International Journal of Disaster Risk Reduction 34 (2019) 108–115

Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

journal homepage: www.elsevier.com/locate/ijdrr

How do natural hazards affect participation in voluntary association? The social impacts of disasters in Japanese society

Juheon Lee[a,*], Timothy Fraser[b]

[a] Department of Political Science, Northeastern University, 915 Renaissance Park, 360 Huntington Ave., Boston, MA 02115-5000, United States
[b] Department of Political Science, Northeastern University, 960A Renaissance Park, 360 Huntington Avenue, Boston, MA 02115-5000, United States

ARTICLE INFO

Keywords:
Disaster experience
Civil society
Voluntary association
Social capital
Japan

ABSTRACT

This study focused on the way individuals' past experiences with disasters and their perceived risks of disasters affect their involvement in voluntary associations, which are important indicators of social capital. Moreover, as recent social capital studies have examined the different types of associations that contribute to the formation of social capital in various ways, for this present study, associations were categorized as civic, reward-based, and social/recreational. The results indicate that both respondents' experiences with disasters and their perceived risks of disasters tend to increase both the number of associations in which they participate and their degree of involvement. However, experiences related to disasters had a higher impact on the number of associations in which residents participate than on their degree of involvement. Individuals' experiences with disasters also increased their tendency to join civic associations, whereas their perceived risks of disasters increased participation in both civic and reward-based associations. Social/recreational associations were not significantly affected by either disaster experiences or the perceived risks of a disaster.

1. Introduction

The 2011 triple disaster in Japan—the Tohoku earthquake, the subsequent tsunami, and the Fukushima Daiichi meltdown—highlighted the devastating impacts of disasters on cities, but recent research indicated the possibility that some areas can 'bounce back better' than others [1–3]. For example, social capital studies have emphasized that communities with greater social capital, which includes strong social ties between residents, can better mobilize after disasters, coordinate with local officials, and engineer an effective recovery process [see 4–9]; however, major questions regarding the effect of disasters on social ties remain. For instance, the effects of pre-disaster social capital on the post-disaster recovery process cannot be estimated without considering how disaster events alter social capital. Therefore, in this study, the ways in which individuals' direct and indirect experiences with natural hazards affect their social ties in the context of Japan were explored. Among various measures of social capital, the focus of this study is individuals' participation in voluntary associations, such as neighborhood organizations, temples and churches, political organizations, and sports associations, which have been considered key indicators and sources of social capital [see 10–16].

Disaster scholars have long recognized that major damage in the face of natural hazards is caused by man-made vulnerabilities [17,18]. Residents in disaster-stricken areas are often exposed to technological catastrophes after extreme natural events, as seen in the Fukushima Daiichi meltdown; therefore, some scholars specifically called this natural event-triggered technological disaster a *natech* disaster [see 19–21]. The present study is based on a survey that explores people's direct exposure to and the fear of having both extreme natural hazards and the following technological catastrophes; man-made technological disasters, such as oil spills, chemical spills, or radiation leaks, are therefore not included in the analysis.

This study contributes to the literature on community resilience and social capital in three ways. First, although some scholarship has investigated the impacts of natural hazards on social trust and the sense of solidarity among community members [see 22–29], few have particularly focused on the impacts of natural disasters on residents' participation in voluntary associations. The results of this study can therefore fill this gap in the literature. Second, individuals' participation in voluntary associations is a widely used measure of social capital that has been included in various national/international social surveys. The results of this study therefore provide empirical evidence that is more generalizable and potentially applicable to other community problems, such as crime, disease, and terrorism, in various cultural/social contexts. Third, this study also examined different types of voluntary associations to address a growing concern among social capital scholars

* Corresponding author.
E-mail addresses: lee.juhe@husky.neu.edu (J. Lee), fraser.ti@husky.neu.edu (T. Fraser).

https://doi.org/10.1016/j.ijdrr.2018.11.009
Received 8 July 2018; Received in revised form 29 September 2018; Accepted 6 November 2018
Available online 17 November 2018
2212-4209/

that voluntary associations are not monolithic. Some scholars have argued that different types of associations may have different social characteristics [see 30–33]. To test this postulation, this study explored how natural disasters have affected individuals' participation in different types of associations. The results can help identify which types of associations are more closely associated with disasters.

In the following sections, a review of the scholarship on the social impacts of natural disasters and the factors that potentially affect individuals' decisions to participate in voluntary associations is presented. Then, the methodology, data, and variables are outlined. Next, the test results of the regression analysis are reported. Finally, the findings and implications are discussed.

2. Social impacts of natural disasters and voluntary associations

A growing number of studies have paid special attention to making communities more prepared for and resilient against disasters [34]. Among them, social capital studies have emphasized the usefulness of social capital during and after natural disasters [e.g. 5,6,9,35–37]. Such studies have commonly shown that social capital is a critical resource not only for the post-disaster recovery process but also for the transformation of a community into a more resilient community than before [38–41]. Community resilience is the collective ability to absorb changes and build sustainable environments during and after disasters; therefore, social capital, generated through community members' trust, norms of volunteerism, and social networks, is an important asset for the entire community [6,15,37]. As community resilience is strongly influenced by pre-disaster social contexts and processes that are endogenous to local communities, studies have been looking for various socioeconomic and demographic characteristics of communities to measure their social equilibrium, vulnerability, or preparedness in pre-disaster settings [9,35,40–44]. More recently, social capital studies have emphasized the existence of the following three types of social capital that are important in times of disaster: bonding, bridging, and linking social capital [5,6,36,37,45]. Bonding social capital represents the close ties that build cohesion within homogeneous groups, such as specific communities, neighbors, or friends [4,46]. Bridging social capital represents the loose ties between groups that bring people together across diverse social divisions [47–49]. Finally, linking capital focuses on the vertical relationship between groups [50,51]. However, less attention has been focused on how disaster events affect or alter the level of social capital, which was the motivation of this study. Whether pre-disaster social capital plays a crucial role after disaster events cannot be fully determined without determining whether or not and to what extent disaster events affect social ties.

