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◆CONTENTS◆

The Effects of Generalized Trust and Group Identification on Social Support Networks and Feelings of Stress in Japan: Comparing Face-to-face and Instant Messaging[1]

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Abstract

   This study focused on international students (ISs) studying in Japan and investigated (a) the effects of their generalized trust and group identification on their social support networks (SSNs) with Japanese people, same-language speakers, and other-language speakers; (b) their SSNs formed through face-to-face (FTF) communication and instant messaging (IM) usage; and (c) whether these relationships differed between Chinese ISs and other ISs, as over 60% of ISs in Japan are Chinese, who more easily form in-groups than other ISs. A self-report questionnaire survey was conducted in 2018, and the following results were observed based on 209 valid responses. (a) ISs with higher levels of generalized trust felt less stress, while ISs with higher levels of group identification felt more stress. (b) ISs with higher levels of generalized trust were able to receive more social support from Japanese people and other-language speakers, but only social support from Japanese people helped decrease their feelings of stress in Japan. (c) ISs with higher levels of group identification tended to form larger SSNs with same-language speakers and received more social support from them, which in turn, led them to feel more stress. (d) The above results were found both in SSNs formed via FTF communication and through IM usage. (e) For non-Chinese ISs, their group identification did not lead them to receive more social support from the same-language speakers. The results suggest that it is necessary to distinguish the effects of generalized trust toward out-group members between Japanese people and other-language speakers when examining ISs' intercultural adaptation.

1. Introduction

Trust is fundamental to social life. Trust is described as people's belief in the good intentions of others— that is, the intentions of others not to do harm, to respect people's rights, and to carry out their obligations (Yamagishi, 1998). According to Yamagishi (1998) and Yamagishi and Yamagishi (1994), there are two types of trust: generalized trust and particularistic trust. Generalized trust is a general belief in human benevolence, suggesting that trustworthiness is an aspect of human nature and that most people can be trusted, with some exceptions. By contrast, particularistic trust or assurance arises from secure relationships with particular others.

Prior research has pointed out that these two types of trust may play different roles in the formation and maintenance of social networks. Since generalized trust encourages people to approach others to form social relationships, people with a higher level of generalized trust are more likely to cooperate with strangers compared to those with a lower level (Yamagishi, 1986). On the other hand, particularistic trust—assurance marked by emotional connectedness—may help people maintain narrow social relationships. Once relationships are formed, people may require a sense of emotional connection with those others to maintain secure and committed social relationships. Therefore, people may not feel encouraged to seek out new social opportunities by finding and forming new social relationships. This would be more obvious when people encounter out-group members.

International students (ISs) who study in Japan may feel strong assurance toward other ISs, especially those from the same country, as they share more similarities than differences and are therefore considered "in-group" members. Conversely, they may have a lower level of generalized trust toward others, especially local residents (hosts), who are considered "out-group" members owing to cultural differences, language boundaries, and so on. Based on this distinction, Ye (2018) found that ISs with higher levels of generalized trust were able to receive more social support from Japanese people, which led them to experience a greater sense of acceptance in Japan. No similar effects could be detected for those who received more social support from those with the same mother language ("same-language speakers" below). However, the effects of other-language speakers were not studied.

Another important factor that influences people's tolerance level is group identification. According to the social identity theory, the groups to which people belong are an important source of pride and self-esteem (Tajfel & Turner, 1986). Groups give people a sense of social identity— a sense of belonging to the social world (Tajfel & Turner, 1986; Shuter, 2012). To improve their self-image, people enhance the status of the group to which they belong. Therefore, people divide the world into an in-group (us) and an out-group (them). Based on these groupings, it is reasonable to believe that ISs with higher levels of group identification may tend to communicate with a greater number of same-language speakers, which would decrease their opportunities to communicate with Japanese people and other-language speakers. However, because there are also other-language speakers from other countries, it is necessary to clarify these roles as they may be categorized as "in-group" members when the definition is "non-Japanese speakers" but "out-group" members

when the definition is based on the "same mother language" and "same cultural background." Therefore, this study also compared the effects of generalized trust toward Japanese people and other language speakers.

Previous studies (e.g., Tanaka, 2000) have suggested that increased communication with hosts would be an effective way for ISs to better adapt to Japanese society. Forming stable and fruitful relationships with Japanese people is likely to lead to an enhanced ability to cope with stress and improve adaptation. Such beneficial relationships are known as "social support networks" (SSNs), a general psychological term referring to personal relationships expected to provide both tangible and intangible support and promote intercultural adaptation. Therefore, this study proposed the following hypotheses:

H1: ISs with higher levels of generalized trust will be able to form larger SSNs with Japanese people and other-language speakers and receive more social support from them. However, only social support from Japanese people will help them decrease their feelings of stress.

H2: ISs with higher levels of group identification will form larger SSNs with same-language speakers and receive more social support from them, which will, in turn, increase their feelings of stress in Japan.

Furthermore, compared to two decades ago, the spread of mobile devices and social media means that ISs use various kinds of media, especially instant messaging (IM) (e.g., WeChat, LINE), to communicate with same-language speakers, as IM allows ISs to use their mother language, rather than Japanese or English. This had led to a decreasing motivation and necessity for ISs to form "strong ties" with Japanese local people.

In fact, Kim (2003) conducted a survey in 2002 and found that ISs used cell phones to make voice calls to same-language speakers only rather than sending text messages to Japanese people. Therefore, she suggested that ISs' use of cell phone voice calls may inhibit their communication with Japanese people and thus hinder their understanding of Japanese culture, their acquisition of the Japanese language, and so on. Additionally, Ye and Murota (2014) conducted a survey in early June 2011 and found a significant relationship between ISs' communication media usage and adaptation situations. Their results indicated that cell phone usage (especially text messages) had a particularly positive effect on ISs' satisfaction improvement, with this positive effect exceeding that of computer usage. However, whether the communication partners were Japanese or same-language speakers was not clarified. Furthermore, Ye (2017) indicated that while face-to-face (FTF) communication could help decrease ISs' levels of maladaptation in Japan, communication through voice calls, IM, or email had no such effect, as these SSNs included a greater number of same-language speakers than Japanese speakers and other-language speakers. Therefore, this study proposed the following hypothesis:

H3: H1 and H2 will be more obvious when ISs communicate through IM than via FTF.

Regarding ISs' social support received from others, Jou (1993) found that this support could be categorized into four areas (research/study, human relationships, emotional, and environmental-cultural) and four types (tangible, mental, directive, and informational). Following on this finding, Ye (2018) indicated that, among the four areas and four types, ISs received most social support in the human relationship, emotional,

and environmental/cultural areas and of the mental and informational types from same-language speakers. They received most social support in the research/study and environmental/cultural areas and of the material, directive and mental types from Japanese people. On this basis, this study investigated the effects of social support from Japanese people, same-language speakers, and other-language speakers.

Additionally, in Japan, over 90% of ISs are from Asia, and over 60% are Chinese ISs (JASSO, 2020), who find it comparatively easy to form in-groups with other Chinese ISs. This is in contrast to others who may find it difficult to form in-groups with same-language speakers and might rely on Japanese people and other- language speakers. Therefore, this study also examined the following hypothesis:

H4: The previous three hypotheses will be obvious for those ISs, such as Chinese ISs, who find it easy to form in-groups, while they will be different for those ISs who do not find it easy to form in-groups.

Based on these findings and discussions, the present study investigated the model shown in Figure 1 and compared the differences and similarities between Chinese ISs and other ISs and their SSNs formed via IM and FTF. In Figure 1, "Demographics" refers to age, length of stay in Japan, length of learning of the Japanese language, Japanese and English language proficiency, and experience of doing a part-time job. The "SSNs with JSs/SLSs" includes ISs number of communication partners, communication frequency, and level of satisfaction with their relationships. For example, ISs with a shorter length of stay in Japan and/or shorter length of learning of the Japanese language and limited Japanese language may

have a strong group identification toward SLSs and rely on them to receive more social support, but such support may not help them fully understand the Japanese culture and improve their communication skills with Japanese people. Therefore, they may feel more stressed. This would be more obvious among Chinese ISs, as they easily form relationships with other Chinese ISs. On the other hand, ISs with a longer length of stay in Japan and/or longer length of learning of the Japanese language and higher level of the Japanese/English language proficiency may have a higher level of generalized trust and be able to communicate with more Japanese people to receive more social support. This will help them understand the Japanese culture, etc., and decrease their level of stress. Moreover, this will be more obvious among non-Chinese ISs, especially those who do not easily form in-groups.

2. Research Method

To examine the issues raised above, a self-report survey (pencil-and-paper version and web version) was conducted from June to July 2018.[2] We prepared the survey in Japanese, English, Chinese (Simple and Traditional), and Korean and allowed the ISs to freely select the version they wished to answer. The English version was translated by the author and received English-native speakers' proofing; the Chinese and Korean versions were translated by native speakers of Chinese and Korean, whose Japanese language proficiency was close to that of Japanese native speakers. All versions were confirmed by back translation. The participants were ISs enrolled at several general national universities in the Kanto Region of Japan. They received instructions (in either oral or written form)
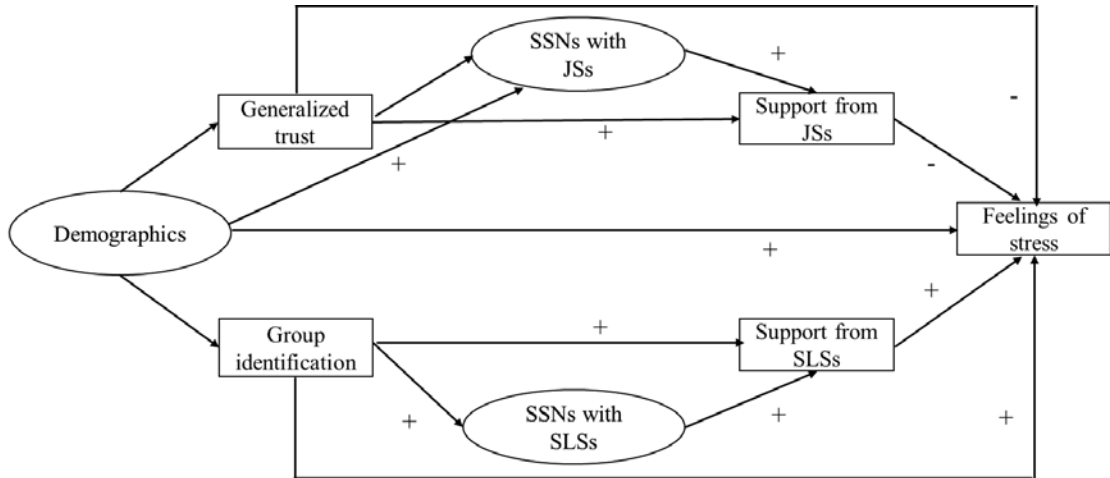
Figure 1. The model analyzed in this study

before answering concerning the storage of their data, free and informed consent, freedom to cooperate and withdraw without penalty in the case of not agreeing to cooperate, privacy and protection of personal information, and so on. A total of 213 ISs submitted their responses. Four incomplete responses were eliminated, and the remaining 209 responses were analyzed. When compared with the sample size in Ye (2017) and Ye (2018) of 99 and 206, respectively, the sample size in this study was considered to be sufficient. The questionnaire survey included three parts: Part A, Part B, and Part C. The content in each part was as follows:

Part A gathered personal information, which included demographic data (e.g., gender, age, nationality, and academic standing), total length of stay in Japan, Japanese language learning history, level of Japanese language ability (score and level from the Japanese Language Proficiency Test (JLPT), and self-evaluation of Japanese language proficiency in reading, listening, speaking, and writing as compared to an adult native Japanese speaker, reported as a percentage),[3] English language ability (score on TOEFL-iBT, TOEIC, and self- evaluation of English language proficiency in reading, listening, speaking, and writing as compared to an adult native English speaker, reported as a percentage),[4] living situation, experience with/ frequency of doing part-time jobs, and so on (see Table 1 for details).

