

# Comparing the disaster information gathering behavior and post-disaster actions of Japanese and foreigners in the Kanto area after the 2011 Tohoku Earthquake



**A. Kawasaki & K. Meguro**

*International Center for Urban Safety Engineering (ICUS),  
Institute of Industrial Science, The University of Tokyo, Japan*

**M. Henry**

*Division of Field Engineering for the Environment,  
Faculty of Engineering, Hokkaido University, Japan*

## SUMMARY:

After the March 11 Tohoku earthquake, people living in Japan were faced with confusing and conflicting messages from differing information sources which created an atmosphere of uncertainty and led many people, particularly foreigners, to relocate to western Japan or leave the country entirely. In order to improve the dissemination of information after future disasters, a survey was conducted to understand how people in the Kanto region – the most populous area of Japan and bordering the Tohoku region – received their disaster-related information and how it affected their decisions in the aftermath of the disaster. This paper compares the results of Japanese and foreigners and discusses some initial impressions of the disaster information gathering behavior and post-disaster actions. It was found that the role of domestic information sources versus overseas information sources could have contributed to the confusion foreign respondents experienced and led to their relocate or evacuation from Japan.

*Keywords: Tohoku Earthquake, disaster information, media, foreigners, Japan*

## 1. INTRODUCTION

At 14:46 Japan Standard Time (05:46 UTC) on March 11, 2011, a magnitude 9.0 earthquake occurred off the Pacific coast of the Tohoku region of Japan. This earthquake not only caused strong ground motion but also triggered a massive tsunami which inundated the eastern seaboard of Japan and caused widespread destruction. The earthquake and tsunami also knocked out the cooling systems at the Fukushima Daiichi nuclear power plant in Fukushima Prefecture, sparking a nuclear-related crisis which culminated with the confirmation of nuclear meltdown in three of the reactors.

In the wake of this triple disaster, people living in Japan began to seek disaster-related information in order to keep pace with the evolving situation and to make decisions regarding their post-disaster actions. As previous research shows, the primary source of information after environmental or man-made disasters is generally the mass media (Greenberg et al., 2002), and although this information was traditionally accessed via television, radio, or printed media, internet-based media are becoming the predominant means for people to access and communicate disaster-related information (Boyle et al., 2004; Lu et al., 2007), with social media in particular emerging as an important communication tool (Palen, 2008; Qu et al., 2009; Yates and Paquette, 2010; Kawasaki et al., 2012).

After the Tohoku Earthquake and during the unfolding of the nuclear crisis, there emerged a growing disparity between the information given by domestic Japanese sources and overseas sources (Sanchanta, 2011), which may have contributed to the wide gap in perception of the situation between Japanese and foreigners residing in Japan. While Japanese people in general continued life as usual, foreign communities reacted much differently, with many foreigners relocating within the country or leaving Japan altogether (Associated Press, 2011). The difference in post-disaster actions between Japanese and foreigners supports previous evidence which suggests that increased attention must be given to populations which have specific needs during times of disaster (Spence, 2007). Therefore, in order to improve disaster response and recovery, it is necessary to understand disaster information gathering behavior considering different needs and perspectives.

The objective of this paper is to examine and clarify the information gathering behavior and post-disaster actions after the Tohoku Earthquake considering the difference between Japanese and foreigners. This study focused on people living in the Kanto region of Japan, which lies to the south of the Tohoku region, and includes Tokyo along with seven surrounding prefectures (Fig. 1).

