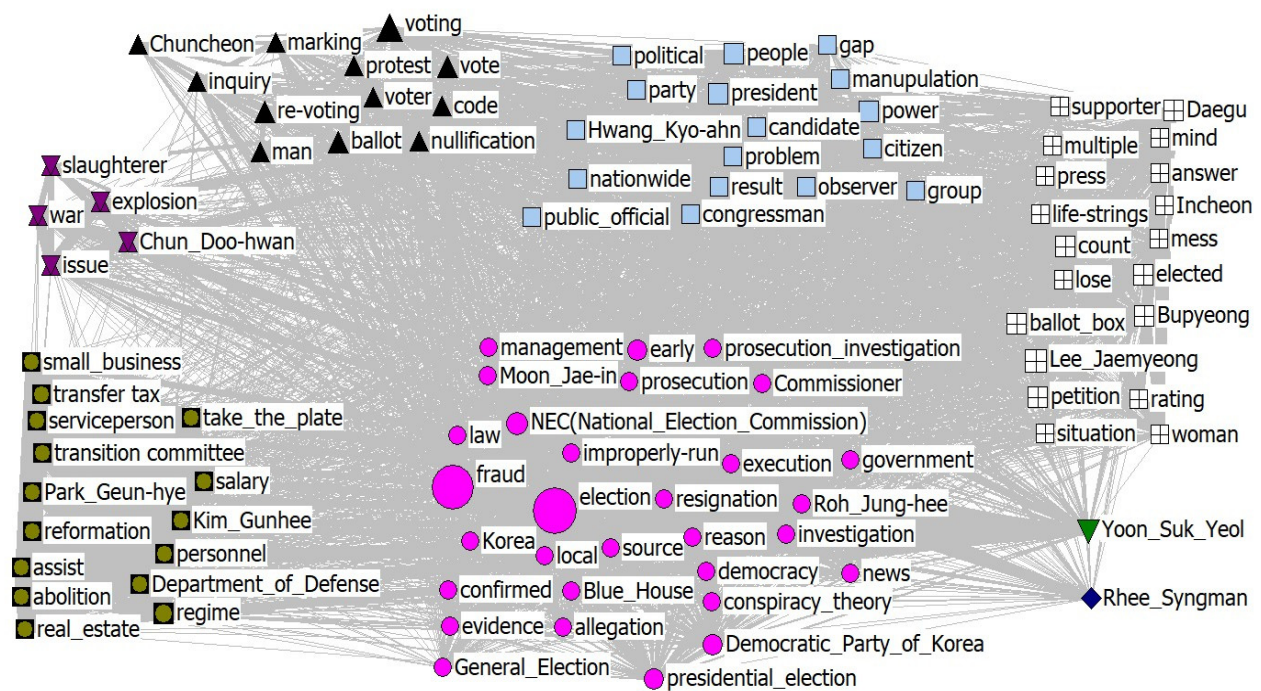


Figure 2. CONvergence of iterated CORrelation (CONCOR) network of presidential election fraud issues in South Korea. *Note:* the size of the concentric circles indicates the degree centrality among words. The thicker the line, the greater the number of links it represents.

We extracted 20 topics from tweets focusing on the U.S. presidential elections through STM. The majority of these topics were associated with the candidate Trump, who appeared in all topics. This finding contrasted with the case of Biden and illustrated that Trump

was at the center of the unsubstantiated claims of election fraud. Topics 1, 4, 7, 14, and 17 describe the actions taken by Trump, and topics 3, 9, 11, 13, 16, and 20 are the types of reactions to the events caused by Trump. Table 3 summarizes the vocabularies associated with each topic.

Table 3. Topics and associated vocabularies of false allegations of election fraud regarding the 2020 U.S. presidential election.

