HOW DO JAPANESE PEOPLE TALK ABOUT POLITICS ON TWITTER?
ANALYSIS OF EMOTIONAL EXPRESSIONS IN POLITICAL TOPICS ON JAPANESE TWITTER

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This study investigated the characteristics of people who promoted political conversations on Japanese Twitter, and found that the way they mentioned political topics seemed to reflect their distrust of the current politics in Japan. Tweets from public accounts that promoted political conversations on the Lower House election day in 2017 were collected, and the nouns in these tweets were extracted. The tweets were then classified into ‘political related tweets’ and the others, based on the topics of the extracted nouns. The statistical analysis of the tweets and their metadata revealed that Twitter users who seem to be influential on political conversations tend to mention political topics with emotional expressions of anger rather than anxiety or positive emotional expressions, while other users tend to mention those topics with anxiety. These patterns seem to reflect the distrust of politics in the public opinion in Japan.

**Key words**: political conversation, Twitter, text mining, emotional expressions, distrust of politics

**INTRODUCTION**

*Political Apathy and Distrust Among Young People in Japan*

Encouraging young people to participate in politics is a challenge in many societies. Japan is one of the countries facing political apathy among their young people. An international survey by the Japanese government (Cabinet Office, Government of Japan [CAO], 2014) indicated the alienation of young people from politics. In the survey, interest in domestic politics, will to get involved in policy making, political efficacy, and satisfaction with the society in their country were lower among young Japanese participants than most or all young participants from six other countries (South Korea, the United States, the United Kingdom, Germany, France, and Sweden). This tendency seems to be reflected in the voter turnout, which is a common measure of political participation, and is often mentioned as a sign of political apathy. The official statistics from the Japanese government (Ministry of Internal Affairs and Communications [MIC], 2018) has reported lower participation of young people in national elections compared to other generations over the past quarter of a century. Considering that the Japanese
society is extremely aging, this indicates that the young population’s voice might be increasingly disregarded in policy making, which could alienate the young generation from politics and reinforce their political apathy — this could be a vicious spiral.

The latest World Values Survey (Wave Six; Inglehart et al., 2014) also revealed Japanese youth’s distrust of politics in a narrow sense, that is, in certain public organisations (such as the central and local governments), in the Diet, and in political parties. The average rates of trust of these organisations among the Japanese participants were lower than those among participants from most of the 60 countries in the survey (Yamada, 2016b), and the average score of trust was the lowest among the Japanese participants aged 18 to 25, compared to other age-groups among the Japanese participants (Yasuno, 2018). Despite the distrust of politics among Japanese youth, the survey showed that there were few methods of protests that young people actually got involved in, indicating their passive attitudes towards participation. Among the five options of protest in the survey, only ‘signing a petition’ was selected by about 30 percent of the Japanese participants, who answered that they had done it before, while less than four percentage of the participants selected the other four options: boycott, peaceful demonstration, strike, and ‘other’. The latter rates were lower in Japan than in at least half of the 60 countries in the survey (Yamada, 2016a). Therefore, the statistics discussed above show Japanese young people’s political apathy, distrust, and passive attitude towards political participation such as voting or protest. Social media might have been disregarded as a way of political protest or general political participation in the latest World Values Survey that was conducted in 2010 in Japan. However, nowadays, social media is becoming more and more important to consider political participation, especially by young generations.

Social Media as a Modern Platform of Political Conversation

Social media, which is more common and accessible to young people, is used as a new sphere for political conversation (e.g., Loader, Vromen, & Xenos, 2014), and this activity can be linked with offline political participation, as a number of studies have indicated (Leyva, 2017; Chen, Chan, & Lee, 2016; Barberá & Rivero, 2015; Vaccari et al., 2015; Bekafigo & McBride, 2013; Vaccari et al., 2013; Gil de Zúñiga, Jung, & Valenzuela, 2012). Moreover, as a negative example, the Cambridge Analytica case revealed the influence of social media on the Presidential election in the US (Kleinman, 2018). In that case, a huge amount of data (‘big data’) from a world-wide social media platform, Facebook, were extracted by a British private company, Cambridge Analytica, and utilised as online ‘psychological manipulation’ for the election campaigns.

This tendency to use social media can also be observed in Japan, although its impact on the Japanese politics, including elections and policy making, still seems to be obscure (Osaka, 2014). In Japan, Twitter is the most common social media platform among teenagers and people in their twenties, after the online chat application, LINE. Approximately half of the 18 to 29 year-old population use LINE (Ministry of Internal Affairs and Communications [MIC], 2015), and about half of its users are teenagers and people in their twenties (App Ape Lab, 2016). Thus, research on political conversation
on Twitter might provide insight about a modern way of political participation by the young generation and their opinions on politics in Japan.

**Twitter Analysis**

Twitter is a micro blog platform that was opened in 2006 by Twitter, Inc., and the Japanese version has been available since 2008. Users can write 280 characters, at most, in a tweet (article on Twitter), which is commonly known as ‘tweeting’. Chinese, Korean, and Japanese languages are limited to 140 characters because of their higher density of information per character (Rosen, 2017). Users can share and show other users’ tweets on their own timeline (front page of a personal account), which is called ‘retweet’ or ‘retweeting’. If a user ‘follows’ another user’s account, his or her account is registered as a ‘follower’ (regular reader) of their timeline. Every tweet is public, except tweets belonging to a locked account, which can only be seen by its approved followers and users whose accounts are open can freely send tweets to each other’s certain tweet. Private messages can also be exchanged between accounts.

In terms of the language on Twitter, Japan is the only country in the world whose official language is Japanese, and it does not have any other official language. In addition, most Japanese speakers’ nationality is Japanese (Ethnologue, 2018), and the number of Japanese learners from outside of Japan is estimated to be under three percent of the total Japanese population (Japan Foundation, 2015, p.7; Statistics Bureau, Ministry of Internal Affairs and Communications [MIC], 2018). Therefore, it is assumed that most tweets in Japanese would be by Japanese users, which can be another advantage to investigate political conversations on social media among Japanese.

A number of studies have investigated the use of Twitter focusing on political topics and users’ profiles. In terms of political communication, there are some studies targeting Japanese Twitter. Kobayashi and Ichifuji (2015) investigated the influence of a politician’s tweets on ordinary users, and concluded that exposure to a politician’s tweets may improve ordinary users’ impression of the politician, but not induce them to vote for him or her. Similarly, Ogasawara (2014) also concluded that the influence of election campaigning seems to be limited. On the other hand, Schäfer, Evert, and Heinrich’s (2017) study revealed a huge number of Japanese tweets that seem to support the Prime Minister Shinzo Abe and criticise his political enemies, which are sent through automated systems called ‘bots’. The main function of bots is to automatically send tweets made by users at the times set by the users, and the use of bots is growing. To deal with this issue, Twitter, Inc. has strengthened its regulation on bot or fake accounts and deleted a massive number of accounts in 2018 (Confessore & Dance, 2018). In reference to this, social media, such as Twitter, is sometimes mentioned as an ‘echo chamber’ in which similar opinions, especially on political topics, can be repeated and polarised (e.g., Jackson, 2017). However, some studies that focused on Japanese or American Twitter users suggest that the echo chamber effect might change depending on the users’ political position (Takikawa & Nagayoshi, 2017; Barberá, Jost, Nagler, Tucker, & Bonneau, 2015; Colleoni, Rozza, & Arvidsson, 2014). These studies imply that despite the limitation of propaganda through Twitter, a large number of tweets by other people might become an
important factor in public opinion about politics in Japan.

In terms of profiling Twitter, there are a number of studies in the US and European countries that profiled Twitter users who mentioned the candidate of an election (e.g., Barberá & Rivero, 2015; Bekafigo & McBride, 2013; Vaccari et al., 2013). However, Jungherr (2016) reviewed 127 articles that were written in English and published between 2008 and 2014, whose topics were related to Twitter use in elections, and found only one study targeting elections in Japan. Furthermore, there seems to be few similar studies written in Japanese. A study by Ciot, Sonderegger, and Ruths (2013) might partially explain the situation from the viewpoint of language system. They conducted profiling of gender of Twitter users in French, Turkish, Indonesian, and Japanese, and found it more difficult to do gender profiling in Japanese than in the other three languages because of its language system. Cesare, Grant, and Nsosie (2017) point out that gender is the easiest attribute of users on Twitter. They reviewed 91 articles published until November 2017, which profiled Twitter users, and found that in profiling Twitter users, the gender category would be the easiest to predict, while age and race or ethnicity would be relatively harder to identify precisely. Moreover, Cesare et al. point out that there seems to be no established way of profiling these characteristics of Twitter users. These studies imply a special difficulty in profiling on Japanese Twitter; therefore, the present study focused mainly on the choice of topics and words by Japanese Twitter users to analyse their political participation.