Additionally, 13 items were chosen from Yamagishi and Yamagishi (1994) to measure the participants' level of generalized trust. A further 12 items were chosen from Karasawa (1991) to measure group identification. In this study, in addition to other scales, the respondents were asked to use a five-point scale ("5. Strongly agree"; "3. Neither"; "1. Strongly disagree") to rate each of the items.

Part B measured the ISs' use of media, including regular smartphones, computers, daily time spent accessing the Internet via these devices ("8. Over 6 hours"; "1. Don't use"),[5] and the most frequently used social media. This part of the study gathered information about participants' SSNs through FTF and IM communications. Following Tanaka's (2000) definition, "SSNs" were defined as *"important*

relationships in their daily lives," and the ISs were asked to list UP TO 10 people they had met in person or sent instant messages to over the previous three months for important conversations. For each SSN, the ISs were asked to provide their contact person's gender, age, nationality, relationship, frequency of contact (from "5. Almost every day" to "1. Seldom meet"), and place of residence (Japan; Home country; Other country/region) and to rate their satisfaction with that person ("5. Very satisfied"; "3. No preference either way"; "1. Not satisfied at all"). Additionally, the ISs were asked whether the person(s) listed in the SSNs via IM was/were also listed in those via FTF, and so on (Table 2).

Part C addressed the ISs' feelings of stress using 11 items ("5. Very much" to "1. Not at all") chosen from Tanaka (2000). The 14 items for social support were chosen from Okunishi and Tanaka (2008), and the respondents were asked whether they received social support from each of three specific groups: Japanese people, same-language speakers, and other-language speakerss[6] (Table 3).

3. Results

3.1 Descriptive results

Table 1 reports the details of the respondents included in the study: 94.3% of the analyzed ISs were regular course students. The top five nationalities were Chinese (including ISs from Hong Kong), South Korean, Indonesian, Thai, and Vietnamese, which shows a similar distribution to national survey results (JASSO, 2020). Over one third of the ISs had passed the JLPT Level 1, and over 80% had taken at least one of the English tests. This study conducted a *t*-test (independent example) to examine gender

differences among these variables.[7] The results indicated no significant differences among these variables except for the length of learning of the Japanese language (t(192.8)=11.43, p<.05, male vs. female: 34.76 vs. 46.18).

As Table 1 shows, more than 40% had received scholarships, over half of which were from MEXT, but only one third had a daily part-time job, which meant that 2/3 did not have many opportunities to communicate with Japanese people off the campus. Furthermore, over half of them used computers to access the Internet for over four hours, which was longer than smartphone use.

3.2 Configurations of SSNs and social support

Prior to examining the relationship shown in Figure 1, this study investigated the configuration of each SSN. As indicated in Table 2, which shows the average number of people interacting via IM and FTF and their relationships, the largest number was in the category of SLSs via IM usage, followed by SLSs via FTF, and Japanese people via FTF. The results show that over half of the communication partners met in person were also contacted by IM. And these had no relationship with gender.

Table 3 shows the social support that ISs received from Japanese people, same-language speakers, and other-language speakers. The results show that ISs received the most social support from same-language speakers in the human relationship and emotional areas and the material and informational types. They received the most social support from Japanese people in the research/study area and type of mental, area of environment/culture and types of directive and informational. This study further considered whether such support might vary based on

Table 1. Analyzed ISs' information

Gender ratio	Males: 46.9%	Females: 52.6%	Other: 0.5%
Age (in years)	24.5 years (SD: 4.4)		
Academic standing	Undergraduate: 39.2% Master's: 34.0% Doctoral: 21.1% Research/Special research students: 4.8% Others: 1.0%		
Nationalities (Top 5)	Chinese: 49.4% Korean: 7.7% Indonesian: 7.2% Thai: 4.3% Vietnamese: 3.3%		
History of stay in Japan	31.1 months (*SD*: 21.4)		
History of learning Japanese	41.1 months (*SD*: 38.9) (JLPT-N1/L1 holders: 34.9%)		
English language abilities[2]	TOEIC: 37.8% TOEFL: 29.2% IELTS: 17.2% Other: 1.9%		
Living place	University dormitory: 24.9% Dormitory for ISs only: 12.4% Private rental housing: 60.3% Rental/house share for foreigners: 1.0% Other: 1.4%		
Living with someone	Alone: 52.5% With other ISs: 32.3% With family/relatives: 9.1% With Japanese students: 2.0% Other: 4.0%		
Scholarship	Yes: 44.5% (MEXT: 60.3% Private: 21.6% Other: 18.1%) No: 55.5%		
Daily part-time job	Yes: 33.0% No: 67.0%		
Internet time (Computers)	Don't use: 1.0% -1h: 7.2% 1-2h: 12.0% 2-3h:14.8% 3-4h: 12.4% 4-5h: 14.4% 5-6h: 10.0% Over 6h: 28.2%		
Internet time (iPhone/Android)	Don't use: 0.0% -1h: 3.8% 1-2h: 17.2% 2-3h: 18.2% 3-4h: 22.5% 4-5h: 13.4% 5-6h: 5.7% Over 6h: 19.1%		
Internet time (iPad etc.)	Don't use: 63.6% -1h: 15.8% 1-2h: 10.0% 2-3h: 3.3% 3-4h: 2.9% 4-5h: 1.4% 5-6h: 0.5% Over 6h: 2.4%		

Table 2: ISs' SSNs formed through IM and FTF

	Total (same gender vs. cross-gender)	Japanese	SLSs	OLSs
IM				
Number of contacts	6.11 (3.73 vs. 2.47)	1.12	4.16	.84
Contact frequency		3.89	10.53	2.86
Satisfaction with partners		4.91	18.87	3.45
FTF				
Number of contacts	4.15 (2.51 vs. 1.63)	1.35	2.03	.77
Contact frequency		4.93	6.89	2.85
Satisfaction with partners		5.80	8.81	3.28
Same person between IM & FTF		.60	1.38	.40

Table 3: ISs' social support received from others

Received social support	Nationality		
	JSs	SLSs	OLSs
1. Explained the Japanese to me when I did not understand it, even after reading or listening to it	90.4%	73.7%	51.7%
2. Corrected my mistakes in Japanese when writing or speaking	75.1%	56.0%	38.8%
3. Explained Japanese culture and customs to me	38.8%	68.4%	46.9%
4. Became interested in my country's culture and customs and tried to understand them	82.8%	59.8%	65.1%
5. Helped me finish my homework and pass examinations	45.0%	47.8%	39.2%
6. Helped me conduct my research	58.4%	44.5%	38.8%
7. Could be consulted when I experienced personal problems	47.4%	84.2%	45.9%
8. Encouraged me when I did not do well	57.4%	83.3%	54.5%
9. Invited me for dinner at home or had dinner on/off-campus	67.9%	86.6%	58.9%
10. Went out for leisure and to have fun together	58.9%	85.6%	60.3%
11. Gave me necessary/useful items	60.8%	83.3%	56.0%
12. Lent me money when I needed it	26.8%	63.2%	27.8%
13. Provided useful information for my life in the local area	81.3%	81.3%	57.4%
14. Told me how to conduct necessary procedures and provided information about important notices at the university	72.2%	74.2%	50.7%

Table 4: ISs' feelings of stress in Japan

Items	*Mean*
1. Understanding the real meaning of vague and unclear Japanese expressions	3.12
2. Completing necessary daily life tasks, for example, throwing away garbage, preparing meals, or washing	2.49
3. Maintaining good relationships with Japanese people with whom I am in contact in my daily life	2.84
4. Knowing that once I leave my room, I enter a Japanese language world	2.17
5. Being in a situation in which Japanese people are laughing cheerfully, but I do not find it funny	2.74
6. Experiencing difficulty obtaining necessary daily living information	2.59
7. Wanting to study the Japanese language but not having an opportunity to practice it	2.60
8. Experiencing difficulty having intimate relationships with Japanese students	3.17
9. Getting special treatment because I am a foreigner	2.56
10. Feeling anxious about being in an emergency situation such as having a serious illness, being injured, and so on	2.89
11. Being ignored when asking a Japanese person something or trying to join their conversations	2.44

gender, and the results indicated that females received more social support from same-language speakers than males ($t(185.24) = 1.403$, $p<.01$, males vs. females: 9.22 vs. 10.63).

3.3 Internal reliability for each scale

This study confirmed each scale's internal reliability by calculating its Cronbach's a : .86 for generalized trust, .88 for group identification and .81 for feelings of stress. These scales all showed very high internal reliability. Therefore, this study used the total scores for each scale in the following analysis. This study also conducted an independent *t*-test to confirm whether there were any differences due to gender. The results indicated no differences among these scales.

3.4 The relationships between generalized trust /group identification, SSNs, social support, and feelings of stress

This study conducted SEM analysis to test the relationships as Figure 1 shows, comparing IM and FTF (Figures 2–5). Additionally, this study conducted multi-group SEM to detect whether the relationships would differ between Chinese ISs and non-Chinese ISs. As a result, the goodness of fit of the model for Chinese ISs was not high enough to adopt; therefore, only the relationships for non-Chinese ISs comparing FTF and IM between Japanese people and same-language speakers could be detected (Figure 6). All the indexes, parameter estimates, and goodness of fit are shown in Figures 2–6.

The following commonalities could be found: (a) Generalized trust had a direct effect on decreasing feelings of stress, while group identification had a direct effect on increasing feelings of stress. (b) Group identification had a direct positive effect on receiving more social

support from same-language people, which, in turn, increased feelings of stress when including both Chinese ISs and non-Chinese ISs. (c) Generalized trust had no effect on SSNs with Japanese people or other-language speakers, while group identification had a positive effect on SSNs with same-language speakers.

Meanwhile, the results indicated that (a) generalized trust had a positive effect on receiving more social support from Japanese people and other-language speakers, but only social support from Japanese people helped decrease feelings of stress. (b) In the case of IM usage, there were slightly significant effects of demographic factors on SSNs with Japanese people, but no similar effects could be found in terms of FTF; moreover, demographic factors had significant effects on SSNs with other-language speakers among non-Chinese ISs when communicating via IM. (c) Group identification showed a positive direct effect on social support from same-language speakers when including both Chinese ISs and non-Chinese ISs, but no similar effects could be found among non-Chinese ISs.

4. Discussion

The present study investigated the effects of ISs' generalized trust and group identification on their social networks with Japanese people, same-language speakers, and other-language speakers formed through IM usage and FTF communication. Additionally, this study examined whether these relationships would differ between Chinese ISs and non-Chinese ISs, as the former more easily form in-groups with other Chinese ISs.