Order	Topics	Associated Vocabulary
1	Trump's litigation on the election result	Evidence, election, fraud, result, stat, certify, money, video, lying, fight, supporter, CNN, trust, and accusation
2	Disapproval of election result	Fraud, election, Donald_Trump, Joe_Biden, massive, concede, close, witness, zero, voter, refuse, story, process, and states
3	Disapproval of courts of Trump's accusation	Elections, fraud, voters, call, stop, widespread, truth, time, word, outcome, evidence, and far
4	Rising doubts of election fraud by Joe Biden	Fraud, Joe_Biden, election, people, Democrats, America, Donald_Trump, fair, corruption, and history
5	Online discourse on election fraud	Donald_Trump, fraud, election, claim, false, supporter, Twitter, tweets, sure, secure, making, found, dispute, fire, Barr, chief, and widespread
6	Criticism of media	President, Donald_Trump, Joe_Biden, fraud, ballot, election, voter, medium, allegation, accepting, count, press, mail_in, night, and machine
7	Efforts by Trump supporters after the election	Election, fraud, crime, Georgia, team, committed, law, supreme_court, solicitation, lawyer, and official
8	Interviews with related personnel	GOP, Donald_Trump, fact, presidential, former, voter, fraud, Rudy_Giuliani, hearing, national, administration, adviser, security, explain, urge, and Bolton
9	Reactions to Trump's accusation	Election, Donald_Trump, fraud, steal, Barr, Tweet, hope, tell, narrative, and bullshit
10	COVID and election fraud	Donald_Trump, election, voter, COVID, aide, positive, documented, tested, court, plan, and hear
11	Attacks on Trump's assertion	Donald_Trump, official, Michigan, claim, top, fake, breaking, election, fired, cyber, security, campaign, Chris_Krebs, Hannity, affidavit, and false
12	Results of the electoral college vote	Win, Joe_Biden, vote, Donald_Trump, election, electoral, fraud, swing, county, public, college, Georgia, winner, straight, and stopped
13	Criticism of lawsuits and evidence	Donald_Trump, election, fraud, million, investigation, case, special, counsel, proof, voter, Barr, and confirmed
14	Lawsuit	Donald_Trump, campaign, fraud, allegation, lawsuit, court, election, voter, president, right, legal, lawyer, Mitch_McConnell, accusation, baseless, judge, attorney, and Pennsylvania
15	Supporting Trump	Republican, Donald_Trump, state, overturn, support, insane, party, senate, house, normalize, and Georgia

Table 3. Cont.

Order	Topics	Associated Vocabulary
16	Criticism of election fraud claims	Donald_Trump, news, president, accept, fox, statement, effort, justice, loss, win, legal, and defeat
17	Trump coup	Donald_Trump, election, fraud, America, attempt, democracy, DOJ, coup, FBI, investigation, number, and order
18	Spread of conspiracy	Donald_Trump, fraud, election, conspiracy, baseless, theory, watch, voter, claim, president, white_house, spread, ally, false, and Washington
19	Validating the electoral system	Donald_Trump, Joe_Biden, report, country, observer, recount, team, high, invited, full, issued, conduct, and admin
20	Loss of Trump and trust in the election	Vote, Donald_Trump lose, election, system, handful, popular, electoral, college, authoritarianism, faith, fraud, and destroy

Figure 3 shows that topics 1, 2, 3, 4, 9, and 17 are closely correlated and may therefore appear in the same documents. It also reveals the connections among topics and identifies two groups: the first consists of topics 1, 2, 3, 4, 7, and 9, which focus on Trump’s refusal to accept the election results and include issues such as his accusations, the disapproval of the court, his and his supporters’ criticism of Biden, and the handling of the election loss. The second comprises topics 6 and 12 and focuses on the media criticism of Trump’s unsubstantiated claims of election fraud. The other topics are independent of one another.

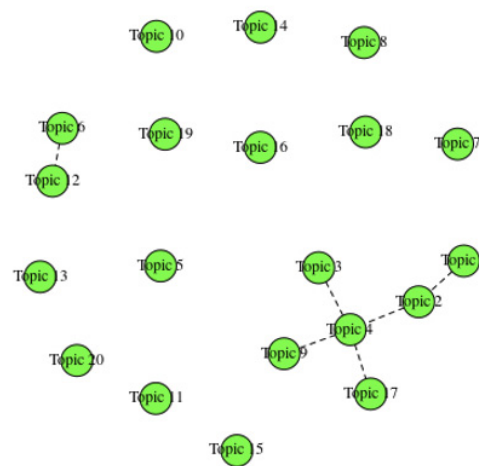


Figure 3. Structural topic modeling (STM) of the unsubstantiated claims of fraud in the U.S. presidential election. Note: each circle represents the topics explained in Table 3. Dotted lines indicate relations among the topics.