Apart from political topics, some studies analysed words in Japanese tweets. Miura, Komori, Matsumura, and Maeda (2015) analysed the usage of emotional expressions in Japanese tweets on Twitter Japan focusing on topics related to the 2011 earthquake in East Japan. They defined topical terms related to the earthquake and words describing positive or negative emotions, and extracted tweets containing those terms to investigate the change of the rates between them. Additionally, Taka (2014, 2015) investigated the usage of words and topics among Japanese tweets mentioning Chinese and Korean people. Taka also defined topical terms that appeared in tweets, and compared the percentages of tweets including those terms between targeted tweets and tweets collected almost randomly. The current study combined those studies’ methodologies and utilised Miura et al.’s (2015) emotion term list to investigate the characteristics of Twitter accounts mentioning politics.

**Research Questions**

As discussed above, although political conversation on social media seems to be a modern way of political participation, which might be more accessible to the young generation in Japan with political apathy and distrust, there have not been enough studies on it in Japan. Thus, this study addresses the research questions below in order to investigate political participation on a popular social media platform among young people in Japan. The main research question for the study was: What characteristics do Japanese accounts mentioning Japanese political issues on Twitter have? The sub research questions were: (1) Is there any difference in the pattern of topics mentioned in tweets between accounts that lead to political conversation and accounts that do not?; (2)
Is there any difference in emotional expression on Twitter between accounts that lead to political conversation and accounts that do not?; (3) How are political topics mentioned on Twitter?

This study adopted the text mining method, whereby nouns and adjectives were extracted from the collected tweets. The nouns were used to classify the tweets’ topics, and the adjectives were used to analyse emotional expressions thereof.

**Method**

*Twitter Account List*

First, a list of influential twitter accounts on political topics was created. Public Japanese tweets mentioning terms related to the election in text, images, or links, were collected between 15 and 17 May 2018 from the website ‘TwTimez’ (http://www.twtimez.net/). This website preserved all Japanese tweets retweeted no less than 200 times in a day and opened them by day. The tweets that contained relevant terms (shown below) were selected among 2,941 tweets preserved by TwTimez on the general election day (Lower House election), 22 October 2017. This data collection targeted only tweets sent just after midnight to 8:00 pm on the election day. It is illegal in Japan for anyone to encourage people to vote for particular candidates or parties on the election day (Ministry of Internal Affairs and Communications [MIC], 2013). However, it is generally interpreted that this ban would not apply after the polling stations close, which was at 8:00 pm in this particular election (e.g., Senkyo dottokomu, 2017). Therefore, the targeted tweets were supposed to mention the election in a neutral way, in theory. Every collected tweet mentioned nouns in at least one of the following categories: names of candidates or leaders of political parties, names of political parties, and common nouns connected to elections. However, tweets mentioning these terms in a context clearly unconnected to political elections (e.g., popularity election of animation characters, or reports on the typhoon) were excluded. Tweets already deleted or those on frozen or locked (private) accounts were also excluded. Moreover, tweets on the following types of accounts were excluded (these were checked on the accounts’ name and profile text on the front page): present or former member of assembly; present or former head of a local government; election candidate; staff of a political party; civic group’s account; company’s official account, including news media; and other types of accounts run by multiple people. In other words, the data collection was done from selected tweets by private individuals, as long as the information shown on the accounts’ names and their profiles was reliable. From this selection, 83 public tweets (on private individual users’ accounts, in theory) mentioning the election in a nonpartisan way were kept in the collection for the next step. Appendix 1 shows all the original nouns related to the election in those tweets, with their English translations. The collected 83 tweets were sent from 80 accounts (three pairs of tweets were from the same accounts). In terms of political conversation on Twitter, some users might have influenced others by posting those theoretically low-partisan tweets shared by other accounts at least 200 times. In other words, when counting each tweet, at least 200 users seem to have joined a conversation on the election, although the actual number of human users (not Twitter bots mentioned above) was not determined. Therefore, the list composed of the 80 accounts was termed the ‘influence group’ list.

Second, another list of Twitter accounts was created to compare with the influence group. This time, tweets not mentioning the election, or ‘non-political tweets’, were collected on 20 June 2018. To make the conditions as close as possible to the first group, the tweets were selected among those sent during the same period and shared the closest times with the collected tweets mentioning the election. As with the first group, tweets already deleted or those on frozen, locked, or certain types of accounts were excluded. In terms of the number of retweets, if only one tweet satisfied these conditions between two collected tweets mentioning the election, only that tweet was included. Additionally, if more than one tweet met the conditions around one collected tweet, all of them were collected. As a result, 90 non-political tweets were collected for the next step, and 73 accounts were extracted from them. The list of those accounts was termed the ‘non-political group’ list.
Tweet and Metadata Collection

First, the latest 3,200 tweets and their metadata were collected from each account on the two lists on 26 June 2018 by running a programming code on a programming language, Python, which utilised one of Twitter’s open source systems (Application Programming Interface [API]). The collected metadata of each tweet included its ID, posting date and time, count of retweets, and count of ‘favourite’. Significantly older tweets than the latest 3,200 tweets were not collected due to the Twitter API’s restriction. However, the number of collected tweets from most of the accounts was not exactly 3,200 because of the unstable internet server. Moreover, much less than 3,200 tweets were collected from accounts whose total number of tweets was under 3,200. The maximum number of tweets from an account was 3,244, and the minimum number was 177. Eventually, 457,189 sets of tweets’ text data and metadata were collected from 153 accounts on the two lists. The oldest collected tweets (by account) ranged from 20 November 2010 to 17 June 2018. Some text data of the tweets lacked some words or letters at the end of the text, which was caused by ‘official retweeting’ on Japanese Twitter. The text of an official retweet starts with the ID of an account (e.g., @govote), which is not counted as letters on the web page, but counted when it is collected via Twitter API. Therefore, IDs push out some words or letters at the end of collected tweets that have more than 140 letters with an ID and the text.

Second, between 29 and 30 June 2018, the following data were collected from the front page of each account on the two lists: profile text, user’s location name, registration date on Twitter, count of images and videos in previous tweets, count of tweets, count of accounts followed by the user, count of ‘followers’, and count of ‘favourite’. Through viewing the account’s names and profile text, it was found that 44 accounts in the influence group (55 percent) and 31 accounts in the non-political group (42 percent) used account names with which the users were doing their professional jobs, such as: athlete, cartoonist, comedian, film director, illustrator, journalist, lawyer, professor, singer, voice actor, and writer. On the other hand, most users’ location names were blank or unspecific.

Lastly, the registration dates ranged from April 2007 to August 2017.

Extracting Nouns From the Collected Tweets

Nouns in the collected tweets’ text data were extracted using two freeware applications in order to categorise the tweets by topic. The application ‘Tiny Text Miner’ (hereafter TTM) and its Microsoft Excel version, ‘ExcelITTM’ (Matsumura & Miura, 2017) were used in this procedure. TTM comprehends the functions of ExcelITTM that work on a popular spreadsheet, Microsoft Excel by Microsoft Corporation, although they have different user interfaces. Up until June 2018, these freeware applications were used in at least 141 published academic articles, studies presented at academic conferences, and dissertations (Matsumura & Miura, 2017). They function by using an open source morphological analyser, ‘MeCab’ (Kudo, 2013), which separates Japanese text into words by parts of speech (namely, morphological analysis). However, TTM and ExcelITTM can also work with English text. It should be noted that some compound nouns extracted by TTM might sometimes be senseless; therefore, checking the words obtained by TTM is necessary. Consequently, 314,436 nouns were extracted from 457,189 collected tweets’ text data by using TTM. Sixty-two percent of the extracted nouns (195,718 nouns) contained the English alphabet.