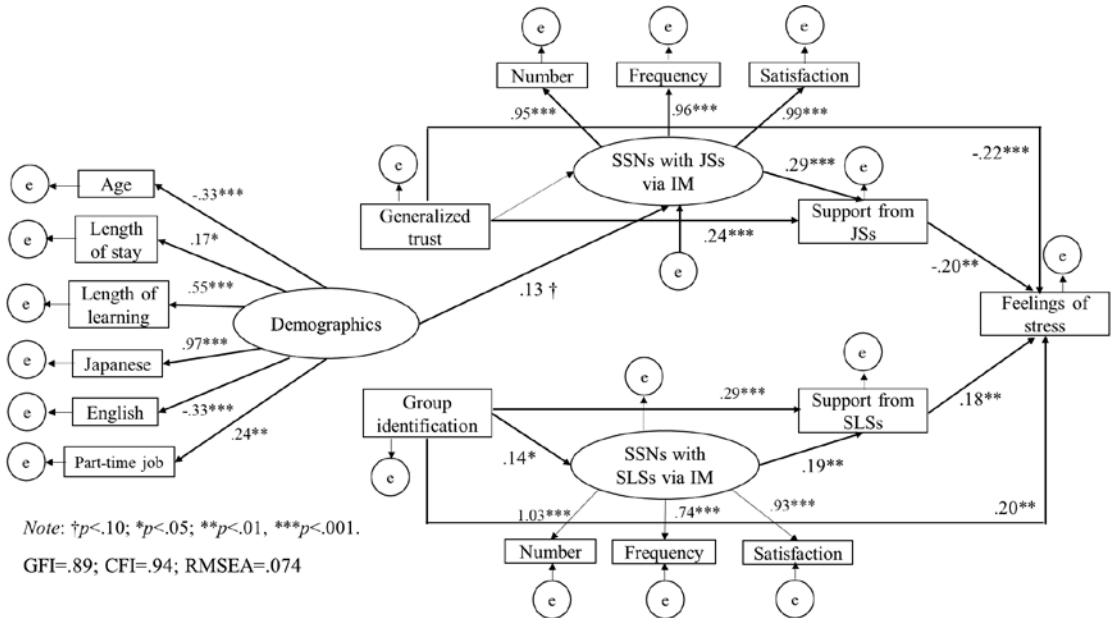The results indicated that, when including

Figure 2. Results for IM usage (Entire: Japanese vs. Same-language speakers)
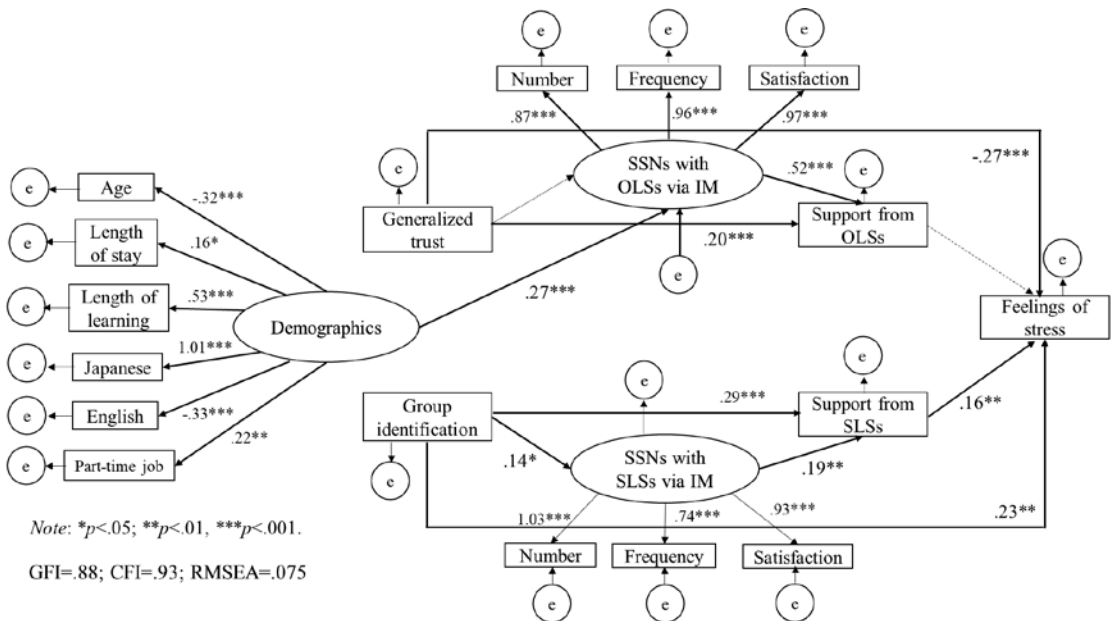

Figure 3. Results for IM usage (Entire: Other-language speakers vs. Same-language speakers)

both Chinese ISs and non-Chinese ISs, those with higher levels of generalized trust were able to receive more social support from Japanese people and other-language speakers. However, only social support from Japanese people helped decrease their feelings of stress (H1). One of the main reasons for this might be the type of social support received. As Table 3 shows, ISs received
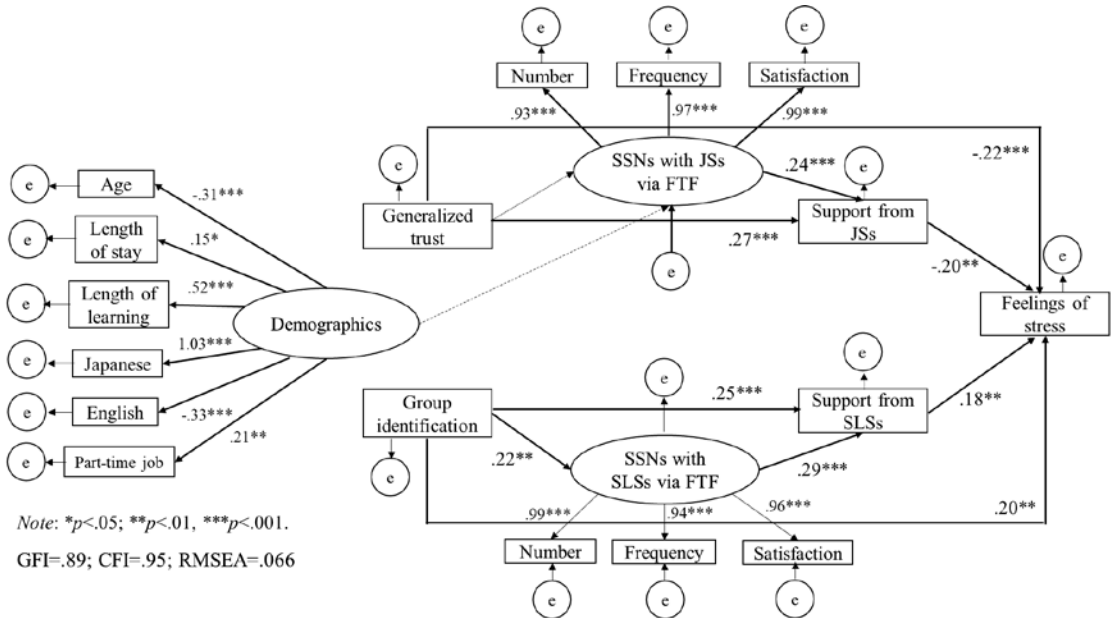
Figure 4. Results for FTF communication (Japanese vs. Same-language speakers)
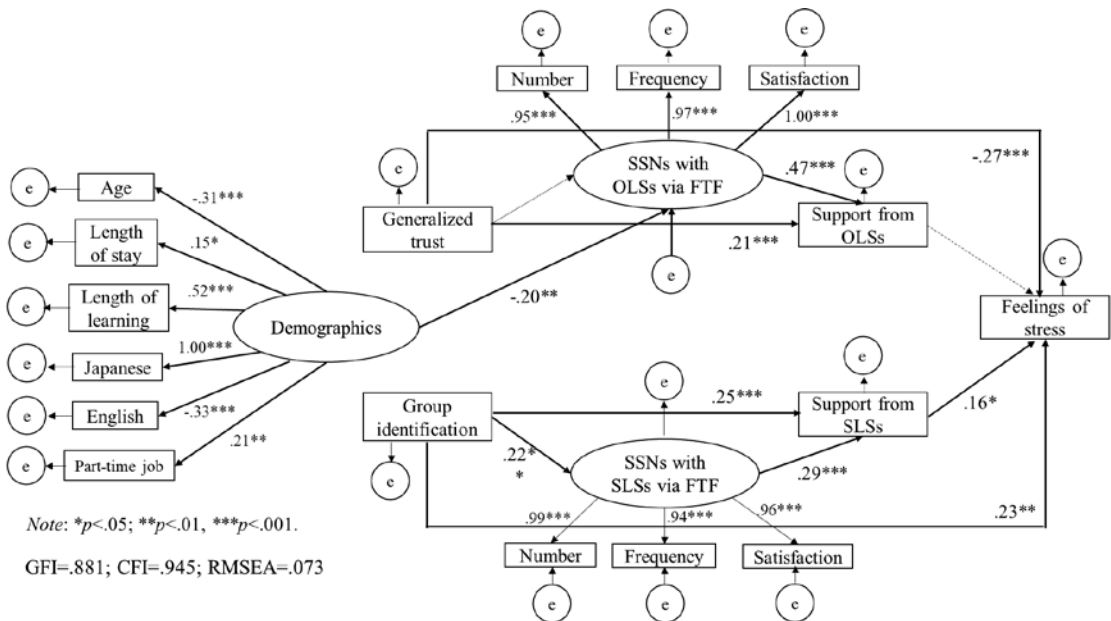

Figure 5. Results for FTF communication (Other-language speakers vs. Same-language speakers)

most social support from Japanese people in the area of environmental-cultural and the type of informational, etc., which helped them adapt better. By contrast, ISs received the least social support from other-language speakers overall compared to same-language speakers and Japanese people. These results indicate the necessity of distinguishing ISs' generalized trust
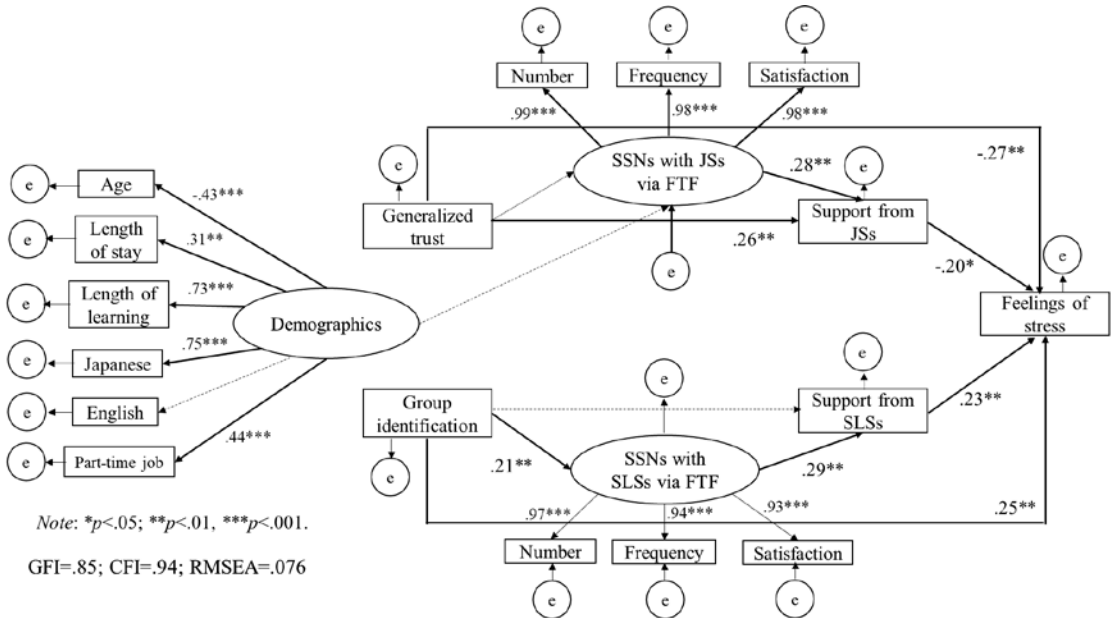
Figure 6. Results for FTF communication (Non-Chinese: Japanese vs. Same-language speakers)

Table 5. The average number of ISs' SSNs in different period

Different	FTF: Total			IM: Total			Contact persons via IM		
studies	JSs	SLs	OLSs	JSs	SLs	OLSs	in Japan / Home country / Other		
Tanaka (2000)	4.14	7.76 2.56	1.06						
Ye (2017) *		8.66 & 8.90 3.77 & 3.78			7.74 & 7.99 5.09 & 5.20		T1: 4.46 T2: 5.43	3.28 2.56	
This study	1.35	4.15 2.03	.77	1.12	6.11 4.16	.84	3.26	2.29	.41

* *Note*: Ye (2017) conducted a panel survey that measured the ISs' SSNs in July 2014 and December 2014.

toward Japanese people from other-language speakers, as they were all treated as "out-group" members traditionally.