Figure 4 compares the effects of the candidates Trump and Biden in all topics. The study found more topics for Biden than for Trump, but those related to Trump were more distant than those associated with Biden. Topics 1, 7, and 16 were unique to Biden. Trump supporters blamed Biden for what they were led to believe was election fraud, and Biden supporters criticized Trump’s accusations. Topics 2, 9, and 17 were unique to Trump. Similar to the topics related to Biden, these included actions caused by Trump and reactions from Biden supporters. Trump’s supporters believed his false accusations, refused to accept the election results, and mentioned extreme measures, such as a coup. Meanwhile, Biden’s

supporters were aware that Trump’s accusation of election fraud was false because of the lack of legitimate evidence.

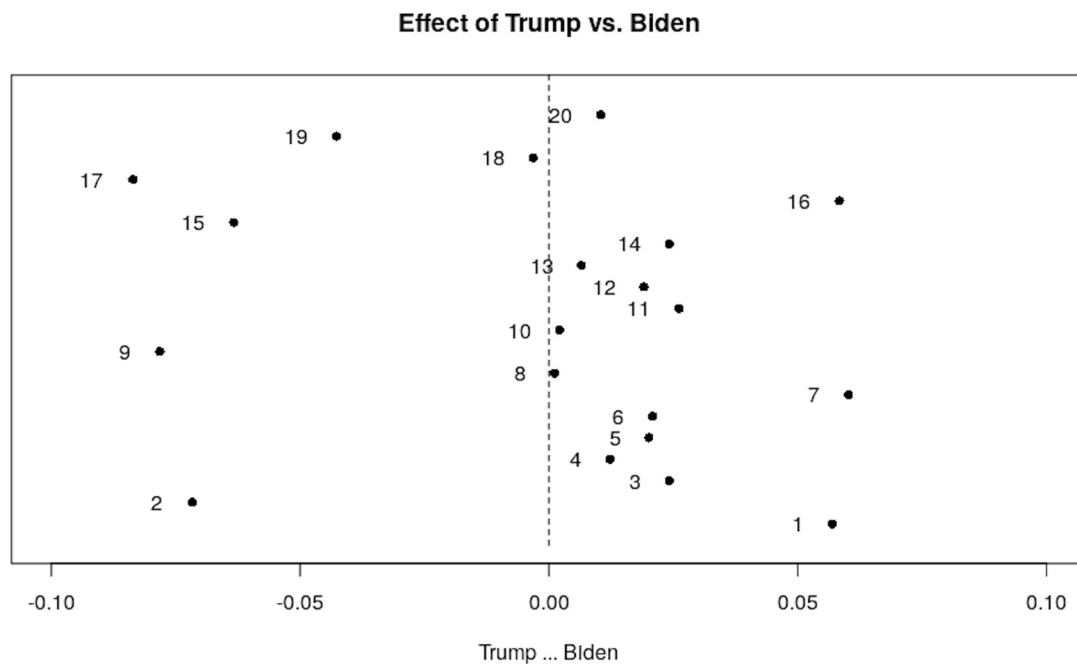


Figure 4. Comparison between the U.S. presidential candidates.

Table 4 shows fewer coherent topics on election fraud in South Korea. Ten topics were observed for the South Korean presidential election. The issues raised in relation to the allegations of election fraud in South Korea lacked a focal point. The table also highlights a particular group of individuals, including the NEC chairperson, who were allegedly behind the election fraud. The opposing side, the progressives, blamed the candidate Seok-yeol Yoon and his election promise to relocate the Blue House, which is the Korean version of the White House in the United States. Other topics applied to political and ideological groups.

Table 4. Topics and associated vocabularies regarding fraud in the South Korean presidential election.

Order	Topics	Associated Vocabulary
1	Figures related to election fraud	Re-election, democracy, Garo-sero-yeonguso, Si-min Yoo, concerned personnel, Mi-hyang Yoon, act, gate, sense, and dish-washing
2	Election fraud claims by progressive supporters	Ballot_box, supporter, approval, Sang-jung Sim, boycott, criminal, mess, sasaoyip, frame, and police
3	Conservative supporters pointing out people related to election fraud	Jae-in Moon, Jung-hee Noh, Gyo-an Hwang, ballot, Nak-yeon Lee, Guen-hyung Lee, Jung-Cheol Yang, YouTuber, sasaoyip, and spokesperson
4	Criticism of Jae-myeong Lee	Jae-myeong Lee, bully, substitution, drunk_driving, ex-convict, social evil, majority party, prevention, and sponsor
5	Criticism of Seok-yeol Yoon	Gun-hee Kim, Guen-hye Park, collaborator, investigator, iPhone, pandora, administration litigation, and souvenir
6	Criticism of President Moon and the media	President, trash, blue_house, South Korea, democratic_party, Min-woong Kim, criminal, Myeong-bak Lee, motor, and Eun-soon Choi

Table 4. Cont.