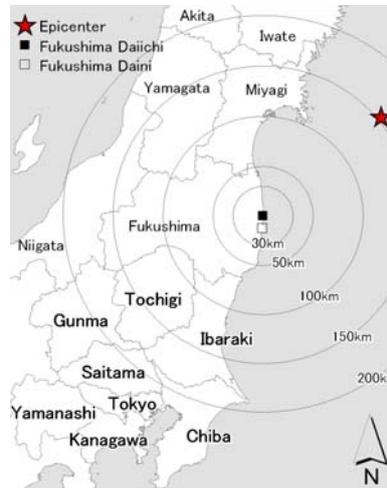


Figure 1. Map of Tohoku and Kanto regions of Japan

## 2. METHODOLOGY

### 2.1. Survey design & distribution

Data on disaster information gathering behavior were collected using an online survey. This survey was provided in nine different languages (Japanese, English, Chinese, Korean, Portuguese, Nepalese, French, Thai, Vietnamese), and the contents were designed to clarify respondents' information gathering activities, their information-related difficulties and their post-disaster actions. A summary of the survey questions is given in Table 1. The survey was distributed via two methods: first, through social and professional contacts of the authors; and second, through direct requests for cooperation with various entities such as business communities, universities, embassies, and so forth. Responses were gathered for two weeks beginning roughly 10 weeks after the earthquake occurred.

Table 1. Survey questions

Theme	Questions
Information gathering activities	What information sources did you trust the most / the least during the two weeks following the earthquake?
	During the two weeks following the earthquake, which media did you use to acquire information and in what language?
	What types of information were most important for you during the first day, first week, and second week after the earthquake?
Information difficulties	What types of information were unavailable, unclear, or difficult for you to understand during the first day, first week, and second week after the earthquake?
	In general, what were the reasons why the above information was unclear or difficult to understand?
	When faced with unclear or difficult to understand information, what media did you utilize in order to clarify or better understand that information?
Post-disaster action	Within the first two weeks after the earthquake, did you choose to remain in the Kanto area, relocate to another area of Japan, or leave Japan?*
	What was the reason for your choice?
	At that time when you made your choice, how useful, if at all, was disaster-related information in making that choice?*

\* Questions were restricted to a single response; other questions allowed multiple responses

## 2.2. Sample characteristics

The survey received 1357 responses representing 74 countries. Japanese respondents alone made up 36% (N=497), and the distribution of foreign respondents (N=860) by country is shown in Fig. 2. Questions asking for gender, age and occupation were voluntary, with overall response rates of 94.8%, 94.9%, and 93.9%, respectively. For gender, 67.8% of Japanese respondents were male and 32.1% female, whereas 57.5% of foreign respondents were male and 42.5% female. The distributions for age and occupation are given in Fig. 3 and Fig. 4, respectively.