It was also expected that ISs with higher levels of generalized trust would be able to form larger SSNs with Japanese people and other- language speakers and receive more social support from them. Although ISs with higher levels of generalized trust did receive more social support from Japanese people and other-language

speakers, no effects could be found on their forming SSNs with them. One of the main reasons might be the small size of their SSNs. Table 2 indicates that the average number of same-language speakers was four times that of Japanese people and other-language speakers in SSNs formed via IM. Even for SSNs formed via FTF communication, the average number of same-language speakers was larger than that of Japanese people and more than twice that of

other-language speakers. In fact, the number of ISs' SSNs (both FTF and IM) was smaller compared to previous studies (Table 5). In particular, the percentage of same-language speakers in both FTF and IM was higher compared to previous studies, which was higher in IM (68.1%) than FTF (48.9%). In addition, the ratio of contact person in home countries was higher than in Ye' study (2017). This was consistent with the possibility that IM usage promote ISs' selective interpersonal relationships, as they can type messages and talk in their mother language by using IM in this "mobile X social" period that Ye (2017) described. In this sense, H1 was partly supported and H3 was almost supported.

Additionally, ISs with higher levels of group identification formed larger SSNs with same-language speakers and received more social support from them, which increased their feelings of stress in Japan (H2). As Table 3 shows, ISs received the most social support from same-language speakers in the areas of human relationships (e.g., personal problem solving) and emotional, and the type of tangible (e.g., money lending), yet these support did not help them fully understand the Japanese culture or learn the Japanese language. Therefore, as they remained unable to understand the Japanese communication style and behaviors, their stress did not decrease.

Furthermore, when dividing the ISs into Chinese and non-Chinese, the results showed that the group identification for non-Chinese ISs had no direct effect on the social support received from same-language speakers through FTF communication (H4). As previously mentioned, over 60% of the ISs in Japan were Chinese, meaning there were fewer opportunities for non-

Chinese ISs to form in- groups with their same-language speakers and receive social support from them. These results suggest that group identification has different effects on receiving social support from same-language speakers between Chinese ISs and non-Chinese ISs.

One reason that no model with high goodness of fit can be found for Chinses ISs would be the difficulty in defining "same-language speakers." According to previous studies, "same nationality" means "same-language speakers." Based on this, this study included ISs from Hong Kong as Chinese ISs, who may have different perceptions compared to those from mainland China. This suggests that it is necessary to divide them up more concretely.

5. Implications and future work

5.1 Implications

The results indicated that raising ISs' generalized trust of Japanese people would be helpful for receiving more social support from Japanese people, which could help decrease their feelings of stress in Japan. For ISs with a higher level of group identification, receiving more social support from same-language speakers does not help decrease their feelings of stress in Japan. As ISs prefer to use IM to communicate more with same-language speakers than with Japanese people, it is necessary to aware that such usage could inhibit their communication with Japanese people from the perspective of better understanding of the Japanese culture and learning of the Japanese language.

5.2 Future work

To date, the definition of "same-language speakers" has been based on "nationality," which does not necessarily apply to some ISs. For

example, some non-Chinese ISs used the Chinese version to answer the survey, although English is one of their official languages. Based on existing theory, this study categorized them as "non-Chinese ISs." However, it is possible that these ISs might have different perceptions and consider Chinese ISs as "same-language speakers." It is necessary to reconsider the definition of it in the future.

It is necessary to note the generality of the findings in this study, as over 95% of the analyzed targets were regular course students in general national universities in the Kanto Region. The present study did not provide any findings for ISs enrolled in private universities, vocational schools, or junior colleges. Furthermore, this study did not investigate how ISs' motivation relates to their adaptation, as previous studies indicated that different factors influence ISs' academic and social/cultural adaptation. In the future, it would be necessary to examine how ISs' motivation relates to the two kinds of adaptation and to consider interactions with the sociolinguistic environment.

Notes

1) Parts of the results have been reported in the 13th Biennial Conference of the Asian Association of Social Psychology (AASP) (2019) and SIETAR Japan 34h Annual Conference (2019).

2) The survey was conducted with the approval of the Research Ethics Review Board at Faculty of Library, Information and Media Science, University of Tsukuba.

3) Japanese Language Proficiency was calculated as follows: (a) For ISs who had passed JLPT-L1/N1, it was calculated as L1 score/400 or N1 score/180. (The total score of L1 is 400 while N1 is 180.); (b) For ISs who had passed JLPT-L2/N2, it was

calculated as L2 score/400 x .08 or N2 score/ 180 x .08. (L2/N2's level is approximately 80% of L1/ N1's.); (c) For ISs who did not take the JLPT, it was calculated as: (self-evaluation percentage of "listening" + "speaking" + "reading" + "writing")/400.

4) As TOEFL and TOEIC have different standards, English ability was calculated as follows: (a) For a TOEIC score over 950, TOEIC score/10 + 8; for a TOEIC score of 901–950, TOEIC score/10+4; for a TOEIC score of 851–900, TOEIC score/10 + 3, and so on; (b) For those who did not take any test, proficiency was calculated as (self-evaluation percentage of listening + speaking + reading + writing)/400.

5) Following Ye et al. (2017), the frequency of Internet use was converted as monthly; namely, "6" was counted as "30," "5" was counted as "25," "1" was counted as "0."

6) This study calculated the score of each item for social support as "1" when it was chosen and "0" when it was not chosen and added up.

7) Since "gender" is a nominal scale, this study coded male as "0," female as "1" and other as "2" when conducting analysis.

Acknowledgement

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Fragmentation and Dynamics of Echo Chambers of Turkish Political Youth Groups on Twitter

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Abstract

Aiming to contribute to the debate whether the Internet and in particular social networks are leading to echo chambers of fragmented groups or to public sphere, this article investigates the dynamics of echo chambers of followers of Turkish political youth groups on Twitter. It focuses on two classes: Official youth organizations of ruling party and main opposition party, and one independent group. Retrieving over 40 million tweets of 30 thousand followers of these groups, 5.5 million interactions between 2016 and 2018 were analyzed. Strong echo chambers are found, and no weakening observed with a small-scale exception through cross-ideology exposure by individuals following two groups. The results are discussed along with the political lines and the independence level of the groups.

1. Introduction

The emergence of the Internet and in particular social media has unprecedentedly enabled the interactions of individuals among the world. It gave rise to a fundamental debate whether it is leading to favoring the democracy by ensuring individuals easy access and even exposure to widespread viewpoints, or hindering the improvement of democracy. In the former case, the communication media have a potential to evolve to a public sphere through exposure to different or even opposite ideologies with a significant and effective volume of interactions. However in the latter case, the interactions between different minded groups are limited and significantly less effective than the interactions within each group, forming and reinforcing the so-called "echo chambers", potentially leading to group polarization (see Sunstein (2001); Sunstein (2002)). Studying online political conversations on a single- or multi-country basis, an intense effort has been devoted to contributing to this debate.

Online political discussions in Turkey are held mostly on Twitter. Along this line, focusing on the dynamics of the interactions between the followers of Twitter accounts of three largest political youth groups of Turkey in a period of three years, this study analyses whether the echo chambers of these fragmented groups are reinforced or weakened over time on Twitter. It also analyses the role of deliberative cross-ideological exposure in the weakening of the echo chambers. In order to establish a concrete basis for this study, the relevant previous works are introduced below.

1.1 Literature Review

Early studies of online communication favored the first side of this debate. For example, Gentzkow and Shapiro (2010) found that the level of online fragmentation is much lower than the fragmentation in the face-to-face human interactions, and also claimed that they found no evidence for the increase of fragmentation on the Internet. Lee et al. (2014) found that online political discussions can moderate the political polarization. In a more recent work, Boxell et al. (2017) found that the political polarization is on the rise in the US mostly among individuals who less likely use the Internet and social networking sites.

However, some of the recent literature favors the other side of the debate. That is, this emergence also expedites people to gather around the same ideological lines on online platforms and interact mostly to those having similar or even same perspectives towards group polarization (see Sunstein (2002)), raising a threat to democracy. Studies on online fragmentation, echo chambers and polarization cover a wide range. Analyzing 30 thousand tweets on abortion (after the shooting of an abortion doctor on May 31, 2009), Yardi and Boyd (2010) studied the dynamics of group polarization over time. They found that although similar minded people strengthen group polarization, interactions between different minded people lead to weaken the polarization over time via exposure to broader perspectives. Focusing on two distinct types of Facebook groups, i.e. one on conspiracy theories and the other on scientific information, Quattrociocchi et al. (2016) found quantitative evidence of echo chambers on social media.

On the other hand, online political fragmentation and its consequences have become

core issues in the field (see Papacharissi (2002); Dahlberg (2007)). In order to provide a large-scale multi-country analysis on extremism due to online political fragmentation, Bright (2018) studied the discussion activities of 115 political groups among 26 countries and found that the more people get ideologically extreme, the less they tend to interact with the other extremes in different ideologies. Very recently, analyzing the political commenting of around 700 thousand people, Bond and Sweitzer (2018) found that the increase in the engagement in politics lead to an increased communication between ideologically dissimilar people and decreased homophily. Barbera (2014) showed that the online fragmentation is in accordance with the offline measures. Analyzing Facebook interactions of liberal and conservative partisan news organization pages, echo chambers are observed, and political orientation segregates partisan political discussions on social media (Jacobson et al (2015)).

Because online political fragmentation cannot be independent from the unique cultural aspects, it was also investigated on the basis of countries. Analyzing the interactions of 10.1 million US Facebook users with news shared on social media, Bakshy et al. (2015) found ideological homophily in friend networks, and in their work, Colleoni et al. (2014) also measured homophily in Twitter. Conover et al. (2011) focused on the political alignment of Twitter users, and Colleoni et al. (2014) focused on the structural differences of homophily of Democrats and Republicans in the US. Performing content analysis on the network of selected political topics regarding 2010 midterm elections, Himelboim et al. (2013) found that because the clusters of Twitter users in the US are usually politically homogeneous,

they are rarely exposed to cross-ideological content. Analyzing Twitter data during 2011 national elections, Aragon et al. (2013) found evidence of balkanization of the Spanish online political conversation. As Switzerland is a unique country with a fragmented party system and strong federalism, Rauchfleisch and Metag (2015) studied the political communication of Swiss politicians on Twitter. Analyzing the online interactions towards 2011 federal elections, Garcia et al. (2015) found a strong polarization in the online political network. Analyzing around six thousand tweets during 2011 federal elections in Canada, Grudz and Roy (2014) found evidences for both political polarization, and potential for cross-ideological interactions. Supporting the analysis of around 700 thousand South Korean Twitter users' activities with survey data, Hahn et al. (2015) showed how news following on Twitter is sharply polarized due to selective exposure. On the other hand, studying Facebook data of the UK and Italy regarding the consumption of political information, Casteltrione (2014) argued how social networking could reduce political fragmentation and polarization via reducing the level of selective exposure.

According to Dahlberg (2007), both sides of this debate -whether the Internet is leading to echo chambers of fragmented groups or to an expanded public sphere- make their observations on very 'small pool' of data and also the data are usually used selectively. Research based on surveys or content analyses usually concentrate on a small set of 'significant issues'. What is more, although more research is needed, the underlying assumptions should not contain flaws, which usually arise from to Habermasian theory.

1.2 Research Gap and Research Questions

In this subsection, we describe the research gap we address and the research questions we rise in this work. As stated above, political fragmentation, echo chambers and polarization in a country are inseparable from the unique socio-cultural aspects from it. Furthermore, countries with a dense political agenda provide a fruitful environment for research.