Previous studies on the social impacts of disasters have produced two divergent findings. The first group of scholars has emphasized the depletion of social capital after disasters. Individuals affected by a disaster tend to prioritize personal interests, such as the protection of private property, over collective goals, such as the protection of the community, which decreases social integration. Norris and Kaniasty reported a community-wide decrease of participation in social activities, which has a negative long-term impact on individual victims of floods [52,53]. Miller also showed evidence of the erosion of trust in the city of New Orleans, which set survivors against outsiders and neighbors against neighbors [25]. Papanikolaou found that the victims of wildfires in Greece in August 2007 were less likely to appreciate mutual support [54]. Some technological catastrophes also reported negative effects on residents. Ritchie argued that specific kinds of disasters, such as oil spills, can deplete formal and informal social capital and trust between individuals [55]. In so-called corrosive communities, residents become divided on proper responses to the local extractive industries that caused these hazards. These populations face greater stress because crisis threatened their resources, caused them to lose such resources, or made them unable to gain equivalent compensation for resources [56]. For example, in both the Exxon Valdez and BP oil spills, communities that also relied on fishing or other renewable resources as a main source of economic revenue experienced high stress and declining social capital [56–58].

Another group of studies has indicated an increase in sympathy and altruism after disasters [22–24,26–29]. This group of studies has shown that normless behavior after disasters is less common than is generally believed and that altruistic and reciprocal behaviors emerge when family, friends, and neighbors are at risk [59]. Some types of natural hazards may provide an opportunity for individuals to work together in order to address their collective challenges. Yamamura's research on the Kobe earthquake in Japan in 1995 revealed increased social capital among affected residents [60]. Dussaillant and Guzman investigated social trust before and after the 2010 earthquake in Chile and found that a disaster situation is an opportunity to strengthen the levels of interpersonal trust; however, areas with lower initial trust levels showed a weaker trust-building process than areas with higher initial trust [61].

Some studies reported a temporarily increase in solidarity immediately after a disastrous event [see 52,53]. Chang reported that cohesion increased at the initial flood stage, but residents diverted their focus to individual interests as the severity of the disaster increased [62]. Powerful collective rituals, such as communal mourning, increased social integration and thus promoted solidarity in the short term. In assessing the impact of the massacre at Virginia Tech in 2007, Hawdon and Ryan pointed out that depending on the type of activity involved, solidarity may last for 5–13 months before behaviors return to the original levels [63]. Collins suggested that traumatic events may affect a population's degree of solidarity for up to nine months [64].

The different findings of previous studies have made the effect of disasters on social capital unclear; therefore additional empirical evidence is required to determine the relationship between disasters and social capital. Among the various indicators of social capital, this study specifically focused on voluntary associations. Participation in voluntary associations is an important indicator of social capital [10–16,65]; however, in most social capital studies, individuals' participation in voluntary associations has been examined as an independent variable, not as a dependent one. Only a few studies have shown the close relationship between irregular events, such as war and neighborhood crime, and participation in voluntary associations [33,66]; furthermore, it has not been tested in relation to natural hazards.

There are important social factors that shape participation in voluntary associations. Scholars have found that individuals' participation in voluntary associations tends to depend on their demographic characteristics, such as age, gender, wealth, and education, as well as personality characteristics [see 65]. Kiyota specifically focused on post-disaster civil society and argued that community elders can function as significant sources of community ties [67]. Lipset hypothesized that wealthier societies became more democratic because they fostered a strong middle class that organized itself into civic associations and effectively pressured the government to make policies favorable to the majority of citizens [68]. Working-class families tend to have less time to participate in civil society than white-collar families are because working-class families must often balance multiple jobs. Bekkers found that the level of education also increased memberships to political/non-political associations in the Netherlands [65]. Moreover, scholars would be remiss to ignore that many voluntary associations are gender based, and participation in these associations is motivated by different pressures. For example, Japan has strong female-oriented food cooperatives, such as the Seikatsu Club, which sometimes also function as political promotion groups for female political candidates. These groups became hotbeds for women's political participation, as did a new generation of women's associations and female-oriented anti-nuclear campaigns after the Chernobyl and Fukushima disasters [69–72]. Bekkers likewise suggested that personality characteristics, such as empathic concern, conscientiousness, and agreeableness, tend to increase participation in voluntary associations [65]. In addition, urban and

Table 1
Participation in voluntary associations in Japan.

Association type	Association category	Membership	Percentage of total respondents
Total	Any of below association	1889	80.9%
Civic associations	Residential association	1399	59.9%
	Volunteer groups	175	7.5%
	Civic movement association	367	15.7%
	Religious association	237	10.1%
Rent-seeking association	Political association	103	4.4%
	Unions	241	10.3%
	Professional association	202	8.7%
Social/recreational association	Alumni groups	1030	44.1%
	Recreational association	712	30.5%

rural areas are different in terms of traditionalism and population density, which can affect residents' social behavior [73]. Finally, years lived in the neighborhood suggested that people who live in a community for a long time tend to be more attached to the neighborhood and maintain long-term relationships with neighbors, creating community cohesion [74,75].

Furthermore, while the primary goal of this study was to determine the impact of disasters on residents' social ties, the increasing concern that voluntary associations are not monolithic was also investigated. Some studies have shown that different social organizations serve as sources of social capital in different ways. Knack and Keefer's study and Rupasingha's study identified the characteristics of different forms of social organizations by categorizing them into Putnam-type and Olson-type social organizations [30,31]. Putnam-type social organizations are based on civic interactions that promote trust and cooperation, and examples are volunteer groups and religious organizations; Olson-type organizations are rent-seeking social organizations, in which forming and joining are based on financial or other material incentives, and examples are political associations, professional associations, and unions [30,31]. Knack and Keefer and Rupasingha concluded that although both types of organizations are positively related to social capital, Putnam-type organizations are a better indicator of social capital than are Olson-type organizations. Building on these findings, Moore and Recker distinguished recreation-type social organizations from Putnam-type organizations on the basis of the assumption that organizations without clear civic causes or goals, such as recreational organizations and sport clubs, would have different characteristics from religious and civic organizations [32]. Recreation-type organizations tend to be informal and private, whereas Putnam-type organizations are relatively formal with public meetings and civic goals. They also found that Putnam-type organizations were more significant indicators for reducing neighborhood crime than other types of organizations and that in particular, organizations that people join with economic expectation do not have a significant effect on reducing crime [32].