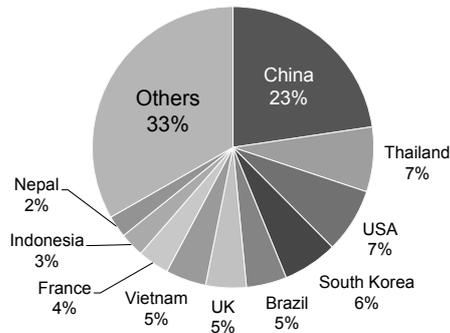


Figure 2. Distribution of foreign respondents by country

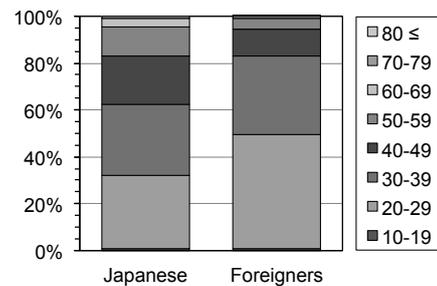


Figure 3. Distribution of respondents by age

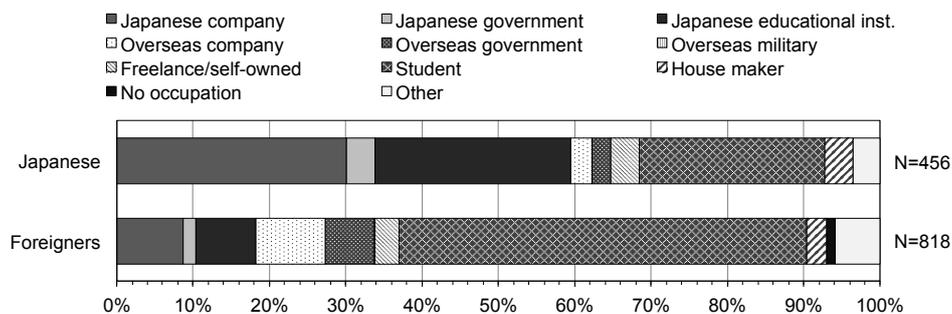


Figure 4. Distribution respondents by occupation

## 3. RESULTS

### 3.1. Information sources

The distributions of most- and least-trusted disaster information sources for Japanese and foreign respondents are shown in Fig. 5. For Japanese respondents, the most-trusted sources were based in Japan, such as Japanese news sources, the Japanese government, and Japanese research and academic institutions. Foreign respondents tended to trust overseas sources more than Japanese respondents, particularly international organizations such as the IAEA or Red Cross. Distrust of Japan-based sources was similar between Japanese and foreign respondents, with both groups showing the greatest distrust of information from the Tokyo Electric Power Company (TEPCO). However, foreign respondents tended to distrust overseas sources more than Japanese respondents.

Furthermore, some sources that were highly trusted were also highly distrusted for both groups. For example, for Japanese respondents the Japanese government was the second most-trusted source, behind Japanese news sources. However, the Japanese government was also the second least-trusted source for Japanese respondents, ranking only behind TEPCO. A similar result could be observed for foreign respondents.

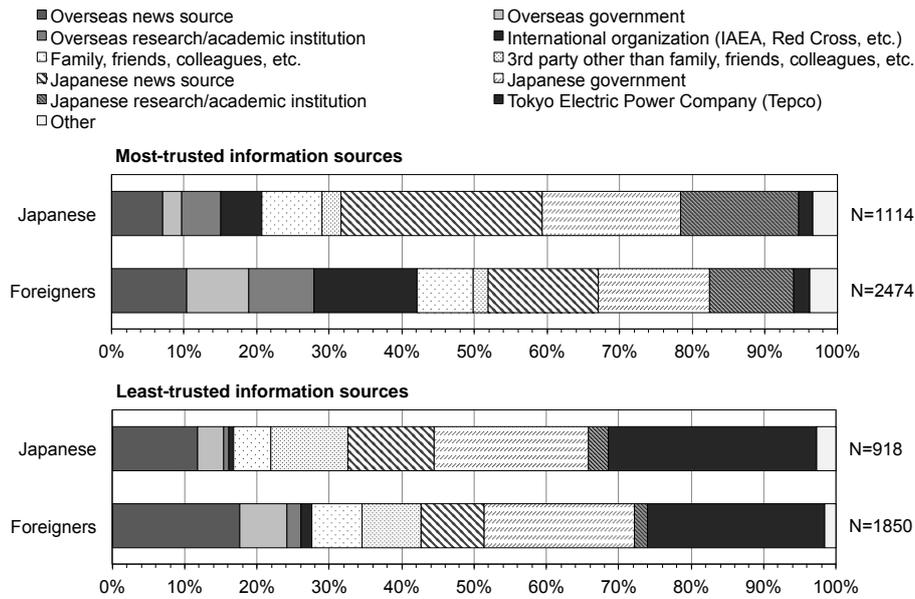


Figure 5. Most- and least-trusted information sources

### 3.2. Media & language for information acquisition

The distributions of media and language utilized for disaster information acquisition for Japanese and foreign respondents are shown in Fig. 6. Understandably, Japanese respondents overwhelmingly used Japanese-language media, with nearly half being “traditional” forms of media such as television, radio, and printed media such as magazines, newspapers, and so forth. The usage pattern of Japanese-language media by foreign respondents was relatively similar to Japanese respondents; however, foreign respondents turned more to internet-based forms of media when using English or other languages. In particular, inter-personal communication such as face-to-face, telephone, and so forth was more highly utilized in other languages than in Japanese or English for foreign respondents.