Focusing on Turkey, which has been facing harsh political experiences and the polarization of the society is argued to increase sharply during the last decade, this article aims to contribute to the debate in the light of the arguments of Dahlberg (2007) within a dynamical perspective covering a three-years period. To name just a few, the rise of political Islam through AKP (Justice and Development Party) and Gulen movement during the last decades, Syrian war and immigration issues, Gezi Park Protests in 2013, the conflict appeared between AKP and Gulen movement which resulted in a failed coup attempt in 2016, and the regime change from parliamentary to a so-called 'Turkish-style presidential' in 2018 make this country an interesting cradle for research in this field. Gezi Park Protests has been the first big case in Turkey that social media played a key role, leading up to studies such as Haciyakupoglu and Weiyu (2015), Ogan and Varol (2017), Varol et al. (2014), and Budak and Duncan (2015).

However, to the best of our knowledge, a comprehensive study on online political fragmentation and echo chambers in Turkey is missing. As the youth is in the center of most of these political experiences such as Gezi Park Protests, such a study focusing on Turkish youth becomes even more prominent. Hence, we ask our main research questions (RQs) as follows.

RQ1: Are there strong echo chambers between fragmented groups, namely the followers of the political youth organizations?

RQ2: If there are, do these echo chambers reinforce or weaken over time?

RQ3: Do the strength of echo chambers depend on the type of the youth group, i.e. whether it is a political party's official organization, or an independent political organization?

On the other hand, despite the efforts to detect 'who tweets' using Twitter data (see Sloan et al. (2015)), it is generally not known directly who is young, making it difficult to study youth participation in politics on social media. Hence, this study chooses a different direction. Rather than attempting to detect young people on Twitter, the study focuses on the political youth groups. Instead of 'young people' directly, this article claims to study on the followers of the Twitter accounts of political youth groups. This way, the first step in the fragmentation research which is generally to detect the individuals forming fragmented groups is already achieved in the present work.

In order to contribute to the efforts on youth participation in politics as well from a structural viewpoint, this article studies the youth groups in two classes. First one is the official youth organizations of political parties. In this class, the youth organizations of the two biggest political parties of Turkey, i.e. ruling party and the main opposition party are studied. The second class is the independent political youth group, and the largest group in this class is studied. Hence, spanning a 3-year period, the dynamics of echo chambers of the followers of fragmented political youth groups is analyzed. The method of this study follows the critics of Dahlberg (2007). That is, in order to avoid from being selective and from

sticking to a small set of 'significant issues', rather than a topic or hashtag basis or a content analysis, the whole space of interactions on Twitter between the groups are studied. To make observations on a 'big pool', over 40 million tweets of around carefully selected 30 thousand individuals were analyzed.

This article is organized as follows. In the next section, political youth groups in Turkey under consideration and their ideological lines are introduced. Next, the method for retrieving and analyzing the data are presented. The results are discussed in a theoretical perspective, which is followed by the conclusion.

2. Political Youth Groups in Turkey

In order to provide a through insight to this study, a brief introduction to the political groups in consideration is given in this section. The official youth organizations of political parties in Turkey consist of the official members of the parties below a certain age. Rather than focusing on youth issues, these youth organizations directly follow the general politics of the party. On the other hand, following their ideological lines, independent political youth groups create their own policies. This study focuses on the official youth organization of the ruling party, AKP (Justice and Development Party) and main opposition party, CHP (Republican People's Party), and the largest independent political youth group TGB (Youth Union of Turkey).

2.1 AKP

The party AKP was founded in 2001 and has been the ruling party since 2002 elections. AKP claims to be a 'conservative democratic party', and Islam has been the core value of the party.

Locating in the central right, the supporters of AKP do not follow strict ideological line, but rather span a wide spectrum. The main issues creating fragmentation among Turkish people are secularism, headscarf rights, Kemalism, human rights, youth politics and economy. AKP has been in the center of these issues, usually receiving serious criticism for polarizing the people ideologically.

2.2 CHP

Established in 1923 and though experienced several transformations during the last century, CHP is the founder party of the modern Turkish Republic, claiming to follow the six basic principles of Kemal Ataturk: Republicanism, Populism, Secularism, Reformism, Nationalism and Statism. However, in the last decade, CHP is criticized to be moving away from these principles, in particular for the candidates and political alliances during the elections. Being a central left party, CHP covers a very wide range of ideologies, mainly social democrats and also including a spectrum from radical leftists to people who define themselves as not even leftists but only republicans.

2.3 TGB

Established in 2006 through the union of 65 student clubs (most of them being Ataturk's Thought Clubs) at 40 universities, TGB (Youth Union of Turkey) is the largest independent political youth organization, currently organized in 65 universities and hundreds of high schools in 70 cities. Claiming to be Kemalist, patriotic, secular and anti-imperialist, TGB follows a strict ideological line.

At the first glance, the ideological line of TGB may look similar and even overlapping to the

(claimed) line of CHP up to some point, and strictly against to the line of AKP. However, in the daily politics, some serious conflicts emerge between TGB and CHP, and reconciliations take place between TGB and AKP. Due to such conflicts and reconciliations over time, a variable volume of face-to-face and online interactions can be expected between these fragmented groups.

3. Methodology

An unbiased analysis spanning a long period for detecting the strength and the dynamics of echo chambers among fragmented groups require to make no assumptions based on the daily political issues. Hence, analyzing the pure volume of interactions within the groups and between the groups over time can also shed light onto question whether temporal conflicts and reconciliations have a significant effect on the dynamics of echo chambers.

In order to analyze the dynamics of the interactions between the carefully selected subsets of the followers of the Twitter accounts of the political youth groups in concern, the data of this study covering the range from January 1, 2016 to December 31, 2018 were retrieved from Twitter during January 2019, using Tweepy library for Python programming language (Tweepy, 2010). Finding the volume of intra- and inter-group interactions, the obtained numbers reveal the strength of echo chambers of each political youth organization for each year. Observation in the 3-years period shows whether the echo chamber of each group is weakened or reinforced with respect to time, indicating the disposition to group polarization (Sunstein (2002)). In details, the basic steps of the method are as follows:

I. The followers of the official Twitter accounts of the three groups in concern were detected, namely

(i) *@AKGenclikGM*:   Official   youth organization of AKP,

(ii) *@chpgenclikgm*: Official youth organization of CHP,

(iii) *@genclikbirligi*: TGB, the independent political youth organization.

II. In order to eliminate the accounts which cannot be considered as reflecting the nature of the political youth groups, filters were applied to each set of followers according to the criteria below:

(i) Verified accounts (with blue tick). These accounts usually belong to politicians, journalists, celebrities etc.

(ii) Accounts with screen names consisting of eight consecutive digits. These accounts are usually maintained automatically.

(iii) Accounts with screen names including the abbreviations AKP, CHP, TGB, etc. These accounts usually belong to party or group professionals, not natural followers.

III. The common followers of the groups were detected and labeled as listed in Table 1.

IV. Due to the rate limits of Twitter, because it would be infeasible to retrieve all the tweets of all the users in sets A, C and T (making more than half million), commensurate subsets A^S, C^S and T^S were picked as follows. There are users with too many or too few tweets that potentially unbiased the results. Hence, rather than a random sampling, we sorted the users in each set, i.e. A, C and T by their total number of tweets. We compared these sorted sets with respect to total number of tweets of the users. We found that taking 5% of each set with an upper bound of 30.000 tweets leads to subsets A^S, C^S and T^S with

comparable numbers of tweets, excluding the users with too many and too few tweets.

V. The tweets of the users in the subsets A^S, C^S and T^S were retrieved. Note that, the tweets of the users following more than one group (such as the sets AC or AT) were not retrieved because it is not possible to determine exactly which user actually belongs to one group, and also following the other group. The intersecting sets and the subsets are illustrated in Figure 1.

VI. Each retrieved tweet was checked if it is a *Retweet*, *Retweet with Comment*, or *Reply*, constituting an interaction with a target user (whose tweet was retweeted or received a reply). If so, the target user was searched among the seven sets listed in Table 1. If found, the relevant counter was incremented.

Please note that the sets of the follower accounts are fixed (according to Steps I-IV), and then their tweets are retrieved at once for the three-years period (according to Step V). Hence, the results are not affected from the change of the followers during that three-years period.
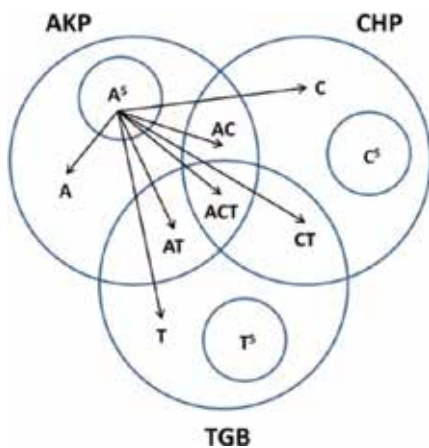

Figure 1. Sets of the followers of Twitter accounts of considered official youth organizations.

Table 1. The sets of considered Twitter users

Set	Explanation	Number of Followers
A	Following only AKP (@AKGenclikGM)	335.345
C	Following only CHP (@chpgenclikgm)	50.766
T	Following only TGB (@genclikbirligi)	191.750
AC	Following AKP and CHP	1.432
AT	Following AKP and TGB	2.227
CT	Following CHP and TGB	4.017
ACT	Following AKP, CHP and TGB	148

4. Results

The goal of this study is to analyze the strength and the dynamics of echo chambers of fragmented Turkish political youth groups to reveal the inclination to group polarization and extremism. The groups are studied in two classes: Official youth organizations of (ruling and opposition) parties, and an independent group.

At the time of the study, AKP (@AKGenclikGM) had 391.662, CHP (@chpgenclikgm) had 60.505 and TGB (@genclikbirligi) had 205.552 followers. After the filtering, these numbers reduced to 339.155, 56.366 and 198.145, respectively, and the result of the classification of distinct and common followers of accounts are given in Table 1. Subsets A^S (of size 16767), C^S (of size 2538) and T^S (of size 9587) were obtained. Up to last 3.200 tweets (between January 1, 2016 and December 31, 2018) of each user in subsets A^S, C^S and T^S were retrieved, -as this is the maximum allowed number by Twitter. The numbers of tweets retrieved are 24.361.415 for A^S, 3.812.329 for C^S,

and 12.193.410 for T^S, exceeding 40 million tweets in total. Next, for each subset, the tweets were analyzed according to item VI of the Method section, and among them, the numbers of detected interactions (Retweet, Retweet with Comments or Reply) are found to be 3.756.220 for A^S, 383.025 for C^S and 1.353.917 for T^S during the 3-years period.

Now, let us analyze the results for each group, starting with AKP.