Order	Topics	Associated Vocabulary
7	Requesting investigation	Seok-yeol Yoon, campaign rally, slow, Shincheonji, corruption, final, Byeong-ho Gong, Dong-hoon Hahn, and committee
8	Criticism of relocation of the Ministry of Defense	Guen-hye Park, real estate, transition_team, Ministry_of_Defense, small_business, transfer_tax, Myeong-shin Kim, Gun-hee Kim, Seong-tae Yang, and Yeonsangun
9	Causes and methods of election fraud	National_election_commission, elected_candidate, ballot, Daejang-dong, chairman, Gyeong-wook Min, lie, Naver, supreme_court, and chosunjok
10	Perspectives on election fraud method	Democratic_party, ballot, elected_candidate, voter, Cheol-soo Ahn, Jun-seok Lee, spoiled_vote, election_law, COVID, and point

According to Figure 5, all topics are correlated with one another. Topic 7 shows five connections, and topics 9 and 10 display four connections. Topic 7 includes an investigation into potential election fraud, which has many targets, such as President Moon, candidate Yoon, related individuals, and the media. Topics 9 and 10 refer to election fraud methods; each political ideology group has their own perspective on how election fraud is committed, such as through ballot manipulation and the immobilization of voters in the context of COVID-19. Topics 5 and 8 are separate from other topics because they represent criticisms of candidate Yoon and his election promise, that is, the relocation of his office to the Ministry of Defense. The words used in these two topics are not observed in others, except in topic 7.

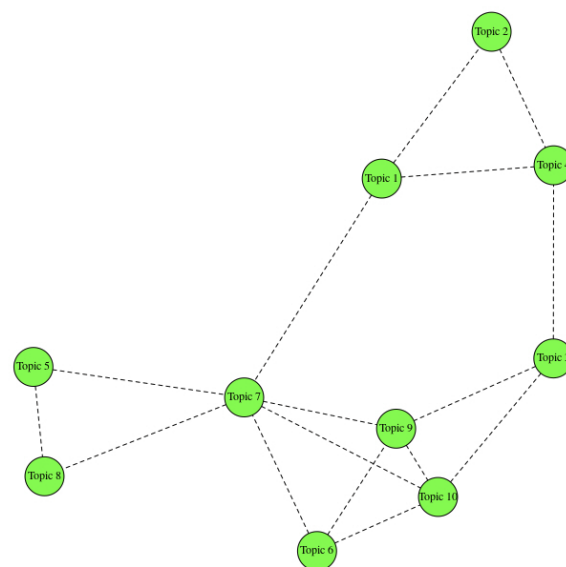


Figure 5. STM of presidential election fraud issues in South Korea. Note: each circle represents the topics explained in Table 3. Dotted lines indicate relations among the topics.

Figure 6 illustrates the effect between the two candidates. Topic 7, “requesting investigation”, is unique to the candidate Yoon. People who demanded an inquiry into election fraud mainly came from a progressive group that targeted Yoon. Topic 3, “conservatives calling out figures associated with election fraud”, mainly includes progressive politicians. Each group blamed the candidate of the opposite party; therefore, topics emerged for both candidates.