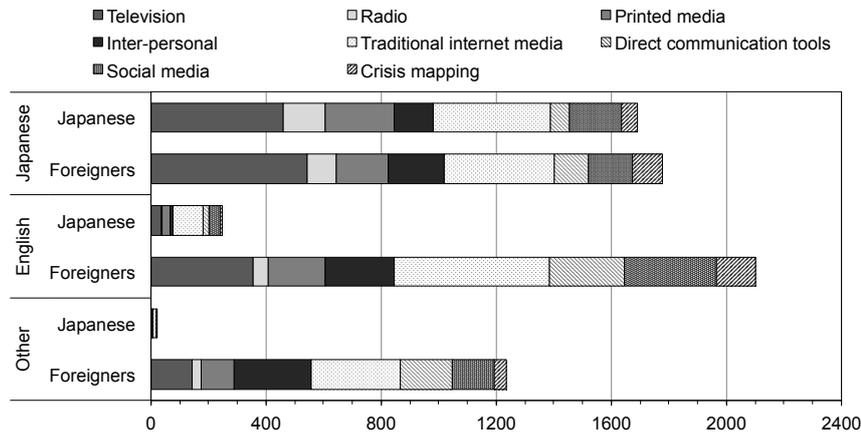


Figure 6. Media and language for information acquisition

### 3.3. Importance of information

The importance of information over time is shown in Fig. 7. Overall, there was little difference between Japanese and foreign respondents for all three time periods. On the first day, information on the safety of family, friends, etc. was the most important type of information, followed by information on earthquake and tsunami damage and on transportation systems. By the first week, however, the importance of information on radiation level and risk and on food and water supply, along with

information on transportation systems, became the most important types of information; by the second week, these were joined by information on government response. For both Japanese and foreign respondents, the relative importance of information on radiation level and risk increased consistently from the first day to the first and second weeks, along with the importance of information on the government's response and on school and business continuity. Conversely, the relative importance of information on the safety of family, friends, etc. and on the earthquake and tsunami damage tended to decrease over time.

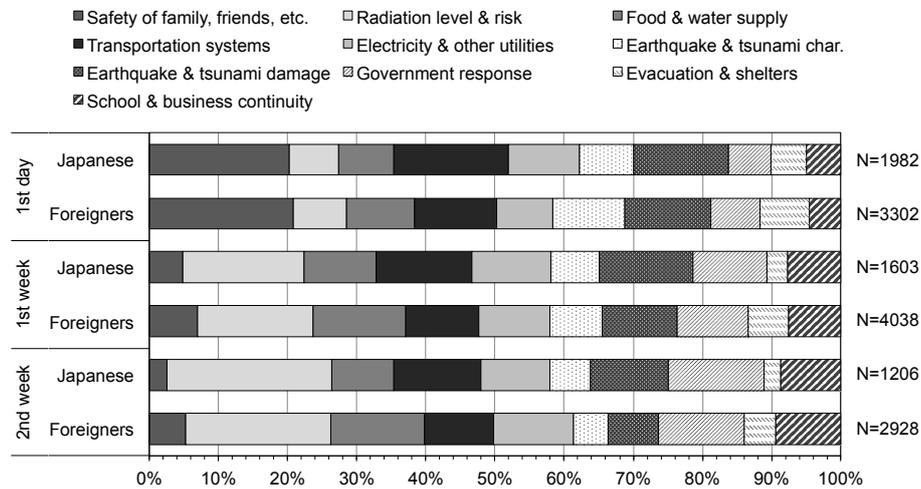


Figure 7. Importance of information over time

### 3.4. Difficulties related to information

Fig. 8 shows what information was unavailable, unclear, or hard to understand over time. Again, the distribution for Japanese and foreign respondents was mostly similar, although Japanese respondents tended to have more difficulties with earthquake and tsunami damage and on government response than foreign respondents. Conversely, foreign respondents tended to have more difficulties with information on food and water supply. For both groups, the most difficulty on the first day was with information on safety of family and friends, on radiation level and risk, and on transportation systems. By the first and second weeks, radiation level and risk had become the information with most difficulties, along with government response. Over time, information difficulties increased for radiation level and risk, food and water supply, and government response, and decreased for safety of family and friends, earthquake and tsunami damage, and evacuation and shelters.