4.1 AKP

The obvious result for A^S (the sample subset of the official youth organization of the ruling party, AKP) as shown in Figure 2 (and the data presented in Table 2) is that almost all of the interactions are made within the fragmented group, clearly indicating an echo chamber. *Retweets with Comment* and *Replies* can be against or for the original tweet while a *Retweet* usually supports the original tweet and also contributes to its spreading. Hence, this result is the most obvious for *Retweets*, in the sense that the interactions with the like-minded individuals (following A) have the highest percentage. On the other hand, no significant change is observed over years 2016, 2017 and 2018 (depicted with red, green and blue in the figure, respectively, in
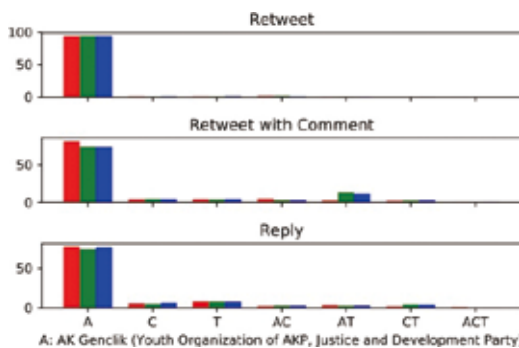

Figure 2. Percentage of interactions from A^S

Table 2. The number of interactions from A^S

		A^S		
		2016	**2017**	**2018**
A	**Retweet**	611846	869731	1643179
	RT wComment	7512	12929	26539
	Reply	59919	89043	141418
C	**Retweet**	8628	8798	23577
	RT wComment	397	596	1612
	Reply	4259	5526	11053
T	**Retweet**	8652	11090	27279
	RT wComment	400	697	1625
	Reply	6166	9030	14112
AC	**Retweet**	12826	16929	22141
	RT wComment	479	471	957
	Reply	1922	3391	5353
AT	**Retweet**	4392	8376	11827
	RT wComment	197	2298	4042
	Reply	2661	3169	5521
CT	**Retweet**	1325	3144	9934
	RT wComment	168	370	910
	Reply	1548	4779	7089
ACT	**Retweet**	2980	2134	5885
	RT wComment	49	102	291
	Reply	988	732	1227

the figures). The only noticeable change suggesting a weakening of the echo chamber over time is in the *Retweets with Comment* to the users following both AKP and TGB (AT).

4.2 CHP

Looking at the numbers of the interactions only, the weakest echo chamber is found for C^S (the sample subset of the official youth organization of the main opposition party, CHP) in all types of interactions (see Figure 3, and the data is presented in Table 3). Although the highest percentage of interactions is done with C, there is a significant amount of interactions with the other two groups, T being the maximum; and especially with the intersections, CT being the maximum. What is more, from 2016 to 2018, the interactions to T and especially to CT exhibit an increase, as interactions to C tend to decrease.

4.3 TGB

In the case of T^S (the sample subset of the independent political youth group TGB), again looking at the numbers of the interactions only (see Figure 4 and the data is presented in Table 4), though not as high as AKP, the echo chamber is found to be stronger than CHP. Similar to the case of CHP, the interactions with the CT intersection exhibit an increase over time, again suggesting a weakening of the echo chamber. Although the like-mindedness in TGB is considered to be the highest, TGB forms a much weaker echo chamber than AKP.
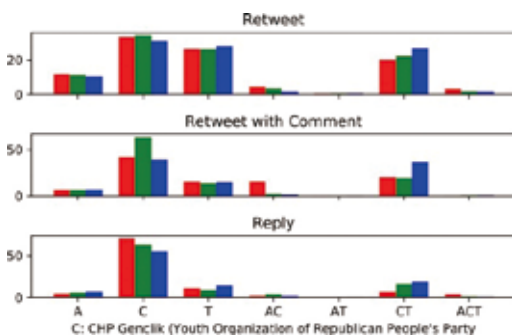

Figure 3. Percentage of interactions from C^S

Table 3. The number of interactions from C^S

		C^S		
		2016	**2017**	**2018**
A	**Retweet**	3583	6327	16933
	RT wComment	127	294	917
	Reply	830	1461	4711
C	**Retweet**	10322	19210	50957
	RT wComment	861	2804	5422
	Reply	12037	17851	36530
T	**Retweet**	8201	14812	45807
	RT wComment	311	672	2047
	Reply	1852	2459	9962
AC	**Retweet**	1409	2073	2394
	RT w Comment	313	108	230
	Reply	459	1153	1547
AT	**Retweet**	142	312	884
	RT wComment	8	13	79
	Reply	73	136	414
CT	**Retweet**	6283	12510	43980
	RT wComment	420	965	5089
	Reply	1173	4644	12589
ACT	**Retweet**	1044	962	2381
	RT wComment	10	42	127
	Reply	708	444	607

4.4 Analyzing the Results of Three Groups Together

Because one can retrieve only around the last 3200 tweets of a user, the more a user tweets (more than around 1.000 times a year), the more
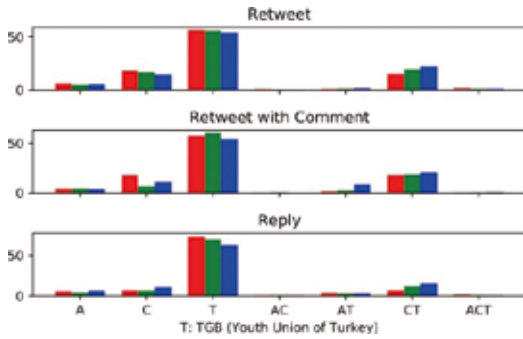
Figure 4. Percentage of interactions from T^S

Table 4. The number of interactions from T^S

			T^S		
			2016	**2017**	**2018**
A	**Retweet**		8707	10526	33363
	RT wComment		302	584	1725
	Reply		3514	5966	13265
C	**Retweet**		24420	37137	85903
	RT wComment		1271	1760	4911
	Reply		4149	5968	20987
T	**Retweet**		76122	124093	317200
	RT wComment		4119	8063	24704
	Reply		42945	60817	123914
AC	**Retweet**		1345	1293	2322
	RT wComment		41	102	195
	Reply		398	719	1404
AT	**Retweet**		1478	2986	10291
	RT wComment		112	322	3865
	Reply		2142	2451	5879
CT	**Retweet**		20507	43750	130233
	RT wComment		1271	2478	9465
	Reply		4135	10657	31477
ACT	**Retweet**		2492	2788	7231
	RT wComment		45	95	365
	Reply		897	782	1469

retrieved tweets will belong to the most recent years. Therefore, in order to reveal the dynamics over the years, instead of the exact numbers, the percentages of the interactions are analyzed and presented in Table 5. Take A^S in 2016, for example, i.e. analyzing the interactions from the users in subset A^S to all the users in each distinct set, the following results are found:

Retweets: 94.04% to A; 1.33% to C; 1.33% to T...
RT wComment: 81.63% to A; 4.31% to C; 4.35% to T..
Reply: 77.35% to A; 5.50% to C; 7.96% to T..

Echo chambers at various levels were observed for each fragmented group. The strongest echo chamber is found in the youth organization of AKP, where the like-minded individuals in this group reinforce the group positions and tend to be in more insulated 'deliberative enclaves' (see Sunstein (2001); Dahlberg (2007)). In the case of CHP, though being very limited, the weakening of the echo chamber is achieved mostly through the individuals on the boundaries, contributing to the expansion of public sphere towards a stronger democracy (see Habermas (1989)). This result suggests an accordance with the policy of CHP in the last decades to cover diverse ideologies. The

results of TGB suggests that being an independent political group, TGB tends to a more rational deliberation between 'unlike-minded' groups. Sunstein (2001) discussed that such a rational deliberation paves the way for avoiding group polarization and extremism which lead to social

Table 5. The percentage of interactions from A^S, C^S and T^S

			A^S			C^S			T^S		
			2016	2017	2018	2016	2017	2018	2016	2017	2018
A	**Retweet**		94.04	94.52	94.23	11.56	11.26	10.37	6.45	4.73	5.69
	RT with Comment		81.63	74.04	73.77	6.2	6.0	6.59	4.22	4.36	3.81
	Reply		77.35	76.98	76.12	4.84	5.19	7.1	6.04	6.83	6.69
C	**Retweet**		1.33	0.96	1.35	33.31	34.18	31.2	18.08	16.69	14.65
	RT with Comment		4.31	3.41	4.48	42.0	57.25	38.98	17.75	13.13	10.86
	Reply		5.5	4.78	5.95	70.26	63.42	55.05	7.13	6.83	10.58
T	**Retweet**		1.33	1.21	1.56	26.47	26.35	28.04	56.36	55.75	54.08
	RT with Comment		4.35	3.99	4.52	15.17	13.72	14.71	57.52	60.15	54.62
	Reply		7.96	7.81	7.6	10.81	8.74	15.01	73.81	69.62	62.46
AC	**Retweet**		1.97	1.84	1.27	4.55	3.69	1.47	1.0	0.58	0.4
	RT with Comment		5.21	2.7	2.66	15.27	2.2	1.65	0.57	0.76	0.43
	Reply		2.48	2.93	2.88	2.68	4.1	2.33	0.68	0.82	0.71
AT	**Retweet**		0.68	0.91	0.68	0.46	0.56	0.54	1.09	1.34	1.75
	RT with Comment		2.14	13.16	11.24	0.39	0.27	0.57	1.56	2.4	8.55
	Reply		3.44	2.74	2.97	0.43	0.48	0.62	3.68	2.81	2.96
CT	**Retweet**		0.2	0.34	0.57	20.28	22.26	26.93	15.18	19.66	22.2
	RT with Comment		1.83	2.12	2.53	20.49	19.7	36.58	17.75	18.49	20.93
	Reply		2.0	4.13	3.82	6.85	16.5	18.97	7.11	12.2	15.87
ACT	**Retweet**		0.46	0.23	0.34	3.37	1.71	1.46	1.84	1.25	1.23
	RT with Comment		0.53	0.58	0.81	0.49	0.86	0.91	0.63	0.71	0.81
	Reply		1.28	0.63	0.66	4.13	1.58	0.91	1.54	0.9	0.74

destabilization and supports social cohesion.

Despite the dense political agenda and arguably increasing social polarization of the country, no significant change in the strength of echo chamber of each group is observed in a 3-year interval between 2016 and 2018, with the small exception through the individuals following two groups.

A more detailed analysis could take into account the number of followers of each group. Let us take C, T and CT for example with the number of followers approximately 51 thousand,

192 thousand and 4 thousand, respectively. At the first glance, the number of interactions from T^S to C and from T^S to CT (in Figure 4) looks comparable. However, taking into account the number of individuals in each set, it is revealed that these comparable number of interactions are actually made to groups of ≈ 51 thousand and ≈ 4 thousand people, respectively. Therefore, normalizing the number of interactions to each group with respect to the size of the target group provides a clear evidence that the interactions towards expanding the public sphere are made to the individuals who are following two groups, -in other words, the individuals who constitute a bridge between ideological fragmented groups through selective exposure. From the same point of view, as the size of TGB is almost four times of CHP, Figures 3 and 4 can be re-interpreted: Regarding the interactions from the subset C^S to T in Figure 3, the size of the target group T is four times of the size of C. However, regarding the interactions from the subset T^S to C in Figure 4, the size of the target group C is one fourth of the size of T.

In summary, taking into account the size of the target group in each interaction, these results suggest that although TGB has a narrower ideological line than CHP, the echo chamber of TGB may be considered as comparable to that of CHP, emphasizing a rational deliberative. This can be linked to the independent nature of TGB, rather than being the official extension of a political party.

5. Discussions

In this study, the interactions of the targeted followers were analyzed by retrieving up to last 3200 tweets of each follower in a 3-years period (from January 1, 2016 to December 31, 2018). However, the more a follower tweets, the more retrieved tweets will belong to most recent years, potentially biasing the results. In order to overcome this potential bias, rather than the raw numbers, the percentages of the interactions for each year were analyzed.

The findings support the previous research that suggests strong echo chambers in the fragmented political groups, such as the very recent one demonstrating the inevitability of echo chambers (Sasahara (2019)).

One of the shortcomings of retrieving existing data from Twitter is that due to official requests by governments, Twitter may be deleting some of the tweets or suspending accounts, leading to imperfections in the analyses or even biasing the results. As a matter of fact, Turkish Government is one of the countries requesting removals from Twitter the most. However, one can expect that the deleted tweets are actually the sharpest political ones, contributing not only to the forming and reinforcing echo chambers but also to polarization and extremism. This could bias the results in the favor of weakening the echo chambers. Therefore, our interpretation is that having access to the deleted tweets could lead to more accurate results showing even stronger echo chambers. On the other hand, rather than the existing ones, retrieving tweets via live streaming could catch the tweets before they are deleted. This method has the drawback of technical and practical difficulties in the process, especially for the studies spanning several years.