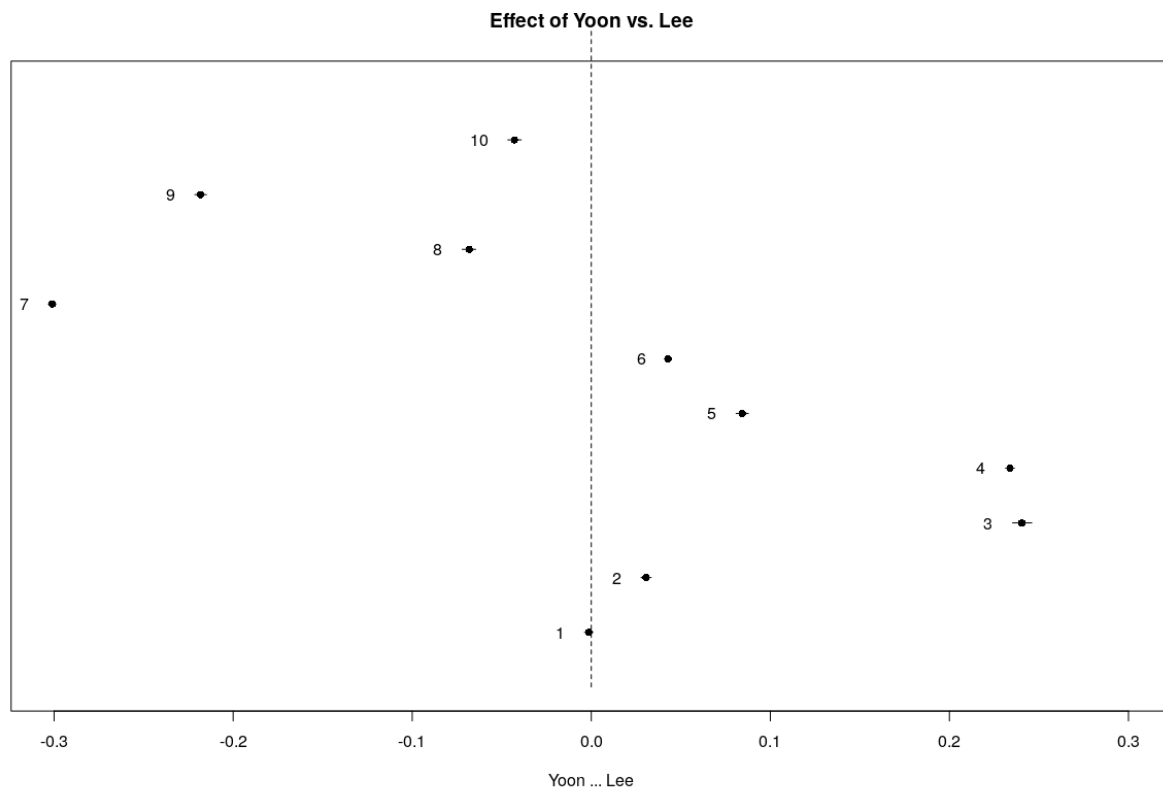


Figure 6. Comparison between the South Korean presidential candidates.

5. Discussion

In the United States and South Korea, *election* and *fraud* were the most cited keywords, followed by those that highlighted key politicians and controversial vote counting in specific locations or close races that raised unsubstantiated fraud allegations. We then analyzed the semantic networks by country and found eight and five implications for the United States and South Korea, respectively. The main themes included allegations against politicians, references to specific political actions, conflicts in close political races, and the possibility of election fraud. Other themes comprised general and major issues surrounding the election and candidates' promises.

Moreover, the issues mentioned in South Korea but not in the United States included transfer tax, small- and medium-sized enterprises, and real estate, which were the focus of the country's presidential election. The United States highlighted court decisions, and South Korea emphasized words such as *prosecution* and *investigation*. This difference was a result of the legal coverage in South Korea, which is inferred to be linked to prosecution- and investigation-orientated reporting practices. This indicates that South Korea and the United States implement different methods for raising and disseminating information on election fraud and that the terminologies are similar only at the basic level.

Election fraud, which was raised in the U.S. and South Korean presidential elections held in similar periods, generated the following points of discussion. First, the United States demanded evidence to substantiate the claims made by Donald Trump, and major remarks were associated with specific statements on the state of Georgia. This result could be understood as a discourse practice for effectively presenting arguments in the United States, where unsubstantiated claims of election fraud are unusual. Simply put, as a convincing electronic fragmentation, suspicions were raised through a specific case by Donald Trump on Twitter, actions involving various legal practices, and persuasion that led to breaking news that supported the act.

By contrast, the most frequent keywords in South Korea included *ballot box*, *early vote*, and *revoting*. This result could be attributed to sophisticated discussions on election

fraud, which were raised once during the previous general election. In other words, the arguments for election fraud were embodied in the possibility of election manipulation during pre-voting and eyewitness statements regarding the delivery of ballot boxes actively shared on Twitter.

Notably, as a practical act in current affairs, YouTube content creators covered the ballot-counting centers at Incheon and Bupyeong, obstructed vote counting, and raised issues through live broadcasting. In the context of South Korea, the issue of election fraud is revealed to be complex and intense, in that live broadcasting beyond the spread of discourse on social media is active.