Drawing from the literature review, the following sections first analyze the impacts of two aspects of natural disasters—disaster experiences and perceived risks of disaster—on individuals' participation in voluntary associations. Then, the voluntary associations will be grouped into three types of associations.

3. Methods

Data were collected from the Japanese General Social Survey (JGSS), a national survey jointly conducted as a part of the East Asian Social Survey in 2012. The survey was carried out by the JGSS Research Center at Osaka University of Commerce in Japan. A total of 2335 respondents were chosen by two-stage stratified random sampling, stratified by regional block and population size. The survey was carried out through face-to-face interview and computer-assisted personal interview, and the response rate was 58.8%. The six Japanese regional blocks examined are Hokkaido/Tohoku, Kanto, Chubu, Kinki, Chugoku/Shikoku, and Kyusyu. For this study, the dataset was obtained through the Inter-University Consortium for Political and Social Research (https://www.icpsr.umich.edu).

The dependent variable is the respondents' participation in voluntary associations. Participation in these associations has been included in many international/national social surveys, but depending on the survey, the categories are slightly different. For example, Curtis used the World Value Survey, which lists a total 16 social associations, whereas Delhey and Newton used the Euromodule, which has 9 associations [11,12]. Other studies used nationwide surveys that have different numbers of categories [see 13,76]. The JGSS suggests examining the following nine associations: political associations, residential/neighborhood associations, social service club/volunteer groups, citizens' movement/consumers' cooperative groups, religious groups, alumni associations, recreational associations, labor unions, and occupational/professional associations. The frequency and the percentage of the respondents' participation in each association are shown in Table 1. Approximately 81% of the respondents were members of at least one of the suggested associations. Among them, residential associations (59.9%) was the most popular in Japan, followed by alumni groups (44.1%), recreational associations (30.5%), and civic movement associations (15.7%). For further analysis, each association was categorized into the following three types of associations: civic associations, reward-based associations, and social/recreational associations [see Table 1]. Civic associations are similar to Knack and Keefer's Putnam-type associations in which individuals meet in public with clear civic goals to develop networks and trust [30]. Reward-based associations are similar to Olson-type associations, in which the primary purpose is to acquire financial and economic rewards from membership. Finally, social/recreational associations are similar to Moore and Recker's Recreation-type associations, in which individuals engage in private and informal interactions related to recreational and social activities [see 30–33].

In addition to memberships with the suggested associations, the JGSS also asks whether the respondents are actively involved in the associations. Each respondent was asked to choose among the following three suggested answers: (1) "No membership," (2) "Yes, but rarely involved," and (3) "Yes, actively involved." Four output variables were developed to compare the depth and breadth of participation [see 65]. The first output variable was a binary variable, coding respondents with memberships to any suggested associations regardless of the level of involvement (0 = "No membership"/1 = "Yes, but rarely involved" or "Yes, actively involved"). The second output variable was also a binary variable that coded the respondents' active participation in any of the suggested associations (0 = "No membership" or "Yes, but rarely involved" / 1 = "Yes, actively involved"). The third output variable tested the breadth of participation by counting the number of memberships to each of the suggested associations. The final output variable only included the number of associations that the respondents were actively involved in. Logistic regression analysis was used for the first two binary output variables, and negative binomial regression was used

Table 2
Descriptive statistics for variables.

Variables	Value Label	Mean	S.D.
Participation in association			
Political association	0 No membership 1 Yes, but hardly involved 2 Yes, actively involved	.06	0.28
Residential association	Same as above	0.78	0.72
Volunteer groups	Same as above	0.11	0.41
Civic movement association	Same as above	0.19	0.46
Religious association	Same as above	0.14	0.44
Unions	Same as above	0.59	0.72
Professional association	Same as above	0.51	0.81
Alumni groups	Same as above	0.12	0.38
Recreational association	Same as above	0.12	0.41
Perceived risk of natural disaster	1 Unlikely 2 Less likely 3 Likely 4 Most likely	2.15	0.72
Disaster Experience	0 Never had such problem 1 have actual experience	0.66	0.47
Age	20 years old − 89 years old	53.27	16.88
Education	6 years − 18 years	13.06	5.27
Gender	0 Male 1 Female	0.53	0.50
Household Income	1 Far below Average 2 Below average 3 Average 4 Above average 5 Far above Average	2.59	0.90
Urbanization	1 A farm in rural area 2 A village in rural area 3 A town or small city 4 City outskirts 5 A big city	2.82	0.88
Duration of Residence	1 Less than 1 year 2 Less than 2 years 3 Less than 5 years 4 Less than 10 years 5 Less than 20 years 6 20 years and more	5.16	1.30

for the final two count output variables.

As explanatory variables, information regarding the respondents' past experiences with natural disasters and their perceived risks for natural disasters was obtained [see 62,77]. For disaster experiences, the respondents were asked whether they had formal and informal channels for help when they actually encountered disaster situations in the past. People who answered "Never had such a problem" were coded 0, and other answers were coded 1. For the perceived risks of natural disasters, the respondents were asked to evaluate the possibility of natural disasters for earthquakes, floods, landslides, and any disasters that may affect nuclear facilities in their living areas and to choose among the following four suggested answers: "unlikely" (1), "less likely" (2), "likely" (3), and "most likely" (4).

As control variables, respondents' age, education level, gender, household income, urbanization, and duration of residence were included. Table 2 summarizes the variables. These included several ordinal measurements. Urbanization was measured on a scale from 1 to 5, including farms in a rural area (1), villages in rural areas (2), towns or small cities (3), city outskirts (4), and big cities (5). Household income included the following five categories: far below average (1), below average (2), average (3), above average (4), and far above average (5). Finally, duration of residence was measured on an ordinal scale with the following anchors: less than 1 year, less than 2 years, less than 5 years, less than 10 years, less than 20 years, and 20 years or more. Best practice often transforms duration of residence into a ratio of percentage of life spent in an area [see 78–80], but this study could not do so without conflating continuous data with ordinal data. Instead, by including both age and duration of residence in out models, we control for the effects of age on duration of residence. Finally, dummy variables for the six regions of Japan were included, and the standard errors were clustered by region to net out regional variations and manage heteroscedasticity. The variance inflation factor for all models was below 2.5, which is acceptable for most social science research.