A basic issue in analyzing data retrieved from social network sites such as Twitter especially in political conversations is the existence of automated accounts, due to their impact in manipulating the conversations (see Ferrara et

al. (2016); Shao et al. (2018); Vosoughi, Roy and Aral (2018)). In order to eliminate the impact of automated accounts, twe applied a filtering as explained in the Method section.

The motivation behind the study on echo chambers is that more than reinforcing the ideologies, political discussions among like-minded individuals drive the fragmented groups to extreme ideologies (Sunstein (2001)). In order to grasp the strength of echo chambers not only at an arbitrary time, but actually the evolution of it in the long term, our method is to focus on a specific 3-year period in which Turkey had intense political experiences and it is widely believed that the political polarization among people has increased sharply.

6. Conclusions

The purpose of this article is to contribute to the debate on online political fragmentation and echo chambers, by investigating the dynamics of echo chambers among the followers of three largest political youth groups of Turkey between 2016 and 2018. In particular, these groups are studied in two classes. The first class consists of the official youth organizations of ruling party AKP (Justice and Development Party) and main opposition party CHP (Republican People's Party). The second class consists of the largest independent political group TGB (Youth Union of Turkey). Retrieving over 40 million tweets of a carefully selected 30 thousand followers of these groups, 5.5 million interactions (Retweets, Retweets with Comment, Replies) were analyzed.

Among these fragmented groups, strong echo chambers were found, by far the strongest in the ruling party AKP. This finding supports the previous research focusing in the US case in the

sense that the followers of AKP are more conservative than the followers of CHP or TGB, and more conservative individuals tend to form stronger political echo chambers in the US case (see Boutyline and Willer (2016)). What is more, followers of AKP are usually less educated (see Uncu (2018)). Less educated people are influenced easier than others by political discussions, which potentially increases the level of homophily, forms and reinforces echo chambers leading to group polarization (see Sasaki (2016)).

TGB is found to have a slightly stronger echo chamber than CHP. However, taking into account the size of the target set of interactions in a more detailed analysis, the strength of the echo chambers of TGB and CHP becomes comparable. On the contrary to the followers of AKP and CHP who have a wide spectrum of ideologies, the followers of TGB has a strictly narrow and well defined ideology. Therefore, despite its narrower political line, having a much weaker echo chamber than AKP and only a slightly stronger one than CHP can be interpreted as a consequence of being not an official party organization but an independent organization. This result emphasizes the role of independent political organizations towards a stronger democracy.

When it comes to the dynamics of echo chambers, in the period that Turkey had harsh political experiences including a failed coup attempt, and political polarization among the people is believed to become sharper, no significant change of echo chambers is found. The only small-scale exception is through the individuals following not one but two groups, experiencing a deliberative cross-ideological exposure.

This work focused on the fragmentation and

the dynamics of echo chambers of political youth groups in Turkey. To the best of our knowledge, this is the first work in the field to focus on political youth groups. Our results favor the side of the debate that online political discussions lead to strong echo chambers and polarization. In addition, previous research is supported that cross-ideological exposure lead to weakening echo chambers, contributing to the favoring of democracy. Because each country has specific cultural and political aspects, we believe that future works on other countries could contribute to provide a more insightful perspective for the debate whether the Internet is leading to echo chambers of fragmented groups or to an expanded public sphere.

Acknowledgements

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Translation

Examining the interactions on SNS that result in meetups among high school adolescents[1,2]

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Abstract

The purpose of this study was to examine how high school adolescents interact with a person of the opposite sex acquainted through SNS and what kind of the interactions result in meeting him or her in real life. A total of 207 high school adolescents who had experienced meeting in someone of the opposite sex acquainted through SNS reported their SNS interactions before the meetup. Results showed that the successive interaction about a common subject such as local being the same and hobbies led to meeting the person in real life. In addition, results showed that high school adolescents met in person not when he or she wanted to see them but when they want to see him or her. Based on these results, future contents of crime prevention education are discussed.

1. Introduction

The number of social networking service (SNS) users has increased every year, reaching 72.16 million (72.1% penetration rate) by the end of 2017 (ICT Research Institute, 2018). Since it is an online service that helps maintain interpersonal relationships, build new ones, and develop interests (Kawaura, Sakata, & Matsuda, 2005), it can be beneficial if used effectively.

However, recent years have seen a social problem involving minors getting into trouble because of face-to-face interactions with members of the opposite sex whom they have met via SNSs. The National Police Agency (2018) reported an overall increase in the number of children who have been victimized by crimes facilitated by SNS, which necessitates certain measures (Koide, 2008; Ogata, 2014). To conceptualize these measures, one needs to clarify the reasons minors engage in face-to-face interactions with members of the opposite sex whom they meet on SNSs.

Many studies have focused on individual traits regarding these reasons. For example, Hanai and Oguchi (2005) examined the relation between loneliness among dating site users and their participation in dating sites and found that those with higher levels of loneliness used dating sites for relationship-building. Caplan (2003) and McKenna, Green, and Gleason (2002) also found that individuals who are more lonely preferred to communicate with their Internet acquaintances, including those of the same sex, and were more likely to meet them face-to-face. Takahira (2009) also suggested that individuals who have poorly adapted to social life and lacked social resources are more willing to form new interpersonal relationships online.

As previously described, several studies have investigated the relation between individual traits and meetups with opposite-sex Internet acquaintances. To obtain further information, it is useful to focus on SNS interactions because their content is believed to determine the occurrence of a face-to-face meeting. For example, Hashimoto, Chiba, Amano, and Horikawa (2015) found that the most common reason high school girls stop interacting with male acquaintances on SNSs is that "the topic was boring" (42.5%), followed by "many sexual and dirty topics" (38.0%). On the other hand, their top reason for interacting with people they meet on SNSs, including those of the same sex, was that they have "common interests and preferences" (75.7%). Kato (2013) also analyzed high school girls' experiences of meeting others via the Internet, focusing on their states of mind. The results showed that despite having negative feelings about being acquainted with a partner via the Internet, they found a "positive reason" (e.g., interaction about a common interest) through their interactions with the individual, leading to face-to-face meetings.

Several other studies have been conducted on interactions leading up to face-to-face meetings (Baker, 2000; Walther, 1996), and more research is being done regarding the relation between the content of SNS interactions and face-to-face meetings. However, such an interaction process has not been sufficiently explained; it remains unclear what kinds of interactions with opposite-sex strangers begin on SNSs and how these interactions lead to face-to-face meetings (or not). Since SNS interactions are assumed to continue before a face-to-face meeting with an opposite-sex acquaintance, it is necessary to examine not only the substance of these interactions but also how

they lead to face-to-face meetings. This study extends our knowledge on the reasons why minors meet face-to-face with opposite-sex SNS acquaintances and may also serve as a resource for devising appropriate crime prevention measures. Therefore, this study explores the process of SNS interactions (i.e., how these interactions lead to face-to-face meetings with opposite-sex acquaintances) among high school students, because 95% of them own and use smartphones (Cabinet Office, 2019).

2. Methods

2.1. Participants and procedures

The survey, which was outsourced to Macromill Inc., was conducted from December 22 to 27, 2014. A preliminary survey was sent to 46,300 registered participants who reported that they were high school or college students. Of the 5,000 who responded, 4,103 (1,242 males and 2,861 females; M_{age} = 16.9, SD_{age} = 0.92) stated that they were currently in high school or college. The survey was then distributed to 325 high school and college students who have met face-to-face with members of the opposite sex with whom they were acquainted through SNSs, and 223 sent back their responses. A total of 207 high school and college students (112 females and 95 males; M_{age} = 17.1, SD_{age} = 0.85) participated in the survey. This study obtained approval from the research ethics committee of the institution to which the authors belonged.

2.2. Measures
2.2.1 SNS used on first contact

The respondents were asked to recall their most memorable experiences meeting a stranger of the opposite sex through SNSs and to freely describe the first time they contacted or were contacted by these individuals.[4]

2.2.2 Content of messages on first contact

In an open-ended questionnaire, the participants then indicated the kind of messages they received or sent at the time of their first contact.

2.2.3 Invitations from interactions

As for invitations resulting from their interactions, the respondents were asked to provide multiple responses to the following categories: "being asked for contact information (e-mail address or phone number)," "asking for contact information," "being asked to meet in real life," "asking to meet in real life," "telling his or her contact information," "being told interaction partner's contact information," or "none of the above occurred."

2.2.4 Details of interactions prior to invitations

Those who responded with "none of the above occurred" were asked to freely describe the kind of interaction that occurred before such invitations were made.

2.2.5 Face-to-face experiences

They were then asked if they actually met with the opposite-sex individual they had been in contact with.

3. Results

A total of 194 individuals were analyzed, 13 of which were excluded as their answers were incomplete.

3.1 Type of SNS used on first contact

There were 14 different types of SNSs through which the respondents had initial contact with their acquaintances. The most frequently mentioned SNS was Twitter (n = 100, 51.5%). SNSs that were mentioned by more than one person included LINE (n = 23, 11.9%), chat sites (n = 10, 5.2%), BBSs (Bulletin Board Systems) such as LINE BBS (n = 10, 5.2%), Facebook (n = 8, 4.1%), Skype (n = 7, 3.6%), Ameba (n = 7, 3.6%), and GREE (n = 6, 3.1%) and mixi (n = 6, 3.1%).[5]

3.2 Classification of contact content, rate of acceptance of invitations during the contact, and rate of actual meetings

Free descriptions were classified according to the contents of the first contact and interactions until the invitation. The first author and a graduate student, who did not know the purpose of the study, performed the kind of KJ method to classify the responses based on the similarity of the descriptions (Kawakita, 1986). This generated 12 categories for the first-contact content and 10 categories for the content of interactions prior to the invitation (Table 1). For the former, the most common category was "Greetings (nice to meet you, etc.)" while for the latter, the top category was "Common interests (common hobbies, etc.)." Many responses were categorized under "other/ none/don't remember" because most of them fell under "none/don't remember"; an example of a response under "other" was "yes."

The rate of those who reported invitations that occurred during interaction is shown in Table 2. The most commonly reported experience was "being asked to meet in real life." About 10% of the respondents reported receiving no invitations while 122 (62.9%) reported actually meeting their contacts.

Table 1. Content of SNS interactions with the opposite sex

Categories	Examples	Rates	
First contact　(n = 194)			
Greetings	Nice to meet you.	40.2%	(78)
Common topics	We are from the same hometown.	28.9%	(56)
Invitations	Would you like to meet me?	8.8%	(17)
Self-introductions	I am XX.	6.7%	(13)
Chatting	We had a chat.	6.2%	(12)
Expression of favor	You are so pretty.	5.7%	(11)
Use of BBS	I saw your posting on BBS.	5.7%	(11)
Approaching	Let's talk.	5.2%	(10)
Contact exchange	We'll exchange contact information.	2.1%	(4)
Other/none/don't remember		19.6%	(38)
Interactions prior to the invitation (n = 168)			
Common interests	Common hobbies.	50.0%	(84)
Personal information	Age.	40.5%	(68)
Gossip	Conversation about everyday events.	22.0%	(37)
Interpersonal relationships	Conversation about friends.	10.7%	(18)
Personal topics	Consultation.	7.7%	(13)
Hope for friendship	Would you like to go to a concert?	7.1%	(12)
Imagination	Where would you go if you did meet me?	3.0%	(5)
Other/none/don't remember		16.7%	(28)

Note. The figures in parentheses correspond to the number of people described in the category.