Political Topic List From Public Opinion Polls

Nouns in public opinion polls’ text data were extracted using TTM to construct a ‘political topic list’, which was utilised to define ‘political related tweets’ in the following analysis steps. In Japan, as of July 2018, there were almost ten monthly polls surveying the percentage of those supporting the present cabinet and other related political issues from the following corporations: three national newspaper companies, two news agencies, five TV company groups, and a combination of a national newspaper company and a TV company (Real Politics Japan, 2018). Only the Nikkei group (a national newspaper — Nikkei and TV Tokyo) and All-Nippon News Network (ANN — a commercial television news network) offered free online access to the results and questionnaires in their polls since November 2010; the date of the oldest collected tweet. It seemed that, while ANN’s polls (2018) contained fewer topics and asked several questions on one topic, Nikkei group’s polls (Nikkei Shimbun, 2018) — hereafter Nikkei polls — have treated a wider range of issues and almost comprehensively covered the topics in ANN’s polls. This tendency can be explained by the nature of the corporations: The Nikkei group conducted the polls to mention not only in TV news but also in a newspaper that has larger space than the others, while ANN would utilise the results of the polls.
Table 1. Definitions and word counts of categories from the polls

| Category [words]                  | Definition                                                                 |
|----------------------------------|-----------------------------------------------------------------------------|
| (1) Assembly and government term [133] | Assemblies’ or administrations’ names, positions in assemblies or administrations, and particular procedures in the assemblies or administrations. |
| (2) Politician and administrative official [85] | Names of present or former members of assemblies, present or former heads of local governments, election candidates, and executive officials. |
| (3) Political party term [52]     | Political parties’ names, posts and particular procedures in political parties. |
| (4) Election term [43]            | Election names and technical terms of elections, including the ‘approval rating’ of the government or political parties. |
| (5) External affairs term [39]    | Names of heads of overseas countries, their post names, and their affairs abroad (i.e., not in Japan). |
| (6) Policies [176]               | See the subtopics in Table 2.                                               |
| (7) Current issues [43]           | See the subtopics in Table 2.                                               |
| (8) Legislation [42]              | See the subtopics in Table 2.                                               |

only for TV news. Therefore, only the Nikkei polls text data were utilised to make a political topic list. The Nikkei group has conducted polls almost monthly, but sometimes once in two months or twice a month. Accordingly, text data from 95 polls were collected, which ranged from November 2010 to June 2018 (92 months in total) in keeping with the period of the collected tweets, and 1,849 nouns in the text data were extracted by TTM.

Subsequently, a political topic list was constructed from those extracted words, which was referred to in the process of defining ‘political related tweets’ in the analyses. This list was composed of eight categories and 33 subtopics, which were defined by the author based on those extracted nouns. First, five categories were formed by collecting 352 nouns from those words, which meant a similar type of position, organisation, or election: (1) assembly and administration term; (2) politician and administrative official; (3) political party term; (4) election term; and (5) external affairs term. ‘Assembly and administration term’ consisted of 133 nouns, which included: names of assemblies or administrations, positions in the assemblies or administrations, and particular procedures in assemblies or administrations. ‘Politician and administrative official’ contained 85 nouns, including names of present or former members of assemblies, present or former heads of local governments, election candidates, and executive officials. However, it excluded nouns composed of only surnames and a title, because they were comprehended by the full names or the surnames with an official post. ‘Political party term’ was composed of 52 nouns with names of political parties, posts, and particular procedures in the political parties. ‘Election term’ consisted of 43 nouns, which included the elections’ names and technical terms of the elections, including the ‘approval rating’ of the government or political parties. Lastly, ‘external affairs term’ contained 39 nouns, including names of heads of overseas countries, names of their posts, and their affairs abroad (i.e., not in Japan). Appendix 2 shows the three most frequent terms in each of the five categories (with English translations) and their count in the text data of the polls.

Second, 261 topical nouns were selected from the rest of the extracted nouns by referring to the questionnaires of the polls. These nouns formed the following categories and the subtopics in each category: (6) policies; (7) current issues; and (8) legislation. ‘Policies’ included 176 nouns in 16 subtopics, whose two most frequent words are shown by subtopic in Appendix 3. ‘Current issues’ consisted of 43 nouns in
Table 2. Subtopics in three categories from the polls and word counts

| (6) Policies: 176 words | (7) Current issues: 43 words |
|------------------------|-----------------------------|
| (i) Tax reform         | (i) Nuclear power plan      |
| (ii) Education & welfare | (ii) Kake Educational Institute |
| (iii) Finance          | (iii) Moritomo Educational Institute |
| (iv) Military security | (iv) Suspicion of corruption |
| (v) Foreign affairs    | (v) Hostage incident        |
| (vi) Reconstruction    | (vi) Others                 |
| (vii) US military base |                             |
| (viii) North Korea issues |                           |
| (ix) Historical issues | (i) Constitutional revision |
| (x) Trade agreement    | (ii) Security legislation   |
| (xi) Imperial household reform | (iii) Taxation system |
| (xii) Territorial disputes | (iv) Conspiracy law |
| (xiii) Local autonomy  | (v) Budget-related bills    |
| (xiv) Energy resources | (vi) Labour legislation     |
| (xv) Discretionary labour system | (vii) Act on the Protection of Specially Designated Secrets (SDS) |
| (xvi) Others           | (ix) Elderly care           |
|                        | (x) Integrated Resorts (IR) implementation |
|                        | (xi) Others                 |

six subtopics, and ‘legislation’ contained 42 nouns in 11 subtopics. The two most frequent nouns are also shown in Appendices 4 and 5.

In summary, 613 nouns were selected from the 1,849 nouns extracted from the text data of Nikkei group’s 95 polls. The nouns formed eight categories and 33 subtopics in a bottom-up manner as shown in Table 1 and 2, meaning that they were organised based on the types of the nouns or from the topics in the questionnaires of the polls.

**Emotion Terms**

To analyse the emotional expressions in the collected tweets, especially the ‘political related tweets’, a Japanese emotion term list made by Miura et al. (2015) was utilised. It was originally formed to analyse emotional reactions in Japanese tweets mentioning the huge earthquake disaster in East Japan on 11 March 2011. They first categorised emotions into three types based on a study by Back, Käfner, and Egloff (2010): positive emotions, and anger and anxiety as negative emotions. They then collected Japanese nouns, verbs, adjectives, and adverbs expressing emotions from five psychological scales (Joh, 2009; Sato & Yasuda, 2001; Terasaki, Kishimoto, & Koga, 1992; Monchi & Suzuki, 2000; Ogawa, Monchi, Kikuya, & Suzuki, 2000) and two synonym dictionaries (Shibata & Yamada, 2002; Ohno & Hamanishi, 1981). In this process, Miura et al. carefully selected words that could be used as having one meaning beyond the context. Consequently, 91 emotion terms (hereafter ETs) were extracted, which were composed of 27 positive emotion words, and 27 anger words and 37 anxiety words as negative emotions. All terms are shown in Appendix 6, with their English translations.
Ethical Considerations

In this research, only data of individuals’ activities on Twitter that are open to the public were collected and analysed, in compliance with Twitter, Inc.’s guidelines for use of data. No private data on Twitter were used, and there were no human participants in this study. However, it is possible that some accounts targeted in this study may have been locked after the data collection. In this case, anything the users uploaded after they had locked their accounts was not used in this research. Moreover, every procedure and analysis avoided identifying the real names of those using anonymous Twitter accounts. Finally, although this study mentioned political perspectives of individuals on public Twitter platforms, no questionnaire was used.

Results

Defining ‘Political Related Tweets’

In the first phase, a ‘political term list’ consisted of nouns selected from the collected tweets by referencing the political topic list based on the Nikkei polls, and the ‘political related tweets’ were then extracted from them. For the first step, 15 sub-categories of political terms were made by subdividing specific categories from the political topic list and categorising them further. While the political topic list from the polls was created in a bottom-up manner, the political term list was formed in a top-down manner. The details of each sub-category are explained in the following paragraphs, and Table 3 illustrates the final five main categories with definitions and word counts.

The first main category, ‘Topics from polls’, was composed of 1,085 nouns in three sub-categories with 25 subtopics that were formed according to similarly named categories in the political topic list. In this main category, nouns that were related to any of the subtopics in the political topic list were selected, and some of them were further integrated into one sub-category. Moreover, the following four subtopics were added to the three sub-categories: ‘public opinion polls’ under ‘current issues’; ‘daily report of Self-Defence Force’ under ‘policies’; and ‘bribery’ and ‘Election Law’ under ‘legislation’. Since the political topic list was based on the Nikkei public opinion polls, the polls themselves and associated approval could be reflective of political conversations. Therefore, 56 nouns that were associated with polls or approval ratings were categorised to an added subtopic, ‘public opinion polls’. Terms that were collected from any daily reports of Self-Defence Forces activities were controversial in that they comprised both open and official documents that had been made by Self-Defence Force units and dispatched abroad. These were categorised as a subtopic, ‘dispatch of the Ground Self-Defence Force’ and categorised as ‘military security’ on the political topic list. Therefore, 22 nouns were selected as terms related to that issue in an additional subtopic, ‘daily report of Self-Defence Force’. ‘Bribery’ included six nouns related to laws that governed bribery for politicians, which were directly associated with the subtopic, ‘suspicion of corruption’ under ‘current issues’, a sub-category on the political topic list. For similar reasons, a subtopic, ‘Election Law’ was added, which contained six nouns pertaining to election laws that were directly connected to elections, as reflected in other sub-categories and on the political topic list. Table 4 shows all
Table 3. Definitions and word counts of categories nouns related to politics