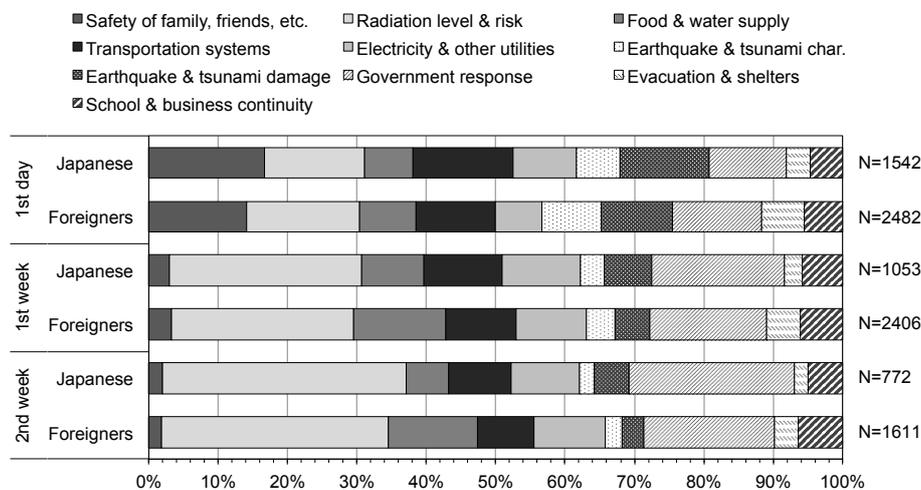
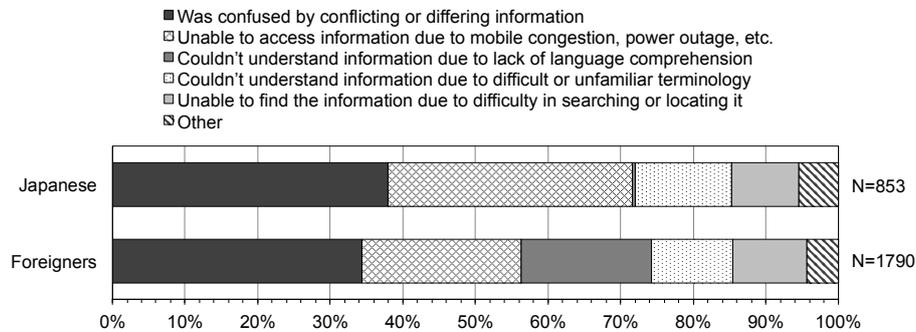


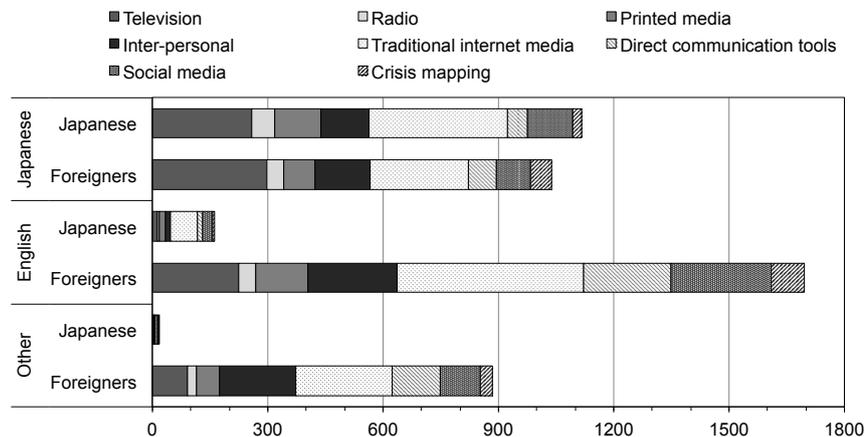
Figure 8. Unavailable, unclear, or hard to understand information over time

The reasons why this information was unavailable, unclear, or hard to understand are shown in Fig. 9. For both Japanese and foreign respondents, the primary reason for information difficulties was due to confusion caused by conflicting or differing information, followed by inability to access information due to mobile congestion or power outages. However, for foreign respondents, lack of language comprehension was another source of information difficulties, whereas very few Japanese respondents cited this as a problem.