3.3 The interaction process leading up to the face-to-face meeting

Hayashi's quantification Method III (Method III) was used to examine the kinds of interactions that resulted in face-to-face meetings with

Table 2. Rate of invitations that occurred during the contact

Options	Rates	
Being asked for contact information	44.3%	(86)
Asking for contact information	20.1%	(39)
Being asked to meet in real life	53.6%	(104)
Asking to meet in real life	26.8%	(52)
Telling contact information	33.5%	(65)
Being told interaction partner's contact information	30.9%	(60)
None of the above occurred	12.4%	(24)

Note. The figures in parentheses correspond to the number of people described in the category.

opposite-sex SNS acquaintances.

When each category of the content of the first contact and the interaction until the invitation was selected, the date was quantified as 2, and when not selected, it was 1. In this case, "Contact exchange" and "Imagination" were excluded from the analysis, as well as "Other," "Don't remember," and "None" because of the small number of descriptions. Participants who did not provide data on a category for either the content of their first contact or the interaction until the invitation were excluded from the analysis as well.

Next, the invitation choices that arose from the interactions were regarded as categories, quantified as 2 if each category was selected and 1 if it was not. In that case, "None of the above occurred" was excluded from the analysis.

Finally, whether or not the two parties actually met was quantified using a score of 2 if they did and 1 if they did not. For the 21 categories included in the analysis through the above procedure, the 1, 2, and 3 axes of category scores were calculated using Method III. The eigenvalues were 0.12, 0.10, and 0.09, in that order. Cluster analysis (Ward's method) was also

performed using the calculated category scores up to three axes, and four clusters were extracted[6] (Figure 1).

The first cluster consisted of "Greetings," "Self-introductions," "Personal information," "Gossip," "Personal topics," "Being asked for contact information," and "Being asked to meet in real life." The second cluster had "Common
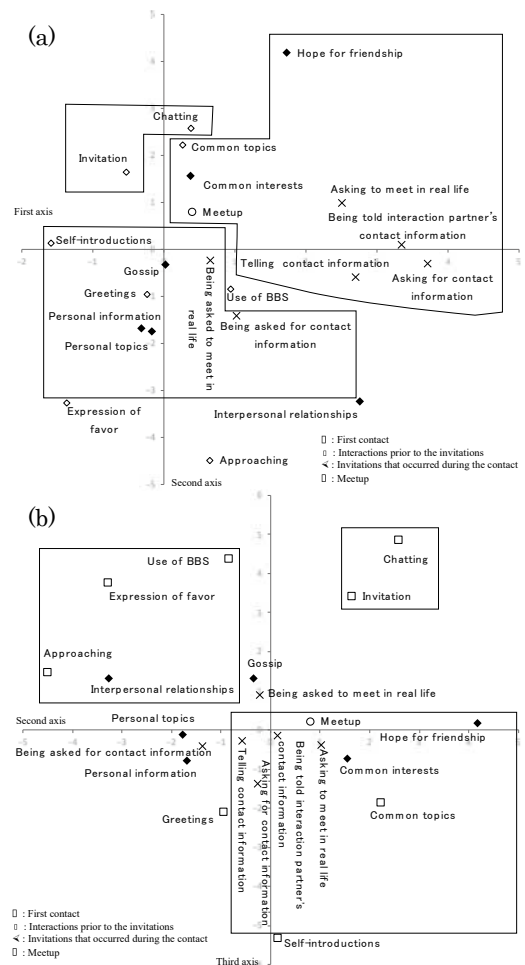
Figure 1. Plot of the category score of the content of the interaction by Hayashi's quantification methods III—(a) plots of the first–second axes and (b) the second–third axes. Enclosures (or no enclosures) indicate the same cluster.

topics," "Common interests," "Hope for friendship," "Asking for contact information," "Asking to meet in real life," "Telling contact information," "Being told contact information," and "Meetup." The third cluster contained "Invitation (first contact)" and "Chatting." The fourth cluster consisted of "Expression of favor," "Use of BBS," "Approaching," and "Interpersonal relationships."

4. Discussion

This study examined high school students' interactions with their opposite-sex SNS acquaintances and how they ended up meeting these individuals in real life.

4.1 Rate of high school students who met face-to-face with opposite-sex SNS acquaintances

The pilot survey showed that 7.9% of high school and college students met face-to-face with their opposite-sex SNS acquaintances. Hashimoto et al. (2015) reported that about 20% of high school girls (n = 554) engaged in such face-to-face meetings, a difference of more than 10% from the present study. However, the results for the interaction contents were similar to those of previous studies (Hashimoto et al., 2015; Kato, 2013), suggesting that the following discussion about interaction contents and processes are valid for this study.

4.2 Contents of SNS interactions

The classifications of the interaction contents indicated that actions on SNSs evolved in the same way as those in offline heterosexual relationships. In other words, the results showed that SNS interactions begin with friendship

conversations such as "Greetings" or "Common topics" and then gradually proceed to deeper contents such as "Interpersonal relationships" or "Personal topics." This is similar to how offline romantic behaviors develop, starting with friendly conversations that progressively become more in-depth (Matsui, 2006).

4.3 Process of SNS interactions leading to face-to-face meetings

In our study of interactions that result in face-to-face meetings, we generated four clusters. The results suggest the following typical interaction process on SNSs.[7]

The first cluster consisted of the first-contact content, the interaction content prior to the invitation, and the invitation that occurred during contact. This means the typical process begins with a greeting (e.g., Nice to meet you.) and a self-introduction (e.g., I am XX.), and then the invitation to meet is received through personal information (e.g., age), gossip (e.g., daily life stories), and personal topics (e.g., consultation), in which the person is asked to provide their contact information and meet with their interaction partner. The second cluster had the first-contact content, the contact content up to the invitation, and the invitation between contacts and also included the "Meetup" category. In other words, the typical process starts with a common topic (e.g., We're from the same hometown.) followed by a discussion of common interests (e.g., common hobbies) and hope for friendship (e.g., Would you like to go to a concert?), which then leads to an invitation such as requests for contact information, being given contact information, providing contact information, and asking to meet physically. Finally, real-life meetups occur. The third cluster

contained only the first-contact content; that is, the typical process begins with an invitation (e.g., Would you like to meet?) and a chat (e.g., We had a chat.) but did not proceed with the subsequent interactions. The fourth cluster consisted of the first-contact content and the interaction content prior to the invitation. The typical process begins with an expression of favor or compliment (e.g., You are so pretty.), use of BBS (e.g., I saw your posting on BBS.), and an approach (e.g., Let's talk.), followed by efforts toward interpersonal relationships (e.g., conversation about friends). Among these typical processes, the second one resulted in physical meetups, indicating that face-to-face meetings were induced by the parties' consistent interaction on a common subject, such as being from the same hometown and having the same hobbies.

Some studies (Hashimoto et al., 2015; Kato, 2013) have also suggested that common interests and preferences are important reasons for meeting physically. The present study obtained similar results, suggesting that it is especially important to continue conversations about common interests and preferences.

This may be because the topics they have in common with one another lead to interactions in which they discover similarities, which have been shown to influence interpersonal attraction (Rubin, 1973). Research has examined the impact of similarity on the formation of friendships and romantic relationships in existing social networks such as schools (Nakamine, 2015; Rubin, 1973). Given the differences between SNSs and such existing social networks, the results showed that similarity affects not only friendships and romantic relationships formed at school and other places but also face-to-face meetups with opposite-sex SNS acquaintances. However,

cluster analysis has certain limitations regarding reproducibility. Therefore, to test the generalizability of this study's results, future research may examine whether an individual's awareness of "similarity" is linked to face-to-face meetings and other factors.

In the second process, the participants wanted to meet their interaction partners (i.e., they asked for the person's contact information or asked to meet them). It was suggested that they were meeting not because they were invited but rather because they wanted to do so.

4.4 A reflection on crime prevention education

Crime prevention education is one of the measures to prevent problems caused by physical meetups with heterosexual SNS acquaintances (Koide, 2008; Ogata, 2014). So far, conducting crime prevention education has been focused on prohibition in which minors are informed of the risks of face-to-face meetings with opposite-sex SNS acquaintances and encouraged to avoid doing so (Koide, 2008; Nishimura, Murakami, and Fuji, 2014; Sugano, 2011). However, based on this study's results, physical meetups were promoted by consistent interactions about common topics, and the participants met with the partners they wanted to meet, which suggest that minors engage in physical interactions with their partners as a result of their own choices and that they may not think it is dangerous (or they are hedging their risk). According to Reyna and Farley (2006), minors (teens) do not perceive such risk, but in fact engage in risky behaviors because while they view these behaviors as risky, they also judge them as more beneficial. This study's results are consistent with those of Reyna and Farley (2006). In light of these findings, crime prevention education will need to take a

new form and let go of its prohibitive nature.

4.5 Limitations and future studies

This study has three limitations. First, the participants were registered panelists of a survey company. It has been pointed out that the respondents of a web-based survey that uses a survey company's registered panelists may be a limited group, as they prefer simple interpersonal relationships, have a high affinity for the Internet, and so on (Yoshimura, 2001). Therefore, it is necessary to be cautious about whether this study's findings can be applied to high school and college students who are not registered monitors. Second, the coverage, duration, and frequency of interactions were not sufficient. For example, although Hashimoto et al. (2015) showed that while interactions involved sexual and "dirty" content, with the participants being asked to send pictures, such content was not found in the present study. It is not possible to examine how long and how many times they interacted with their partners. By covering the content of the interactions to some extent and examining their processes in detail, including duration and frequency, it would be possible to completely understand the reasons for face-to-face meetings. Third, the survey included only high school and college students who have met their opposite-sex SNS acquaintances; hence, the content of their interactions may be different from those of high school students and college students who have never met their respective partners.

Finally, it would be beneficial to conduct a survey of cases in which face-to-face meetings with opposite-sex SNS acquaintances have actually caused trouble. Focusing on high school students who have had such experiences may help clarify the interaction process that is likely

to cause trouble. This may be done by examining the kind of interactions that have occurred and how long they have been interacting on SNSs when they decided to meet physically. In addition, interviews may be conducted to clarify what kinds of trouble they encountered during these face-to-face meetings, what they thought about when they decided to meet physically (e.g., the risk of engaging in such meetups), and what they should have focused on during the meeting (e.g., bringing along a third attendant). This would help reduce unpleasant incidents caused by face-to-face meetings between minors and their opposite-sex SNS acquaintances, enabling them to enjoy the benefits of heterosexual relationships that originate from SNS interactions. Future research on these issues will be important for Japan, where SNSs will become increasingly popular.

Notes

1. This study was conducted with a 2013 grant from the Japan Internet Safety Promotion Association.
2. We would like to thank Prof. Yutaka Matsui of the University of Tsukuba for his guidance on this paper. We would also like to express our gratitude to Prof. Kei Fuji and Prof. Shintaro Yukawa, also from the University of Tsukuba, for their valuable comments on this paper. And, we would like to thank Enago (www.enago.jp) for the English language review.
3. Affiliation at the time of research.
4. All survey participants engaged in face-to-face meetings with their opposite-sex SNS acquaintances. However, the most memorable experiences of being acquainted with the opposite sex on SNS (outside face-to-face meetings) were requested at the time the questionnaire was answered; therefore, some participants stated that

they did not meet their opposite-sex acquaintances face-to-face. The reason for this inquiry was to clarify the interaction processes that led to the actual meeting and the nonmeeting.

5. Because this study did not aim to examine differences in interactions by type of SNS, and because only a few respondents mentioned SNSs other than Twitter, we did not include the type of SNS in our analysis.

6. When we checked whether coherence in Method III and cluster analysis differed between men and women, we found almost the same coherence, so we conducted a combined analysis for both sexes.

7. In a study on street interactions between men and women (Nakamine, 2015), male–female interactions were typified by Method III, and the process was inferred from that type of interaction. This study used this to interpret the clusters accordingly. Based on the point that Method III does not necessarily require the interpretation of axes (Matsui & Takamoto, 2018), we interpreted the domain rather than the axes in this study.

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