| Main category [words]                | Sub-category [words]     | Definition                                                                                                                                 |
|--------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| I: Topics from polls [1085]          | (1) Current issues [551] | See the sub-categories in Table 4.                                                                                                        |
|                                      | (2) Policies [302]       | See the sub-categories in Table 4.                                                                                                        |
|                                      | (3) Legislation [232]    | See the sub-categories in Table 4.                                                                                                        |
| II: Specific names [2835]             | (1) Assembly & administration [1236] | ‘Assembly & administration’ in the political topic list, Bank of Japan, and Japan Pension Service. However, names of organisations and local governments and nouns that contained words meaning ‘in front of’ were excluded. |
|                                      | (2) Politician & administrative official [1118] | Politicians’ and administrative officials’ names and their positions. Full names that were mentioned in reference to positions in other tweets were also included. Additionally, names and positions in the political topic list were included, while names that only had surnames or a title were excluded. On the other hand, the process made an exception for ‘Abe’ (the present Prime Minister’s surname). |
|                                      | (3) Political group name [309] | Names of groups within assemblies or political parties and names of political parties.                                                                 |
|                                      | (4) Name of election [172] | Specific names of elections. However, nouns related to specific procedures were not included.                                                   |
| III: Overseas topics [464]            | (1) External affairs [377] | The same criteria of selection as with ‘external affairs’ in the political topic list were used. Unlike ‘Specific name’, it included nouns composed of only surname and an honorific title. |
|                                      | (2) Diplomacy (Japan) [87] | Nouns including ‘diplomacy’ or ‘diplomatic relations’, Japan, or other countries’ names. Additionally, ‘Kanemaru’s visit to North Korea’ was added. |
| IV: Political ideologies [251]        | (1) Right and left ideologies [184] | Nouns including characters that mean ‘right wing’, ‘left wing’, ‘conservative’, or ‘liberal’. However, nouns that referred to ‘maintenance’ were excluded. |
|                                      | (2) Nationalism [67]     | ‘Nationalism’ consisted of nouns, including characters, that mean ‘nationalism’, ‘patriotism’, ‘anti Japan’, or ‘treason’. |
| V: Political compound words [749]     | (1) Politics [335]       | Any of four Chinese (kanji in Japanese) compound words, were selected as ‘Political compound words’: (1) ‘politics’ (politi); (2) (political) ‘party’ (党); (3) ‘election’ (選挙); and (4) ‘vote’ (投票). However, individual names and nouns obviously unconnected to real parties, elections, and vote (e.g., popularity election of fictional characters) were excluded. |
|                                      | (2) Party (political party) [253] |                                                                                                                                              |
|                                      | (3) Election [106]       |                                                                                                                                              |
|                                      | (4) Vote [55]            |                                                                                                                                              |

Note. ‘Specific names’ excluded nouns that included things that had existed or names of those who worked only before World War II.
Table 4. Sub-categories under ‘Topics from polls’ and word counts of nouns

| Sub-category                  | Subtopic                                                                 | Words |
|-------------------------------|--------------------------------------------------------------------------|-------|
| (1) Current issues (551 words)| (i) Moritomo & Kake Educational Institute                                | 364   |
|                               | (ii) Nuclear power plant                                                 | 100   |
|                               | (iii) Public opinion polls                                               | 56    |
|                               | (iv) Suspicion of sexual harassment                                      | 28    |
|                               | (v) Suspicion of corruption                                              | 3     |
| (2) Policies (302 words)      | (i) North Korea issues                                                  | 87    |
|                               | (ii) US military base                                                    | 55    |
|                               | (iii) Education & welfare                                                | 43    |
|                               | (iv) Historical issues                                                  | 25    |
|                               | (v) Daily reports of Self-Defence Force                                  | 22    |
|                               | (vi) Local autonomy                                                     | 17    |
|                               | (vii) Finance                                                            | 12    |
|                               | (viii) Territorial disputes                                              | 12    |
|                               | (ix) Tax reform                                                          | 10    |
|                               | (x) Trade agreement                                                     | 10    |
|                               | (xi) Reconstruction                                                      | 9     |
| (3) Legislation (232 words)   | (i) Constitutional revision                                              | 107   |
|                               | (ii) Security legislation                                                | 41    |
|                               | (iii) Labour legislation                                                 | 38    |
|                               | (iv) Integrated Resorts (IR) implementation                              | 17    |
|                               | (v) Conspiracy law                                                       | 11    |
|                               | (vi) Bribery                                                             | 6     |
|                               | (vii) Election Law                                                       | 6     |
|                               | (viii) Act on SDS Protection                                             | 4     |
|                               | (ix) Others                                                              | 2     |

Subtopics of these three categories with the count of words, and Appendices 7, 8, and 9 show the nouns, sorted according to their English translations, and their frequency.

For ‘Specific names’, 1,236 words were sorted under ‘assembly & administration’ in the same way as the same category on the political topic list. The category also included nouns containing names of two organisations that were not governmental because they were mentioned in the Nikkei polls: Bank of Japan (日本銀行; the central bank) and Japan Pension Service. However, the category excluded names of organisations of local
governments and nouns that contained words that mean ‘in front of’, as they referred to organisations that were geographically situated in front of specified buildings of assemblies or administrations (e.g., 国会前; in front of the Diet). Such terms are often mentioned in the context of daily situations compared to other words in this sub-category due to linguistic ambiguities in Japanese. Additionally, nouns related to the military were excluded, to avoid selecting words from tweets that were mentioned in the context of fiction or history, while some of them were nouns connected to certain topics in other sub-categories. Furthermore, terms of specific procedures were excluded because the context of tweets in which they were mentioned were not connected to assemblies or administrations, while the Nikkei questionnaires were related to issues by which assemblies and administrations could be evaluated. For this reason, the ‘politician & administrative official’ list, which had 1,118 nouns, including politicians’ and administrative officials’ names with their positions, also excluded names that were not accompanied by their respective positions. Nevertheless, full names that were mentioned in reference to positions in other tweets were included, as such posts were likely referring to the same person. Additionally, names with the associated positions on the political topic list were also included, and names that only had surnames or a title were excluded. On the other hand, the process made an exception for ‘Abe’, because it was the present Prime Minister’s surname, and was mentioned 954 times with 116 kinds of words that did not include an honorific title. ‘Political group name’ contained 309 nouns that included names of groups in assemblies or political parties, and the names of political parties. ‘Name of election’ was composed of specific names of elections. These two sub-categories did not include nouns related to specific procedures for the same reason as for ‘assembly & administration’ mentioned above. Lastly, this main category excluded nouns including things that had existed or names of those who worked only before World War II, because they could be regarded as historical topics rather than present politics in Japan. Therefore, these 116 terms were also included. The other two sub-categories consisted of 481 nouns, including specific political parties’ names or specific election names.

In the ‘Overseas topics’ category, 464 nouns were selected as ‘external affairs’ or ‘diplomacy’ (of Japan) to distinguish domestic from foreign political terms. The former sub-category had the same standards of selection as the same category on the political topic list. Unlike ‘Specific name’, this category included nouns consisting of only surname and an honorific title (e.g., ‘Mr. Trump’), because foreigners’ family names selected here were based on different languages from Japanese and were very specific. The latter sub-category contained nouns including ‘diplomacy’ (外交 or 外務) or ‘diplomatic relations’ (国交), and Japan and another country’s name (e.g., 日米; Japan-US). Additionally, ‘Kanemaru’s visit to North Korea’ (金丸訪朝; Kanemaru is a former deputy Prime Minister’s name), was selected in this sub-category.

‘Political ideologies’ consisted of 251 nouns selected as ‘right and left ideologies’ or ‘nationalism’, which were not included on the political topic list. Right and left, or conservative and liberal ideologies, are often the focus of studies on politics and Twitter use (e.g., Conover et al., 2011; Vaccari et al., 2013; Barberá & Rivero, 2015; Barberá et
al., 2015). In addition, right wing internet users, referred to locally as ‘neto-uyo’ (stands for ‘netto-uyoku’; internet right wing), are usually connected to a certain kind of radical nationalism in Japan (e.g., Yasuda, 2015). Therefore, these sub-categories were added. ‘Right and left ideologies’ was composed of nouns including characters that meant ‘right wing’ (e.g., 右翼), ‘left wing’ (e.g., 左翼), ‘conservative’ (保守), or ‘liberal’ (リベラル). However, nouns that referred to ‘maintenance’ (written in Japanese with the same characters for ‘conservative’) were excluded. ‘Nationalism’ consisted of nouns including characters that mean ‘nationalism’ (e.g., 国幹), ‘patriotism’ (愛国), ‘anti Japan’ (反日), or ‘treason’ (卖国).

Finally, after the above selections of the main categories, 749 nouns including any of four Chinese (kanji in Japanese) compound words were selected as ‘Political compound words’: (1) ‘politics’ (政); (2) (political) ‘party’ (党); (3) ‘election’ (選挙); and (4) ‘vote’ (投票). However, individual names and nouns obviously unconnected to real parties, elections, and voting (e.g., popularity election of fictional characters) were excluded.