Table 3
The impact of disaster experience and perceived risk of disaster on participation in voluntary associations: The intensity and breath of participation.

Participation in association	Participating in any association		Number of participating associations	
	Having membership (1)	Active participation (2)	Having membership (3)	Active participation (4)
Disaster experience	− 0.014 (0.011)	0.010 (0.023)	0.143*** (0.025)	0.066** (0.032)
Perceived risk of disaster	0.017 (0.012)	0.039*** (0.013)	0.124*** (0.023)	0.076*** (0.029)
Age	0.005*** (0.001)	0.007*** (0.001)	0.021*** (0.002)	0.011*** (0.001)
Education	0.027*** (0.004)	0.027*** (0.003)	0.143*** (0.009)	0.042*** (0.010)
Gender	0.019 (0.014)	0.039 (0.025)	0.065 (0.105)	0.023 (0.039)
Household Income	0.033*** (0.010)	0.039*** (0.013)	0.203*** (0.035)	0.084*** (0.021)
Urbanization	− 0.006 (0.008)	− 0.021** (0.008)	0.009 (0.037)	− 0.035* (0.019)
Duration of Residence	0.009 (0.006)	0.037*** (0.003)	0.102*** (0.013)	0.102*** (0.009)
Region dummies (Ref.: Hokkaido/Tohoku)				
Kanto	− 0.030*** (0.007)	0.004 (0.009)	− 0.091*** (0.025)	− 0.008 (0.010)
Chubu	0.020*** (0.004)	0.025*** (0.005)	− 0.001 (0.009)	0.028** (0.011)
Kinki	− 0.020*** (0.003)	− 0.007 (0.005)	0.00001 (0.017)	0.003 (0.007)
Chugoku/Shikoku	− 0.013*** (0.003)	− 0.069*** (0.002)	− 0.084*** (0.007)	− 0.078*** (0.013)
Kyusyu	− 0.077*** (0.003)	− 0.027*** (0.003)	− 0.137*** (0.010)	0.020** (0.009)
Observations	2281	2281	2281	2281
Log Likelihood	− 1033.860	− 1471.725	− 3842.868	− 2462.762
AIC	2095.719	2971.450	7713.735	4953.523
Theta (std.err)			43.886 (31.219)	2.091 (0.299)***
Pseudo R^2 (Nagelkerke)	0.139	0.126	0.186	0.134
Pseudo R^2 (CoxSnell)	0.088	0.094	0.181	0.120

Notes: .
(1) and (2) are logistic regression models, and (3) and (4) are negative binomial regression models; coefficients are marginal effects at the means; standard errors are clustered by region; all model included region as dummy variables.
* p < .1.
** p < .05.
*** p < .01.

4. Results

First, four regression models were structured to compare the intensity and the breadth of participation in associations. The first two models (model 1 and nodel 2) tested the respondents' involvement in any of the nine suggested associations, and a logistic regression was used for the first two models because the dependent variables were coded as dichotomous outcomes. The next two models (Model 3 and Model 4) tested the number of associations in which the respondents participated, and negative binomial regression models were used because the dependent variables were count data with over-dispersion (c-hat > 1).

Table 3 presents the results of the impact of disaster on participation in voluntary associations. Coefficients are shown as marginal effects at the means, which indicate the change in the predicted probability of participation in an association for one-unit change in an explanatory variable holding all other variables constant. For having a membership to any association (model 1), there was no significant effect for either the respondents' past experiences of disasters or their perceived risks of disasters. For active participation in any association (Model 2), the respondents' disaster experiences did not show a significant effect, but their perceived risks of disaster increased the probability of active participation by 3.9% ($b = 0.039$, $p < [\,0.01$. Model 3 showed that those who experienced a disaster had a 14.3% higher probability of having a membership to a greater number of associations than those who had not ($b = 0.143$, $p < .01$). Furthermore, an increase in perceived risks of disaster increased the probability of a membership to a higher number of associations by 12.4%. ($b = 0.124$, $p < .01$). In model 4, the probability of the respondents having a higher number of active memberships to participating associations for those who experienced a disaster was about 6.6% higher than those who had not ($b = 0.066$, $p < .05$). An increase in the perceived risks of disasters also increased the probability of a having a higher number of active memberships to participating associations by 7.6% ($b = 0.076$, $p < .01$). A summary of the impacts of the two disaster-related variables regarding the depth and breadth of participation in associations shows that both actual disaster experiences and perceived risk of a disaster tended to have positive effects on respondents' participation in voluntary associations, but the effects were stronger and more significant for the breadth than for the depth of participation. In other words, disasters had a larger impact on the number of associations in which residents participated than the degree of involvement.

In addition to the effects of disasters, age had a positive effect on participation in associations. Respondents older by a year showed a 0.5% higher probability of having memberships to any association ($b = 0.005$, $p < .01$), a 0.7% higher probability of actively participating in any association ($b = 0.007$, $p < .01$), a 2.1% higher probability of having memberships to a greater number of associations ($b = 0.021$, $p < .01$), and a 1.1% higher probability of active participation in a greater number of associations. Level of education also increased the respondents' probability to participate in an association. A one-year increase in education increased the probability of having membership to any association by 2.7% ($b = 0.027$, $p < .01$), the probability of active participation in any association by 2.7% ($b = 0.025$, $p < .01$), the probability of having membership to a greater number of associations by 14.3% ($b = 0.143$, $p < .01$), and the probability of active participation in a greater number of associations by 4.2% ($b = 0.042$, $p < .01$). These findings are consistent with those of previous studies indicating that older citizens tended to participate in associations more actively [67]; however, gender did not show a significant effect for any aspects of participation in voluntary associations. Household income also affected the probability of participation in these associations. A one-scale increase in household income increased the probability of having membership to any association by 3.3% ($b = 0.033$, $p < .01$), active participation in any association by 3.9% ($b = 0.039$, $p < .01$), having membership to a greater number of associations by 20.3% ($b = 0.203$, $p < .01$), and active participation in a greater number of associations by 8.4% ($b = 0.084$, $p < .01$).