In addition, under the influence of Donald Trump in the United States, who used Twitter as his main media for discourse practice, fraud functioned as a central word among the unsubstantiated claims of election fraud. Accordingly, the characters, the election terminology, and their arguments naturally dominated the discourse as keywords. Thus, this study focused on Twitter as a form of media through which this discourse is disseminated.

In contrast, the central word for South Korea was observed in a form that deviated from the issue of election fraud. In other words, Twitter users paid attention to the essential discussion of election issues. Economic discourse was cited as the issue that decided the 20th South Korean presidential election in 2022. This finding was interpreted to be caused by the focus on the election instead of fragments of the election fraud issue.

Accordingly, the election promises of the transition committee and the criticism of the power regime emerged as central words. This result focused on concrete and concurrent issues, such as real estate, tax, and small business. Similarly, although election fraud was a major issue in the previous general election, it did not emerge as a primary discourse in the presidential election.

The discourse on election fraud differed between the United States and South Korea. In the United States, the discussions were focused on the candidate Donald Trump. Moreover, the majority of the topics were independent of one another, except for those in two groups: Trump and the media. In South Korea, meanwhile, the conversations on election fraud were more closely connected than those in the United States and lacked a major actor such as Donald Trump. Supporters from each political faction equally contributed to the online discourse.

This study suggested the following implications. First, it provided a data-driven academic examination of social issues through large-scale text categorization and conceptual grouping. Moreover, we complemented the existing content analysis by conducting extensive data collection, categorization, and analysis of discussions regarding political issues generated and shared on social media.

Second, this study focused on Twitter to examine the emerging trend of unsubstantiated claims in the political ecosystem. In the era of so-called fake news, social media functions as a public sphere for voters and any individual interested in politics with high media attention (Bennett and Segerberg 2013; Jungherr and Jürgens 2013). This study is relevant in that it focuses on recent political issues to investigate how political discourse circulates on Twitter.

Third, this research study applied various new approaches to the new phenomenon at the methodological level. It employed a new topic-modeling approach with network analysis to expand the discussion beyond the conventional method of analyzing discourse on political issues.

Fourth, this study compared and examined the unfamiliar issue of election fraud that simultaneously occurred in two so-called *politically developed* countries. Election fraud, which was previously mentioned only as a historical event, has become a major political controversy through social media.

This study also has its limitations. First, its approach was exploratory rather than theory-based. Therefore, future research must improve the method for measuring online messages and understanding political discourses.

Second, the discussion was limited to a specific segment of social media—Twitter. Although political discourse is produced and circulated on other media platforms, this study focused on social media because of its function and role as a space for the explosive dissemination of new political concerns. As a follow up, further studies could analyze the receiver responses to different political speech sites, such as election campaign speeches, and various levels of approval ratings.

Third, although unsubstantiated claims of election fraud were common in South Korea and the United States, the form of discourse aggregation in the context of South Korea was different from that in the United States. This aspect was a limitation of the cross-national comparative analysis, which is attributed to the historical and cultural contexts that differentiate discussions. Follow-up research must conduct a study that monitors the problem of posing and discursive practices in different elections related to electoral fraud in South Korea.

6. Conclusions

Our current research question focused on the social media platform Twitter, as well as the political issues discussed as central topics during the presidential elections in Korea and the United States. These were analyzed by identifying the primarily mentioned words, networks, topics, and vocabularies, whose meanings were aggregated. In the new era of social media, people worldwide can discuss a wide range of political issues. As such, unverified narratives may emerge from this process. In addition, the recent phenomenon of unfamiliar or obscure political issues, such as the claims of election fraud that were raised and circulated, highlights the urgency of examining these narratives and claims. Accordingly, this study analyzes a new political issue—election fraud—and how it spread throughout social media as the main channel for the dissemination of political discourse. We extended this research by reviewing the literature on the consumption and circulation of controversial political issues through new social media, as well as studies on the political conversations on Twitter. By investigating a wide range of data through network analysis and semantic topic modeling, we determined the categorization of political issues and the construction of discourse.

This study contributes to the literature through its focus on data-driven political discourse on social media and is particularly timely because it highlights election fraud, which has been the most controversial issue during recent election seasons. Furthermore, as various political issues emerge and expand, this study can serve as a precedent for tracking the circulation of issues in new media environments. Simply put, its applicability as a practical study can establish a foundation for understanding new media environments that generate new issues.

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