**Figure 9.** Reasons why information was unavailable, unclear, or hard to understand

Fig. 10 shows the media and language utilized when clarifying information difficulties. Japanese respondents again utilized primarily Japanese-language media, with traditional internet media such as information portals being the most-utilized media. Foreign respondents' usage of Japanese-language media was again similar, although they used television, inter-personal communication, and crisis mapping slightly more than Japanese respondents. Their utilized media in English and other languages, however, differed in that foreign respondents tended to use direct communication tools such as email and chat and social media such as social networking sites and blogs much more in English and other languages than in Japanese. Furthermore, inter-personal communication in other languages was used relatively more than in English or Japanese.

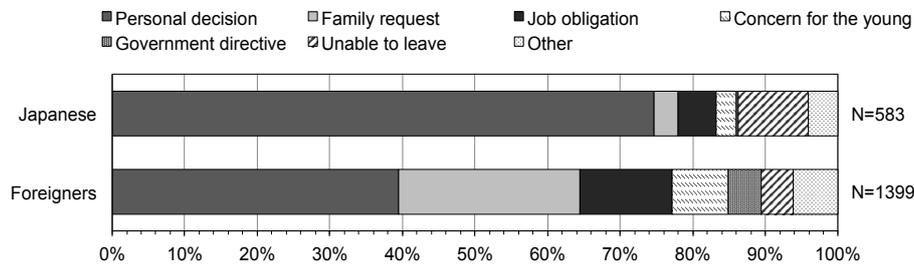


**Figure 10.** Media and language for clarifying information difficulties

### 3.5. Post-disaster actions

The respondents' post-disaster actions were evaluated by whether they relocated from the Kanto region or left Japan. Within this survey's sample, just over 90% of the Japanese respondents elected to remain in Kanto, whereas nearly 60% of the foreign respondents chose to leave Kanto. Of the foreign respondents who chose to leave Kanto, 34% relocated to another area of Japan, while the other 66% left Japan entirely.

The distribution of reasons for choosing to remain in Kanto, relocate to another area of Japan, or leave Japan entirely is shown in Fig. 11. For Japanese respondents, the main reason for their choice was that it was a personal decision. However, for foreign respondents, while personal decision was also cited, other primary reasons included family request and job obligation. Relative to Japanese respondents, a larger percentage of foreign respondents also cited concern for the young and government directive.



**Figure 11.** Reason for post-disaster relocation

When asked about the usefulness of disaster information for making the choice to remain, relocate or leave, more than 70% of both Japanese and foreign respondents stated that disaster information was somewhat to very useful, with only slightly more than 10% of each group finding disaster information to be not useful for their decision-making. The percentage of foreign respondents who found disaster information to be very useful was about 28%, which was more than the 21% of Japanese respondents.

#### 4. DISCUSSION

When comparing the disaster information gathering behaviour of Japanese and foreign respondents, the largest differences could be seen in which sources were trusted and which media and language were utilized for acquiring disaster information. In the case of the Japanese respondents, they trusted domestic sources more than overseas sources but also distrusted domestic sources more than overseas sources. When looking at the language used for acquiring information, however, it can be seen that Japanese respondents turned primarily to Japanese-language forms of media; therefore, their relative trust and distrust of domestic sources versus overseas sources may be attributed to their lack of utilization of overseas (non-Japanese language) media. In the case of foreign respondents, Japanese, English, and other language media were all utilized, and it could also be seen that foreign respondents tended to trust domestic and overseas sources relatively equally, but distrusted overseas sources more than domestic sources. The overlap between sources which were ranked highly as both trusted and distrusted could be seen for both Japanese and foreign respondents, and indicates that there was a large disparity between individuals regarding which sources were or were not trusted – that is, one person’s most-trusted source may be another person’s least-trusted source. Considering the responses of both groups, it would appear that Japanese and overseas academic and research institutions and international organizations may be a good means for disseminating disaster information in the future, as they both had good trust levels and little distrust for both Japanese and foreign respondents.