Urbanization tended to have negative effects on respondents' participation in associations. Urbanization decreased the probability of active participation in any association by 2.1% ($b = -0.021$, $p < .05$) and the probability of active participation in a greater number of associations by 3.5% ($b = -0.035$, $p < .10$); however, the effects of urbanization were not significant for having membership to any association or having membership to a greater number of associations. Finally, duration of residence had positive effects on residents' participation in voluntary associations. Duration of residence did not have a significant effect on having membership to any association, but it significantly increased the probability of active participation in any association by 3.7% ($b = -.037$, $p < .01$), having membership to a greater number of associations by 10.2% ($b = 0.102$, $p < .01$), and active participation in a greater number of associations by 10.2% ($b = 0.102$, $p < .01$).

For further analyses, two sets of logistic regression models were structured to test the effects of disaster experiences and perceived risks of disasters on the respondents' participation in the following three different types of associations: civic association, reward-based association, and social/recreational association. Table 4 presents the results. The results of all six models first indicated that the respondents' disaster experiences in the past significantly affected their participation in civic associations: model 1 and model 4 showed that those who had experienced disasters tended to have a 4% higher probability of having membership to civic associations ($b = 0.040$, $p < .01$) and a 2.8% higher probability of active participation in civic associations ($b = 0.028$, $p < .05$) than those who did not. Disaster experiences did not show a significant effect on other types of associations, which indicates that the respondents' past experiences with disasters led them to join and actively engage in associations that have relatively public civic causes and goals rather than join rent-seeking organizations with financial incentives or social/recreational associations that are private, informal, and without civic or altruistic goals.

The results also showed that the respondents' perceived risk of disasters affected both civic associations and reward-based associations. For civic associations, an increase in perceived risks of disasters led to an increase in the probability of active participation by 2.8% ($b = 0.028$, $p < ..01$). For reward-based associations, a one-unit increase in perceived risks of disasters raised the probability of having a membership by 3.8% ($b = 0.038$, $p < .01$) and active participation by 2.2% ($b = 0.028$, $p < .01$). The results indicated that the respondents' perceived risks of disasters lead to participation in associations that have relatively clear goals and causes, whether these are civic or reward based, rather than participation in an association whose purpose is social and recreational.

Age only increased the probability of having membership to and active participation in civic associations and social/recreational associations. Younger people tended to have a higher probability of having membership to rent-seeking associations. The effects of education were positive, which is consistent with the results shown in Table 3. The results of gender showed that female respondents tended to participate in civic associations and social/recreational associations, whereas male respondents tended to participate in rent-seeking associations. Urbanization tended to decrease participation, but the effects were only significant for active participation in civic associations and social/recreational associations. Finally, duration of residence tended to increase participation in all three types of associations.

5. Discussion and conclusion

The aim of this study was to identify the degree to which experiencing a disaster and the perceived possibility of a disaster in the near future are associated with residents' participation in civil society. The social factors that influence an individual's probability to have

Table 4
The impact of disaster experience and perceived risk of disaster on active participation in associations: Participation by type of association.

Participation in association	Having membership			Active participation		
	Civic (1)	Reward-based (2)	Social/Recreational (3)	Civic (4)	Reward-based (5)	Social/Recreational (6)
Disaster experience	0.040*** (0.014)	0.013 (0.019)	− 0.023 (0.025)	0.028** (0.013)	0.003 (0.004)	0.004 (0.024)
Perceived risk of disaster	0.002 (0.004)	0.038*** (0.011)	0.011 (0.013)	0.028*** (0.009)	0.022*** (0.007)	0.005 (0.013)
Age	0.008*** (0.001)	− 0.002*** (0.0003)	0.006*** (0.001)	0.004*** (0.0004)	0.00003 (0.0002)	0.005*** (0.0004)
Education	0.022*** (0.006)	0.023*** (0.002)	0.058*** (0.008)	0.008 (0.005)	0.005* (0.003)	0.025*** (0.003)
Gender	0.078*** (0.029)	− 0.130*** (0.017)	0.022 (0.022)	0.014 (0.011)	− 0.042*** (0.008)	0.038*** (0.014)
Household Income	0.036*** (0.014)	0.056*** (0.012)	0.044** (0.019)	0.015 (0.014)	0.016*** (0.017)	0.035*** (0.013)
Urbanization	− 0.008 (0.017)	− 0.006 (0.010)	0.005 (0.011)	− 0.020** (0.010)	0.0005 (0.005)	− 0.010*** (0.003)
Duration of Residence	0.025*** (0.007)	0.0001 (0.007)	0.025*** (0.009)	0.040*** (0.007)	0.004* (0.003)	0.035*** (0.005)
Region dummies (Ref.: Hokkaido/ Tohoku)						
Kanto	− 0.079*** (0.015)	− 0.034*** (0.007)	− 0.002 (0.007)	− 0.025*** (0.008)	− 0.017*** (0.002)	0.041*** (0.003)
Chubu	− 0004 (0.004)	− 0.018*** (0.004)	− 0.010 (0.007)	− 0.006 (0.006)	− 0.017*** (0.001)	0.047*** (0.005)
Kinki	− 0.013 (0.011)	− 0.027*** (0.006)	− 0.060*** (0.008)	0.003 (0.003)	− 0.018*** (0.002)	0.008* (0.004)
Chugoku/Shikoku	− 0.007*** (0.001)	− 0.014*** (0.002)	− 0.085*** (0.010)	− 0.020*** (0.008)	− 0.013*** (0.002)	− 0.059*** (0.003)
Kyusyu	− 0.103*** (0.002)	− 0.031*** (0.002)	− 0.080*** (0.007)	− 0.017*** (0.004)	0.002 (0.002)	− 0.004 (0.003)
Observations	2, 229	2162	2247	2229	2162	2247
Log Likelihood	− 1308.418	− 1001.818	− 1437.100	− 1135.420	− 413.730	− 1268.806
AIC	2644.836	2031.635	2902.200	2298.839	855.461	2565.611
Pseudo R^2 (NK)	0.165	0.172	0.151	0.098	0.122	0.117
Pseudo R^2 (CS)	0.120	0.111	0.113	0.065	0.042	0.082