To summarise the above procedures, 5,384 nouns were selected as ‘political terms’ from 314,436 identified nouns, according to the five main categories and their 15 sub-categories, which were based on the political topic list. Appendix 10 shows the original nouns in the above-mentioned four main categories and their frequency, with the English translations.

In the next step, ‘political related tweets’ were extracted by using some of the nouns as a ‘political term list’. First, 57,430 tweets that contained any noun on the political term list, except those from the main category of ‘Overseas topics’, were extracted as ‘domestic politics’ tweets (hereafter “DP tweets”) from the collected 457,189 tweets using ExcelITTM. DP tweets formed 12.6 percent of the collected tweets. Second, 7,544 tweets, including any noun in ‘Overseas topics’, were extracted as ‘foreign politics’ tweets (hereafter FP tweets) from the rest of the collected tweets using ExcelITTM. FP tweets formed 1.7 percent of collected tweets. The statistical analysis (described below) focused mainly on the domestic politics tweets, and utilised the FP tweets to evaluate the users’ interest in overseas political topics.

**Statistical Analysis**

Two types of statistical analysis were conducted on the dataset gained in the above procedure using SPSS. First, the descriptive statistics are shown in Table 5. The labels in the table indicate the numbers of the following items. ‘URL citation’ means tweets that included URL, and ‘Reply’ indicates tweets that were sent to another account as a message. ‘Official retweet’ refers to uncommented retweets, while ‘unofficial retweet’ refers to retweets (RTs) that were commented on by the user. All other tweets were defined as ‘Original tweet’, which contained only original text. ‘Emotion Tweets (ETs)’ refer to tweets that included emotion terms (defined above), and ‘positive ET’, ‘Anger’, and ‘Anxiety’ refer to tweets that contain positive emotion, anger, and anxiety ETs, respectively. ‘DP ET tweet’, ‘DP positive ET’, ‘DP anger’, and ‘DP anxiety’ are examples of ET tweets that were selected from the DP tweets. If one tweet included
| Group          | Mean   | Median | SD     | N  |
|---------------|--------|--------|--------|----|
| **Original tweet** |        |        |        |    |
| Influence     | 641.88 | 439.0  | 584.35 | 80 |
| Non-political  | 936.12 | 869.0  | 680.73 | 73 |
| **URL citation** |        |        |        |    |
| Influence     | 790.49 | 697.5  | 617.91 | 80 |
| Non-political  | 623.45 | 353.0  | 676.82 | 73 |
| **Official RT** |        |        |        |    |
| Influence     | 1251.01| 1292.0 | 851.74 | 80 |
| Non-political  | 678.00 | 517.0  | 628.95 | 73 |
| **Unofficial RT** |        |        |        |    |
| Influence     | 18.74  | 0.0    | 109.12 | 80 |
| Non-political  | 29.08  | 0.0    | 166.58 | 73 |
| **Reply**     |        |        |        |    |
| Influence     | 421.78 | 227.5  | 479.70 | 80 |
| Non-political  | 572.77 | 355.0  | 591.68 | 73 |
| **ET tweet**  |        |        |        |    |
| Influence     | 162.09 | 149.0  | 83.14  | 80 |
| Non-political  | 171.04 | 144.0  | 126.53 | 73 |
| **Positive ET** |        |        |        |    |
| Influence     | 80.81  | 56.5   | 72.73  | 80 |
| Non-political  | 121.32 | 92.0   | 107.54 | 73 |
| **Anger**     |        |        |        |    |
| Influence     | 31.95  | 19.5   | 28.00  | 80 |
| Non-political  | 10.32  | 7.0    | 9.17   | 73 |
| **Anxiety**   |        |        |        |    |
| Influence     | 49.33  | 44.5   | 26.24  | 80 |
| Non-political  | 39.41  | 32.0   | 34.94  | 73 |
| **DP tweet**  |        |        |        |    |
| Influence     | 681.29 | 175.5  | 769.65 | 80 |
| Non-political  | 39.64  | 8.0    | 191.19 | 73 |
| **FP tweet**  |        |        |        |    |
| Influence     | 87.15  | 19.0   | 131.85 | 80 |
| Non-political  | 7.84   | 0.0    | 38.99  | 73 |
| **DP ET tweet** |        |        |        |    |
| Influence     | 29.15  | 10.0   | 34.16  | 80 |
| Non-political  | 1.51   | 0.0    | 6.87   | 73 |
| **DP positive ET** |        |        |        |    |
| Influence     | 5.89   | 3.0    | 10.66  | 80 |
| Non-political  | 0.66   | 0.0    | 1.61   | 73 |
| **DP anger**  |        |        |        |    |
| Influence     | 14.65  | 3.5    | 19.57  | 80 |
| Non-political  | 0.45   | 0.0    | 3.17   | 73 |
| **DP anxiety** |        |        |        |    |
| Influence     | 8.61   | 3.0    | 10.88  | 80 |
| Non-political  | 0.40   | 0.0    | 2.46   | 73 |

*Note. DP: domestic politics, ET: emotion term, FT: foreign politics, RT: retweet*
more than one type of ET, it was counted for each category.

Second, Welch’s t-tests were conducted on 26 variables shown in Table 6 to compare two groups. ‘Whole tweets’ refer to the count of whole tweets sent by an account on the two lists. ‘RT max’ and ‘RT med’ are the maximum and the median of the number of retweets that an account gained from a tweet. The same applies to ‘Favourite max’ and ‘Favourite med’. Generally, variance of counts of RTs and ‘Favourite’ tend to be very high. Therefore, the median was adopted as their representative average value rather than the mean value. ‘Others’ RT med’ refers to the median of the retweet count earned by others’ tweets that an account on the lists also retweeted. The following eight variables about the rate show the percentages of the number of each variable in all collected tweets, by account, on the lists: ‘Original tweet rate’, ‘Official RT rate’, ‘Unofficial RT rate’, ‘URL citation rate’, ‘reply rate’, ‘ET tweet rate’, ‘DP (domestic politics) tweet rate’, and ‘FP (foreign politics) tweet rate’. Moreover, ‘positive ET rate’, ‘anger rate’, and ‘anxiety rate’ mean the percentage of ‘positive ET’, ‘anger’, and ‘anxiety’ in ‘ET tweets’ respectively. Similarly, ‘DP ET tweet rate’ is the percentage of ‘DP ET tweets’ in ‘DP tweets’ by account, and ‘DP positive ET rate’, ‘DP anger rate’, and ‘DP anxiety rate’ are the percentages of those three variables in ‘DP ET tweets’.

As the results of Welch’s t-test suggest, the influence group was significantly higher than the non-political group in nine variables: collected tweets, favourite, official RT rate, Anger rate, Anxiety rate, DP tweet rate, FP tweet rate, DP anger rate, and DP anxiety rate. On the other hand, the non-political group was significantly higher than the influence group in six variables: Favourite max, Others’ RT median, Original tweet rate, Reply rate, Positive ET rate, and DP positive ET rate.

In addition, paired t-tests were conducted on the rates of ET tweets between whole tweets and DP tweets, by account, in the influence group. As Table 7 shows, the rate of anger tweets was significantly higher in DP tweets than in whole tweets, while the percentage of positive ET tweets was significantly higher in whole tweets than in DP tweets. On the other hand, there was no significant difference in ‘ET tweet rate’ and ‘anxiety rate’.

Third, Spearman’s correlation tests were conducted on each of the above 26 variables, and the main results are shown in Table 8 and 9. Spearman’s correlation test was chosen as the histograms of these variables indicated that most of them did not seem to follow a normal distribution. Table 8 indicates the correlations between the percentages of ET tweets in whole tweets and seven kinds of metadata. ‘ET tweet rate’ had significant low negative correlations with ‘Follow’ in both groups, and a significant low positive correlation with ‘Official RT rate’ only in the influence group. ‘Positive ET rate’ had significant low or medium positive correlations with ‘Follower’, ‘RT max’, and ‘Reply rate’ in both groups. Moreover, it had three different significant correlation patterns, by group, with ‘RT med’ (low positive only in the non-political group), ‘Original tweet rate’ (low positive in the influence group, and low negative in the other), and ‘Official RT rate’ (low negative only in the influence group). ‘Anger rate’ had significant low positive correlations with ‘RT med’ and ‘Official RT rate’ only in the
Table 6. Results of Welch’s t-test