For information importance and information difficulties over time, little difference between the responses of Japanese and foreigners was observed. However, the reasons why respondents encountered information difficulties differed; while both groups cited conflicting information as the primary reason, foreign respondents appeared to encounter more difficulties with language, whereas Japanese respondents focused more on inability to access information. Conflicting information and language difficulties may not be completely independent, however, as Japanese respondents could be assumed to have had conflicting information in Japanese alone, whereas foreign respondents may have encountered conflicting information more broadly and in different languages, as they utilized English and other languages more than Japanese respondents. This reason for information disparity may lie within the role which the mass media fulfills in disseminating disaster information. After a disaster, during the “response” and “recovery” phases, the information transmitted by the mass media is

generally focused on the affect areas in order to assist with recovery, but in the long-term “mitigation” phase the mass media help provide information to raise awareness and improve preparation, often through coverage of non-local disasters (Quarantelli, 1996). Therefore, in the aftermath of the Tohoku Earthquake, it can be said that the domestic coverage was intended to support recovery activities but overseas coverage was focusing on lessons for disaster mitigation in their own countries. As a result, foreigners in Japan who turned to overseas media, perhaps due to language comprehension or other problems, encountered disaster information for which they were not the target audience; that is, they needed local information but the sources they could turn to were not providing them with the information they needed.

By far, the largest difference between Japanese and foreign respondents could be observed in the post-disaster action; that is, whether the respondents elected to remain in the Kanto area or relocated. A large majority of the Japanese respondents chose to remain in the Kanto area, with “personal decision” being the most-cited reason for this choice. For foreigner respondents, however, the reasons were more varied but perhaps the largest differences in reasons is the “family request.” The cause of this large difference may also be related to the previous discussion on the target audience of domestic versus overseas coverage of the disaster. Families of foreigners living in Japan may not have been able to receive information about their family member’s local situation, instead only receiving information which focused on the broader issues. As a result, they may have passed on information they were receiving from their overseas sources to their family members in Japan, thus creating conflicting information for those residing in Japan who were receiving domestic information. As this difference in post-disaster response is the largest observed between Japanese and foreign respondents, and was also a critical issue post-disaster as reported in various news sources as mentioned earlier, the next step in the analysis of the survey data will be to examine the characteristics and differences between foreign respondents who remained in Japan and those who chose to relocate.

## 5. CONCLUSION

In this paper, disaster information gathering behaviour and post-disaster actions were investigated through an online survey targeting people who were residing in the Kanto area of Japan at the time of the 2011 Tohoku Earthquake, and specifically compares the results of Japanese and foreigners. From the results, the largest difference could be seen in the post-disaster actions, where it was found that a much larger percentage of foreigners than Japanese chose to relocate from the Kanto area rather than stay and, for foreign respondents, the request of family members to relocate was more highly cited as the reason for the post-disaster action than for Japanese respondents. In addition, foreign respondents tended to encounter more language difficulties when trying to collect disaster information than Japanese respondents. These factors may be affected by the roles of the domestic versus overseas sources; for foreign respondents who could not understand local coverage due to language issues, they were forced to turn to overseas sources, but these sources were not reporting the type of localized recovery information which was necessary for their situation, and possibly caused confusion when this coverage or information conflicted with other information. It could also be seen that foreign respondents turned to media provided in Japanese, English, and other languages, whereas Japanese utilized primarily Japanese-language sources.

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