Notes: .
coefficients are marginal effects at the means; standard errors are clustered by region; all model included region as dummy variables.
* p < .1.
** p < .05.
*** p < .01.

membership with voluntary associations, have active participation, and have membership with three specific types of associations—civic associations, reward-based associations, and social/recreational associations—were also evaluated. The results of this study showed that individuals' perceptions of disasters, whether attributed to a direct experience or perceived fear, may create social bonds, which implies an increase in social capital. This finding is basically consistent with those of previous studies indicating an increase in sympathy and altruism following disasters [22–24,26–29,59]; however, it should be noted that unlike those of previous studies, the findings of the present study did not show the effects of specific types or magnitudes of disasters because the survey questions used did not specifically ask for such information. Therefore, the results of this study should be interpreted as individuals' general responses to disasters, which are different from those of previous studies that included case studies, such as the Kobe earthquake in 1995 and the Chile earthquake in 2010 [60,61].

The findings indicated that residents who experienced disasters joined more associations and were more likely to actively participate. Given that the dataset was generated in Japan following the 3/11 disasters in 2011, a number of these responses may represent those who experienced the triple disaster and then changed their behaviors according to their experiences. Residents who experienced disasters may have personally witnessed the value of social ties with their neighbors or the cost of having none. For example, after the Kobe earthquake in 1995, communities needed to obtain consent from local homeowners to remove rubble and to rebuild, but many had fled or were out of town, meaning that only communities in which neighbors knew each other well could rebuild quickly [5,81]. The demonstrated value of close neighborhood-level social ties during disasters may help explain why disaster experiences increase residents' degree of membership to and active participation in volunteer associations. However, these results do not rule out the possibility that the increased social activities deteriorate in the longer term [40,41]

Moreover, the findings of this study indicate that both disaster experiences and perceived risks of disaster are more strongly connected to the number of associations that the respondents participated in than to their degree of participation. Experiences with disasters had a particularly significant impact on the number of associations that the respondents joined but not on whether they joined at all. In other words, experiencing a disaster did not significantly compel residents to begin participating, actively or not, in any associations if they had not participated in any prior to a disaster. One reason may be that Japan has high rates of civil society participation. On-paper participation in residential associations (*chōnaikai*) is almost mandatory in many communities and apartment buildings. Consequently, while 60% previously joined a residential association, it makes sense that disaster experiences might encourage people to participate more actively because there are readily available sources of social capital in all communities. Conducting studies in other countries with different social systems could help determine whether this result is limited to Japan.

Furthermore, the result that people tend to respond to disasters by expanding the boundaries of networks more often than becoming more actively involved may indicate the benefits associated with weak ties, or bridging capital, which represents the loose ties between groups across diverse social divisions [47,82]. Studies have shown that weak ties are more essential than strong ties for a person's integration into the broader society [15]. This finding may reflect the Japanese people's tendency to create weak ties in response to disasters.

It is also notable that disasters did not affect all types of associations. Disaster experiences increased participation in civic associations that have relatively public, altruistic, and civic goals; however, residents who perceived that they might face a disaster in the near future had an increased likelihood to have membership with reward-based organizations and to actively participate in both civic and reward-based associations. Although participation in reward-based associations may seem less altruistic than civic associations, they provide a vital source of linking social capital [82]: reward-based associations, such as political associations or unions, may connect constituents with officials or professionals who can channel extra-local physical, financial, social, or political resources for residents, helping communities shape rebuilding plans and financial assistant packages in ways that best suit their needs; however, additional studies should be conducted regarding whether participation in reward-based associations can be equated with linking social capital.

It is also notable that disaster experiences and perceived risks of disaster did not show any statistically significant relationship with social/recreational associations in Japan. As discussed, social/recreational associations are private, informal, and not goal oriented compared with other types of associations. The finding may tell us that disasters motivate people to participate in associations that have goals and material benefits rather than associations designed for enjoyment.

While the respondents' personal demographic and socioeconomic factors generally supported the findings of previous studies, the current results suggested that access to reward-based associations is gender segregated. More than any other factor, being male predisposed respondents to a higher probability of membership to and active participation in reward-based associations. Japanese women, often excluded from professional associations, unions, and political associations, have developed alternative bases of political influence through local civic associations, such as volunteer movements [69]. The propensity of women to participate in civic associations, as indicated by the survey, also points to the rise in local women's movements, which have pushed local government to increase transparency related to food sourcing in schools, radiation monitoring, and other issues. While local movements have made progress with local governments, similar associations have had limited success in altering prefectural or national government policies related to nuclear power, which is in part due to their non-political stances and the lack of political capital [83]. In summary, this context should indicate that gender, among other factors, has a strong impact on the types of voluntary associations available to residents, sometimes limiting their access to linking social capital and their capacity to shape their own recovery efforts.

This study provides some implications. It was found that during a disaster or a threat of disaster, residents responded by increasing their levels of social engagement. Therefore, scholars should be cautious not to overestimate the impact of pre-disaster social capital; however, the findings did not necessarily diminish the importance of the effect of pre-disaster social capital on post-disaster resilience. Policymakers should carefully monitor whether increased participation in civic associations following a disaster leads to better recovery or greater inequities because of disparities in pre-disaster community resources.

The importance of these findings is limited in that the natural disaster variables used in this study did not include the types or magnitudes of disasters, which require further study. Further research is needed to assess whether residents' attitudes towards and participation in voluntary associations change, depending on the scale or the timing of the disaster. Moreover, the findings of this study may reflect Japanese cultural characteristics; however, a widely used indicator of social capital was used, so future studies can compare the results with other social and cultural contexts. Finally, the roles of political institutions and their policies were not considered. Scholars should investigate whether changes in governments over time affect community engagement patterns following a disaster.