|                  | Influence |       | Non-political |       | t     |
|------------------|-----------|-------|---------------|-------|-------|
|                  | M     | SD   | M             | SD   |       |
| Whole tweets     | 67327.5| 83706.8| 50535.8       | 70263.3| 1.348 |
| Collected tweets | 3123.9 | 408.6 | 2839.4        | 796.7 | 2.740**|
| Images & videos  | 3455.1 | 4119.6| 3167.4        | 7261.8| 0.298 |
| Follow           | 3188.6 | 8714.1| 1327.1        | 2851.8| 1.808 |
| Follower         | 110327.7| 233952.3| 140326.5      | 335378.4| -0.636|
| Favourite        | 17413.7| 39164.6| 8082.5        | 13030.9| 2.012*|
| RT max           | 9474.5 | 12478.9| 14201.0       | 19755.4| -1.750|
| RT med           | 36.9  | 79.5  | 64.9          | 220.0 | -1.030|
| Favourite max    | 15880.9| 24889.1| 31718.2       | 48936.7| -2.487*|
| Favourite med    | 176.6 | 652.9 | 395.4         | 1682.5| -1.042|
| Others’ RT med   | 520.7 | 1021.7| 1222.2        | 2166.2| -2.522*|
| Original tweet rate | .211  | .194  | .330          | .232  | -3.436**|
| Official RT rate | .397  | .264  | .230          | .201  | 4.433***|
| Unofficial RT rate | .006  | .034  | .011          | .060  | -0.670|
| URL citation rate | .254  | .195  | .222          | .227  | 0.932 |
| Reply rate       | .132  | .149  | .207          | .205  | -2.543*|
| ET tweet rate    | .052  | .025  | .062          | .042  | -1.746|
| Positive ET rate | .466  | .223  | .677          | .187  | -6.358***|
| Anger rate       | .279  | .169  | .124          | .154  | 4.251***|
| Anxiety rate     | .320  | .101  | .275          | .121  | 2.342*|
| DP tweet rate    | .220  | .243  | .013          | .060  | 7.386***|
| FP tweet rate    | .027  | .041  | .002          | .012  | 5.199***|
| DP ET tweet rate | .051  | .069  | .052          | .107  | -0.085|
| DP positive ET rate | .371  | .317  | .709          | .365  | -3.832**|
| DP anger rate    | .369  | .251  | .144          | .313  | 3.063**|
| DP anxiety rate  | .304  | .210  | .147          | .244  | 2.685*|

Note. DP: domestic politics, ET: emotion term, FP: foreign politics, RT: retweet
*p < .05, **p < .01, ***p < .001

Influence group, and significant medium negative correlations with ‘Original tweet rate’ and ‘Reply rate’ only in the influence group. Lastly, ‘Anxiety rate’ had significant low
and medium correlations with ‘Follower’ and ‘RT max’ in both groups, and with ‘RT med’ and ‘Reply rate’ only in the non-political group. Table 9 shows the correlations between ‘DP tweet rate’ and the other eight variables. There were three similar patterns of correlations between two groups. In other words, ‘DP tweet rate’ had low to high
positive correlations with ‘Official RT rate’ and ‘FP tweet rate’ in both groups, and significant low and medium negative correlations with ‘DP positive ET rate’ in both groups. On the other hand, there were five different correlation patterns between the two groups. ‘DP tweet rate’ had significant positive low and medium correlations with ‘RT med’, ‘DP ET tweet rate’, and ‘DP anger rate’ only in the influence group, and a significant low negative correlation with ‘Original tweet rate’ only in the influence group. Furthermore, there was a significant medium positive correlation between ‘DP tweet rate’ and ‘DP anxiety’ only in the non-political group.

**DISCUSSION**

The two types of statistical tests above demonstrate a number of differences between the influence group and the non-political group, and the patterns on how political topics were mentioned. These results can be interpreted in reference to the following three
points: (1) the difference in patterns of topics mentioned in tweets, (2) the difference in emotional expressions between the two groups, and (3) the way political topics are mentioned.

Findings

First, in terms of communication patterns, ‘Others’ RT med’ can be understood as an average scale of networks to share tweets. Accordingly, the results in that variable imply that the influence group tends to be in smaller networks of retweeting than the non-political group. In considering retweets and original tweets, the influence group posted official retweets more often than the other group, while the non-political group posted original tweets and replies to other accounts more often than the other group. Considering the characteristics of official retweets (quoting tweets without any additional comment or URL), those different patterns can be interpreted to mean that the influence group tends to use Twitter for sharing other people’s opinions. However, replying on Twitter does not necessarily mean communicating with other users, because users can reply not only to others’ tweets but also to their own tweets. With regard to topics in tweets, the influence group tends to talk about politics, including foreign topics, more often than non-political topics, compared to other accounts. Finally, in terms of ETs in tweets, there were similar patterns in differences between the two groups beyond topics: the influence group used more terms meaning ‘anger’ or ‘anxiety’, while the non-political group used more positive ETs, which were approximately 70 percent of the ETs used.

Second, regarding the usage of emotion terms by the influence group, the results show that the group tended to use more anger ETs and less positive ETs in DP tweets than in other topics (see Table 7). The Influence group mentioned domestic political topics with less ETs than other non-political topics. Therefore, domestic politics tended to be mentioned with anger ETs more than positive ETs or anxiety ETs on influential accounts on political topics, though this topic does not seem to cause them to use more emotional expressions than other topics.

Third, the results of the correlation analysis focusing on ETs (see Table 8) suggest that while having more positive ETs than anxiety ETs might lead to more retweets by others in networks that the non-political group members belong to, having more anger ETs might lead to receiving more retweets by others in networks that the influence group members belong to. This implies that influential accounts on political topics could be characterised by their patterns of retweeting: influence group tends to share tweets that include more anger ETs than positive ETs, and such tweets are more likely to be shared in the networks they belong to.

Fourth, correlations of ‘DP tweet rate’ with eight other variables (see Table 9) suggest that domestic political topics tend to be mentioned as official retweeting by both non-political and influence groups. In the influence group, ‘DP tweet rate’ positively correlated with ‘RT med’, and negatively correlated with ‘Original tweet rate’. In terms of ETs in DP tweets, there were different correlation patterns between the two groups. While positive ETs were less likely to be used for domestic political topics in both
groups, the influence group tended to mention domestic politics in their tweets with anger ETs. On the other hand, the non-political group tended to tweet domestic politics with anxiety ETs.

Finally, the influence group was supposed to be comprised of accounts that had promoted political conversations in theoretically neutral ways, and the non-political group was supposed to comprise of accounts that had led conversations on non-political topics. In terms of topics in tweets, the influence group mentioned politics, including foreign topics, more often than other users. They tended to use anger or anxiety expressions more than positive emotional expressions in tweets, regardless of topic. Moreover, they are more likely to share information or others’ opinions more often than other users.

**Implications**

As discussed above, this study investigated the characteristics of accounts that might lead political conversation on Japanese Twitter, and illustrated some patterns of accounts that might promote conversation on non-political topics. First, both types of accounts seem to mention political topics with negative emotions (anger or anxiety) more often than with positive emotions, which suggests dissatisfaction and distrust of current politics shared among certain networks of Japanese Twitter users. Second, exchanging information or opinions on political topics by those who seem to be influential and active in political conversation on Twitter is connected with anger expression more than anxiety or positive emotions, compared to those who do not. In summary, while negative impressions of current politics in Japan, which were reported by previous surveys, seem to be reflected in Japanese tweets as public opinion, anger, especially, could be a factor that encourages people to participate actively in political conversation on Twitter. Considering the accessibility of Twitter to Japanese youth, focusing on their anger on politics, or lack of it, could help solve a vicious spiral of their alienation from politics.

**Limitations**

This study had the following limitations in methodology and data analysis. First, the targeted Twitter accounts and collected tweets were limited as the scale of samples because the accounts were selected from a limited range, and no more than approximately 3,200 latest tweets were extracted from each of them. Due to Twitter API regulation, comparison between all accounts that mentioned certain terms during a certain period and the other accounts was not feasible. Additionally, with the limitation of the amount of tweets collected from an account, dates of collected tweets tended to be near the day when they were extracted. Therefore, the emotional expressions on political topics in tweets could be affected by the trends of political topics. Second, although this study referred to Nikkei polls and categorised the nouns there based on the author’s judgement, partially different definitions of political terms are possible. For example, it would be feasible to include more words as political terms by focusing on co-occurring networks of words. However, public opinion polls by major media companies, such as the Nikkei group, should be representative of famous issues at the time, although the details of topics
would be different. This advantage of using Nikkei polls effectively reduced the weakness of categorisation based on the author’s judgement on the political topic list. Third, this study targeted only public Twitter accounts and selected them based on the information shown on the front page of each account. Therefore, the characteristics of politically active users whose accounts were private were not addressed in this study. Furthermore, bot accounts were not filtered by machine learning, which seems to be a mainstream way of detecting bots. Fourth, a large amount of metadata was not included in the text analysis, such as network relationships between accounts. Last, from a general perspective, the findings of this study could be interpreted as a reflection of a possible negativity bias against politics rather than a description of those who seem to be influential in political topics on Japanese Twitter, that is, when it comes to politics, people tend to focus on topics that evoke negative emotions, such as anger or anxiety. If this is the case, the findings would be showing that Japanese Twitter seems to reflect public opinion, at least on political issues. Future studies should elucidate this point.