References

[1] C.L. Dyer, The phoenix effect in post-disaster recovery: an analysis of the economic development administration's culture of response after Hurricane Andrew, angry Earth: Disaster Anthropol. Perspect. (1999) 278–300.
[2] G.P. Cimellaro, D. Solari, M. Bruneau, Physical infrastructure interdependency and regional resilience index after the 2011 Tohoku earthquake in Japan, Earthq. Eng. Struct. Dyn. 43 (12) (2014) 1763–1784.
[3] B. Manyena, G. O'Brien, P. O'Keefe, J. Rose, Disaster resilience: a bounce back or bounce forward ability? Local Environ.: Int. J. Justice Sustain. 16 (5) (2011) 417–424.
[4] F.O. Adeola, J.S. Picou, Race, social capital, and the health impacts of Katrina: Evidence from the Louisiana and Mississippi Gulf coast, Human. Ecol. Rev. 19 (1) (2012) 10–24.
[5] D.P. Aldrich, Building resilience: social capital in post-disaster recovery, University of Chicago Press, 2012.
[6] D.P. Aldrich, M.A. Meyer, Social capital and community resilience, Am. Behav. Sci. 59 (2) (2015) 254–269.
[7] R.S. Cox, K.M.E. Perry, Like a fish out of water: reconsidering disaster recovery and the role of place and social capital in community disaster resilience, Am. J. Community Psychol. 48 (3–4) (2011) 395–411.
[8] R. Dynes, Social capital: Dealing with community emergencies, Homel. Secur. Aff. 2 (2) (2006) 1–26.
[9] R. Wickes, R. Zahnow, M. Taylor, A.R. Piquero, Neighborhood structure, social capital, and community resilience: longitudinal evidence from the 2011 Brisbane flood disaster, Social. Sci. Q. 96 (2) (2015) 330–353.
[10] J. Brehm, W. Rahn, Individual-level evidence for the causes and consequences of social capital, Am. J. Political Sci. 41 (3) (1997) 999–1023.
[11] J.E. Curtis, D.E. Baer, E.G. Grabb, Nations of joiners: explaining voluntary association membership in democratic societies, Am. Sociol. Rev. (2001) 783–805.
[12] J. Delhey, K. Newton, Who trusts? The origins of social trust in seven societies, Eur. Soc. 5 (2) (2003) 93–137.
[13] J.Y. Kim, "Bowling together" isn't a cure-all: the relationship between social capital and political trust in South Korea, Int. Political Sci. Rev. 26 (2) (2005) 193–213.
[14] C. Liu, D. Stolle, Social capital, civic culture and political trust, in: Zmerli, van der Meer (Eds.), Handbook on political trust, Edward Elgar Publishing, 2017, pp. 338–352.
[15] R.D. Putnam, Bowling alone: the collapse and revival of American community, Simon and Schuster, 2001.
[16] D. Stolle, T.R. Rochon, The myth of American exceptionalism, in: Jan van Deth, Marco Maraffi, Ken Newton, Paul Whiteley (Eds.), Social Capital and European Democracy, Routledge, London, 1999, pp. 192–209.
[17] P. O'Keefe, K. Westgate, B. Wisner, Taking the naturalness out of natural disasters, Nature 260 (1976) 566–567.
[18] A. Oliver-Smith, "What is a disaster?": anthropological Perspectives on a Persistent Question, in: A. Oliver-Smith, S. Hoffman (Eds.), The Angry Earth, Routledge, New York, 1999.
[19] A.M. Cruz, L.J. Steinberg, A.L. Vetere-Arellano, Emerging issues for natech disaster risk management in Europe, J. Risk Res. 9 (5) (2006) 483–501.
[20] J.S. Picou, Katrina as a natech disaster: toxic contamination and long-term risks for residents of New Orleans, J. Appl. Social. Sci. 3 (2) (2009) 39–55.
[21] A.M. Cruz, Y. Kajitani, H. Tatano, Natech Disaster Risk Reduction: Can Integrated Risk Governance Help? Risk Governance, Springer, Dordrecht, 2015, pp. 441–462.
[22] D.L. Brunsma, D. Overfelt, S.J. Picou, The sociology of Katrina. Perspectives on a modern catastrophe, Publishers, Rowman & Littlefield, Lanham, Maryland, USA, 2007.
[23] C.M. Douty, Disasters and charity: some aspects of cooperative economic behavior, Am. Econ. Rev. 62 (4) (1972) 580–590.
[24] H.W. Fischer, Response to disaster: fact versus fiction & its perpetuation: the sociology of disaster, University press of America, 1998.
[25] D.S. Miller, Visualizing the corrosive community: Looting in the aftermath of Hurricane Katrina, Space Cult. 9 (1) (2006) 71–73.
[26] E.L. Quarantelli, R.R. Dynes, Response to social crisis and disaster, Annu. Rev. Sociol. 3 (1) (1977) 23–49.
[27] F. Albrecht, Natural hazard events and social capital: the social impact of natural disasters, Disasters 42 (2) (2018) 336–360.
[28] R.G. Tedeschi, L.G. Calhoun, The posttraumatic growth inventory: measuring the positive legacy of trauma, J. Trauma. Stress 9 (3) (1996) 455–471.
[29] M.J. Poulin, R.C. Silver, V. Gil-Rivas, E.A. Holman, D.N. McIntosh, Finding social benefits after a collective trauma: perceiving societal changes and well-being following 9/11, J. Trauma. Stress 22 (2) (2009) 81–90.
[30] S. Knack, P. Keefer, Does social capital have an economic payoff? A cross-country investigation, Q. J. Econ. 112 (1997) 1251–1288.
[31] A. Rupasingha, S.J. Goetz, D. Freshwater, The production of social capital in US counties, J. Socio-Econ. 35 (1) (2006) 83–101.
[32] M.D. Moore, N.L. Recker, Social capital groups and crime in urban counties, Deviant Behav. 38 (6) (2017) 655–667.
[33] J. Lee, S. Cho, The impact of crime rate, experience of crime, and fear of crime on residents' participation in association: studying 25 districts in the city of Seoul, South Korea, Crime. Prev. Community Saf. 20 (3) (2018) 1–19.
[34] C. Perrow, The next catastrophe: reducing our vulnerabilities to natural, industrial, and terrorist disasters, Princeton University Press, 2007.
[35] D.P. Aldrich, Y. Sawada, The physical and social determinants of mortality in the 3.11 tsunami, Social. Sci. Med. 124 (2015) 66–75.
[36] R.L. Hawkins, K. Maurer, Bonding, bridging and linking: how social capital operated in New Orleans following Hurricane Katrina, Br. J. Social. Work (2010) bcp087.
[37] Y. Nakagawa, R. Shaw, Social capital: a missing link to disaster recovery, Int. J. Mass Emergencies Disasters 22 (1) (2004) 5–34.
[38] W.N. Adger, T.P. Hughes, C. Folke, S.R. Carpenter, J. Rockström, Social-ecological resilience to coastal disasters, Science 309 (5737) (2005) 1036–1039.
[39] B. Smit, J. Wandel, Adaptation, adaptive capacity and vulnerability, Glob. Environ. Change 16 (3) (2006) 282–292.
[40] F.H. Norris, S.P. Stevens, B. Pfefferbaum, K.F. Wyche, R.L. Pfefferbaum, Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness, Am. J. Community Psychol. 41 (1–2) (2008) 127–150.
[41] K. Magis, Community resilience: an indicator of social sustainability, Soc. Nat. Resour. 23 (5) (2010) 401–416.
[42] M. Breton, Neighborhood resiliency, J. Community Pract. 9 (1) (2001) 21–36.
[43] S.L. Cutter, B.J. Boruff, W.L. Shirley, Social vulnerability to environmental hazards, Social. Sci. Q. 84 (2) (2003) 242–261.
[44] K.M. Allen, Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines, Disasters 30 (1) (2006) 81–101.
[45] S. Szreter, The state of social capital: Bringing back in power, politics, and history, Theory Soc. 31 (5) (2002) 573–621.
[46] E. Klinenberg, Heat wave: a social autopsy of disaster in Chicago, University of