**Future Research**

As mentioned in the introduction, there seem to be few studies profiling Japanese Twitter users and focusing on the characteristics of politically active users on Japanese Twitter. Thus, replication would need to be conducted with a larger sample size. Moreover, in recent years, studies on Twitter that utilise machine learning or artificial intelligence, are rapidly increasing. Therefore, it would be expected that social scientists and information engineers widely collaborate to investigate these research topics through such advanced statistical methods. To this end, the findings of this study would offer meaningful implications that could serve as a starting point for these future endeavours.

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(Manuscript received 6 January, 2019; Revision accepted 20 April, 2019; Released online in J-STAGE as advance publication 25 December, 2019)
APPENDIX 1

Nouns related to elections from targeted tweets (English translation on the right side of the original words)

*In political parties’ names and common nouns, abbreviations, and synonyms are omitted.

| Candidates and leaders of political parties | 公職選挙法 | Election Law |
|--------------------------------------------|-------------|--------------|
| 安倍 | Abe | 衆議院議員総選挙 | general election of the Lower House |
| 安倍さん | Mr. Abe | 出口調査 | exit poll |
| 安倍晋三 | Shinzo Abe | 政策 | policy |
| 反安倍派 | Anti-Abe group | 政治 | politics |
| 安倍政権 | Abe Government | 政治家 | politician |
| 小池百合子 | Yuriko Koike (leader of Party of Hope) | 政党 | political party |
| 都知事 | Governor of Tokyo (Yuriko Koike) | 選挙 | election |
| 小泉進次郎 | Shinjiro Koizumi | 選挙違反 | electoral fraud |
| 選挙管理委員会 | | 選挙運動 | election campaign |
| | | | electoral administration committee |
| | | | | |

| Political parties | | |
| 自民党 | Liberal Democratic Party | 選挙区 | electoral district |
| 希望の党 | Party of Hope | 選挙権 | right of vote |
| 立憲民主党 | Constitutional Democratic Party of Japan | 選挙妨害 | election obstruction |
| 公明党 | New Komeito | 関票 | vote count |
| 維新 | Japan Innovation (Party) | 投票 | vote |
| 共産党 | Japanese Communist Party | 投票時間 | poll hours |
| | | 投票者数 | number of voters |
| | | 投票所 | polling station |

| Common nouns connected to elections | | |
| 候補者 | Candidate | 投票日 | election day |
| 楽観 | abstention (from voting) | 投票箱 | ballot box |
| ゼロ票確認 | zero vote confirmation | 投票用紙 | ballot |
| 公約 | election promise | 投票率 | turnout |
| 一票 | one vote | 当確 | projected win |
| 街頭演説 | stump speech | 当選 | elected |
| 期日前 | the day before the election | 野党 | opposition party |
| 期日前投票 | early voting | 有権者 | elector |
| 議席 | seat (in the Diet) | 落選 | lose (in an election) |
| 政権 | government | | |
**APPENDIX 2**

Nouns in five categories from the polls and the frequency (English translation on the right side of the original words)

*The three most frequent words in each category are shown.*

| (1) **assembly and administration term:** 133 words | 自民党 Liberal Democratic Party 178 |
| --- | --- |
| 政府 government 223 | 民主党 Democratic Party of Japan 94 |
| 国会 the Diet 38 | (2) **politician & administrative official:** 85 words | 内閣支持率 approval rating for the cabinet 191 |
| 首相 prime minister 35 | 政党支持率 approval rating for each party 95 |
| (3) **political party term:** 52 words | 投票 vote 56 |
| 安倍内閣 Abe Cabinet 128 | (4) **election term:** 43 words | 首脳会談 summit meeting 16 |
| 安倍首相 Prime Minister Abe 123 | 内閣支持率 approval rating for the cabinet 191 |
| 安倍政権 Abe Government 64 | 政党支持率 approval rating for each party 95 |
| 政党 political party 237 | 投票 vote 56 |
| (5) **external affairs term:** 39 words | 首脳会談 summit meeting 16 |
| 大統領 the President 11 | トランプ大統領 President Trump 8 |
APPENDIX 3

Nouns in ‘policies’ from the polls and the their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown, except in (xvi) other.

| (i) tax reform: 29 words | (ix) historical issues: 8 words |
|--------------------------|---------------------------------|
| 消費税率 sales-tax rate | 従軍慰安婦問題 comfort women issue |
| 税率 tax rate            | 首相談話 remarks of the Prime Minister |
| (ii) education & welfare: 21 words | (x) trade agreement: 8 words |
| 社会保障 social security | 環太平洋経済連携協定 Trans-Pacific Partnership Agreement |
| 社会保障改革 social security reform | TPP Trans-Pacific Partnership |
| (iii) finance: 19 words | (xi) Imperial household reform: 8 words |
| 経済政策 economic policies | 生前退位 living abdication |
| 財政再建 fiscal reconstruction | 女性宮家 imperial female family branches |
| (iv) military security: 14 words | (xii) territorial disputes: 7 words |
| 集団的自衛権 right of collective self-defence | 尖閣諸島 Senkaku Islands |
| 行使容認 approval of exercise | 北方領土 Northern Territories |
| (v) diplomacy: 13 words | (xiii) local autonomy: 5 words |
| 外交 diplomacy | 地方分権 decentralisation of power |
| 外交政策 diplomatic policies | 地方創生 local revitalisation |
| (vi) reconstruction: 13 words | (xiv) energy resources: 3 words |
| 東日本大震災 Great East Japan Earthquake | エネルギー政策 energy resource policy |
| 復興財源 financial resource for reconstruction | エネルギー基本計画 Basic Energy Plan |
| (vii) US military base: 13 words | (xv) discretionary labour system: 2 words |
| 普天間基地 Futenma Base | 裁量労働制 discretionary labour system |
| 米軍普天間基地 Futenma US Military Base | 労働時間調査 survey on working hours |
| (viii) North Korea issues: 12 words | (xvi) other: 1 word |
| 日本人拉致問題 abduction of Japanese | 女性政策 women policy |
| 拉致被害者 victim of abduction | |
Nouns in ‘current issues’ from the polls and their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown, except in (vi) others.

| Category | Noun | Frequency | English Translation |
|----------|------|-----------|---------------------|
| (i) nuclear power plant: 15 words | 原発 | 89 | nuclear power plant (abbreviation) |
| | 原子力発電所 | 14 | nuclear power plant |
| (ii) Kake Educational Institute: 10 words | 加計学園 | 18 | Kake Educational Institute |
| | 獣医学部新設 | 9 | establishment of department of veterinary medicine |
| (iii) Moritomo Educational Institute: 9 words | 森友学園 | 12 | Moritomo Educational Institute |
| | 安倍昭恵首相夫人 | 3 | Prime Minister’s wife Akie Abe |
| (iv) suspicion of corruption: 4 words | 政治資金規正法違反事件 | 3 | Political Funds Control Act violation incident |
| | 違法献金疑惑 | 1 | suspicion of illegal contribution |
| (v) hostage incident: 2 words | アルジェリア人質事件 | 2 | hostage incident in Algeria |
| | 日本人人質事件 | 1 | Japanese hostage incident |
| (vi) others: 3 words | 伊勢志摩サミット | 2 | Summit in Ise Shima |
| | セクハラ疑惑 | 1 | suspicion of sexual harassment |
| | 人口減少 | 1 | population decline |
APPENDIX 5

Nouns in ‘legislation’ from the polls and their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown.

| (i) constitutional revision: 12 words | (vi) labour legislation: 2 words |
|--------------------------------------|---------------------------------|
| 憲法改正 constitutional revision | 労働基準法改正案 amendment of Labour Standards Act |
| 憲法 the Constitution | | |
| | | | 働き方改革関連法案 work-style reform bills |
| (ii) security legislation: 7 words | (vii) the Act on the Protection of Specially Designated Secrets (SDS): 2 words |
| 安全保障関連法案 security-related bills | 特定秘密保護法 the Act on SDS Protection |
| 安保関連法案 security-related bills (abbreviation) | 特定秘密保護法案 bills of the Act on SDS Protection |
| (iii) taxation system: 6 words | (ix) elderly care: 2 words |
| 消費税率引き上げ法案 sales-tax increase bill | 国民年金法改正案 amendment of the National Pension Law |
| 所得税改革案 income tax reform bill | | |
| | | | 介護保険法改正案 amendment of the Long-term Care Insurance System |
| (iv) conspiracy law: 4 words | (x) Integrated Resorts (IR) implementation: 2 words |
| 組織犯罪処罰法改正案 amendment of act on punishment of organized crimes | 統合型リゾート施設整備法案 IR bills |
| テロ等準備罪 anti-terror conspiracy law | カジノ解禁 legalising casino |
| (v) budget-related bills: 3 words | (xi) others: 2 words |
| 予算関連法案 budget-related bills | 選択的夫婦別姓制度 optional dual-surname system |
| 赤字国債発行法案 deficit-covering bond bill | 減反制度 acreage reduction system |
| | | | |
Emotion terms (Miura et al., 2015; English translation on the right side of the original words)

*Homophones of hiragana, katakana, and Chinese characters are omitted.

| Positive emotion | Positive emotion | Positive emotion |
|------------------|------------------|------------------|
| 愉快な           | pleasant         | 忌忌しい         | disgusting        |
| 面白い           | interesting      | 忌まわしい         | ominous           |
| 楽しい           | enjoyable        | 荷立たしい         | fretful           |
| 嬉しい           | glad             | もどかしい         | impatient         |
| 喜ばしい         | delightful       | 歯痒い             | irritating        |
| 誇らしい         | proud            | 酷い              | terrible          |
| 清清しい         | refreshing       | 怒り              | rage              |
| 乾燥な           | smooth           | 慎怒              | fury              |
| 陽気な           | cheerful         | 腹立ち            | anger             |
| 爽やかな         | bracing          | 立腹              | indignation       |
| 機嫌良いい       | good temper      | イライラ            | irritable         |
| 元気な           | energetic        | 胸くそ悪い         | sickening         |
| ご機嫌な         | good mood        | 馬鹿らしい         | ridiculous        |
| 生き生き         | vivid            | むっとした         | sullen            |
| うきうき         | buoyant          | かっとした         | hot-tempered      |
| わくわく         | exciting         | 悪らしい           | vexed             |
| 会い            | agreeable        | 悪い              | hateful           |
| 心地よい         | nice             | 苦い              | gloomy            |
| 微笑ましい        | amusing          | 苦々しい           | bitter            |
| 麗しい           | beautiful        | 怨い              | displeased        |
| 気持ち良いい     | comfortable      | 苦々しい           | mortifying        |
| 安らがな         | gentle           | 悔けない           | deplorable        |
| 落ち着いて       | calm             | 悔めしい           | reproachful       |
| 長閑な           | tranquil         | 不満しい           | doubting          |
| 楽しい           | restful          | 不満しい           | doubting          |
| 休息な           | restful          | 不満しい           | doubting          |
| 和やかな         | peaceful         | 不満しい           | doubting          |

| Negative emotion: anxiety |
|---------------------------|
| 悪い           | fearful        |
| 恐ろしい         | dreadful       |
| おっかない         | frightening   |
| ハラハラ         | thrilling      |
| 怪しい           | questionable   |
| 解せない         | incomprehensible |
| 誇しい           | suspicious     |

| Negative emotion: anger |
|-------------------------|
| 不快な                   |
| 不快な                   |
| 腹立たしい               |
APPENDIX 7

Nouns in ‘current issues’ from the collected tweets and their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown.

| (1) current issues | (iv) suspicion of sexual harassment: 28 words |
|---------------------|-----------------------------------------------|
| (i) Moritomo & Kake Educational Institute: 364 words | (iv) suspicion of sexual harassment: 28 words |
| 加計学園 Kake Educational Institute | 福田次官 Vice-Minister Fukuda (abbreviation) 134 |
| 森友問題 Moritomo issue | 福田事務次官 Vice-Minister Fukuda 73 |
| (ii) nuclear power plant: 100 words | (v) suspicion of corruption: 3 words |
| 原発 nuclear power plant | ドリル証拠隠滅事件 incident of distraction of evidence by an electric drill 5 |
| 原発事故 nuclear power plant disaster | 陸山事件 Rikuzankai incident 5 |
| (iii) public opinion polls: 56 words | |
| 支持率 approval rating | 827 |
| 世論調査 public opinion poll | 597 |
Nouns in ‘policies’ from the collected tweets and their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown.

| (2) policies                        | (vii) finance: 12 words |
|-------------------------------------|-------------------------|
| (i) North Korea issues: 87 words   |                         |
| 拉致問題 abduction issue            | 経済成長 economic growth |
| 拉致被害者 victim of abduction      | 経済政策 economic policy |
| (ii) US military base: 55 words    | (viii) territorial disputes: 12 words |
| 米軍基地 US military base          | 北方領土 Northern Territories |
| 基地問題 military base issue       | 尖閣 Senkaku (Islands)   |
| (iii) education & welfare: 43 words| (ix) tax reform: 10 words |
| 少子高齢化 declining birth rate and aging population | 消費増税 sales-tax increase (abbreviation) |
| 待機児童 children wait-listed      | 消費税増税 sales-tax increase |
| (iv) historical issues: 25 words   |                         |
| 震安婦 comfort women               | TPP Trans-Pacific Partnership |
| 震安婦問題 comfort women issue     | 日欧 EPA Japan-EU Economic Partnership Agreement |
| (v) daily reports of Self-Defence Force: 22 words | (xi) reconstruction: 9 words |
| 日報問題 daily reports issue       | 復興支援 reconstruction support |
| イラク日報 Iraq daily report        | 震災復興 earthquake reconstruction |
| (vi) local autonomy: 17 words      |                         |
| 都構想 (Osaka) Metropolis plan      |                         |
| 大阪都構想 Osaka Metropolis plan   |                         |
Nouns in ‘legislation’ from the collected tweets and their frequency (English translation on the right side of the original words)

*The two most frequent words in each category are shown.

| (3) legislation | (vi) bribery: 6 words |
|-----------------|-----------------------|
| (i) constitutional revision: 107 words | (vi) bribery: 6 words |
| 憲法 the Constitution | 賄賂 bribery | 117 |
| 改憲 constitutional revision | 収賄 bribery (abbreviation) | 23 |
| (ii) security legislation: 41 words | (vii) Election Law: 6 words |
| 集団的自衛権 right of collective self-defence | 公職選挙法違反 violation of the Public Offices Election Law | 36 |
| 安保法制 security legislation | 公選法違反 Election Law violation | 36 |
| (iii) labour legislation: 38 words | (viii) the Act on SDS Protection: 4 words |
| 高度プロフェッショナル制度 highly professional system | 特定秘密保護法 the Act on SDS Protection | 39 |
| 労働法 labour law | 秘密保護法 the Act on SDS Protection (abbreviation) | 14 |
| (iv) IR: 17 words | (ix) others: 2 words |
| カジノ法案 casino bills | 皇室典範 Imperial household | 7 |
| カジノ構想 plan for casino | 連帯的夫婦別姓制度 optional dual-surname system | 2 |
| (v) conspiracy law: 11 words | | |
| 共謀罪 conspiracy law | | |
| テロ対策 counterterrorism | | |
APPENDIX 10

Nouns in four main categories from the collected tweets and their frequency (English translation on the right side of the original words)

*The three most frequent words in each category are shown.

| II: Specific names |
|-------------------|
| (1) assembly & administration: 1236 words | (3) political group name: 309 words |
| 国会 the Diet | 2735 自民党 Liberal Democratic Party (LDP) 2074 |
| 首相 prime minister | 2015 自民 LDP 936 |
| 政府 Government | 1999 立憲民主党 Constitutional Democratic Party of Japan 782 |

| (2) politician & administrative official: 1118 words |
|-------------------|
| 安倍首相 Prime Minister Abe | 3122 新潟県知事 Niigata gubernatorial election 515 |
| 安倍政権 Abe Government | 2445 衆院選 Lower House election 345 |
| 安倍総理 Prime Minister Abe | 996 衆院選情勢報道 situation report of Lower House election 288 |

| III: Overseas topics |
|-------------------|
| (1) external affairs: 377 words | (2) foreign affairs (of Japan): 87 words |
| トランプ大統領 President Trump | 757 外交 foreign affairs 422 |
| 来朝首脳会談 US-North Korea summit meeting | 411 日米首脳会談 Japan-US summit meeting 84 |
| トランプ氏 Mr. Trump | 372 日朝首脳会談 Japan-North Korea summit meeting 68 |

| IV: Political ideologies |
|-------------------|
| (1) right and left ideologies: 184 words | (2) nationalism: 67 words |
| リベラル Liberal | 197 反日 anti-Japan 173 |
| 右翼 right wing | 159 愛国心 patriotic spirit 168 |
| 左翼 left wing | 154 愛国 patriotism 96 |

| V: Political compound words |
|-------------------|
| (1) politics: 335 words | (3) election: 106 words |
| 政権 political power | 1531 選挙 election 1853 |
| 政治 Politics | 1512 らい選挙プロジェクト Rai Election Project 357 |
| 政治家 politician | 1109 選挙区 electoral district 235 |

| (2) (political) party: 253 words | (4) vote: 55 words |
|-------------------|
| 野党 opposition party | 2058 投票 vote 1033 |
| 党 (political) party | 1289 投票率 turnout 232 |
| 与党 ruling party | 771 投票所 polling station 98 |