Chicago Press, 2015.
[47] M.S. Granovetter, The strength of weak ties, Am. J. Sociol. 78 (6) (1973) 1360–1380.
[48] J. Takeda, K. Tamura, S. Tatsuki, Life recovery of 1995 Kobe earthquake survivors in Nishinomiya City: a total-quality-management-based assessment of disadvantaged populations, Nat. Hazards 29 (3) (2003) 567–585.
[49] C.U. Mitchell, M. LaGory, Social capital and mental distress in an impoverished community, City Community 1 (2) (2002) 199–222.
[50] R. Ahmed, M. Seedat, A. van Niekerk, S. Bulbulia, Discerning community resilience in disadvantaged communities in the context of violence and injury prevention, S. Afr. J. Psychol. 34 (3) (2004) 386–408.
[51] C.W. Tse, J. Wei, Y. Wang, Social capital and disaster recovery: evidence from Sichuan earthquake in 2008, Center for Global Development, Washington, DC, 2013.
[52] F.H. Norris, K. Kaniasty, Received and perceived social support in times of stress: a test of the social support deterioration deterrence model, J. Personal. Social. Psychol. 71 (3) (1996) 498.
[53] K. Kaniasty, F.H. Norris, A test of the social support deterioration model in the context of natural disaster, J. Personal. Social. Psychol. 64 (3) (1993) 395.
[54] V. Papanikolaou, D. Adamis, R.C. Mellon, G. Prodromitis, J. Kyriopoulos, Trust, social and personal attitudes after wildfires in a rural region of Greece, Sociol. Mind 2 (1) (2012) 87.
[55] Liesel Ashley Ritchie, Individual stress, collective trauma, and social capital in the wake of the Exxon Valdez Oil Spill, Sociol. Inq. 82 (2) (2012) 187–211.
[56] Stevan Hobfoll, Traumatic stress: a theory based on rapid loss of resources, Anxiety Res. 4 (3) (1991) 187–197.
[57] Duane A. Gill, A. Ritchie Liesel, J. Steven Picou, Jennifer Langhinrichsen-Rohling, Michael A. Long, Jessica W. Shenesey, The Exxon and BP oil spills: a comparison of psychosocial impacts, Nat. Hazards 74 (2014) 1911–1932.
[58] Duane A. Gill, A. Ritchie Liesel, J. Steven Picou, Sociocultural and psychosocial impacts of the exxon valdez oil spill: twenty-four years of research in Cordova, Alaska, Extr. Ind. Soc. 3 (2016) 1105–1116.
[59] D. Sauri, V. Domingo, A. Romero, Trust and community building in the Doñana (Spain) toxic spill disaster, J. Risk Res. 6 (2) (2003) 145–162.
[60] E. Yamamura, Natural disasters and social capital formation: the impact of the Great Hanshin-Awaji earthquake, Pap. Reg. Sci. 95 (S1) (2016).
[61] F. Dussaillant, E. Guzmán, Trust via disasters: the case of Chile's 2010 earthquake, Disasters 38 (4) (2014) 808–832.
[62] K. Chang, Community cohesion after a natural disaster: insights from a Carlisle flood, Disasters 34 (2) (2010) 289–302.
[63] J. Hawdon, J. Ryan, Well-being after the Virginia Tech mass murder: the relative effectiveness of face-to-face and virtual interactions in providing support to survivors, Traumatology 18 (4) (2012) 3–12.
[64] R. Collins, Rituals of solidarity and security in the wake of terrorist attack, Sociol. Theory 22 (1) (2004) 53–87.
[65] R. Bekkers, Participation in voluntary associations: relations with resources, personality, and political values, Political Psychol. 26 (3) (2005) 439–454.
[66] Rieko Kage, Civic Engagement in Postwar Japan: The Revival of a Defeated Society, Cambridge University Press, 2010.
[67] E. Kiyota, Y. Tanaka, M. Arnold, D. Aldrich, Elders leading the way to resilience, The World Bank, 2015.
[68] Seymour Martin Lipset, Political Man: The social bases of politics, Doubleday & Company, New York, 1960.
[69] Robin LeBlanc, Bicycle Citizens: The Political World of the Japanese Housewife, University of California Press, 1999.
[70] Susan Pharr, Political Women in Japan: The Search for a Place in Political Life, University of California Press, 1981.
[71] Koichi Hasegawa, Constructing Civil Society in Japan: voices of Environmental Movements, Trans Pacific Press, Melbourne, 2004.
[72] Simon Avenell, Japan's long environmental sixties and the birth of A Green Leviathan, Jpn. Stud. 32 (3) (2012) 423–444.
[73] O. Nummela, T. Sulander, O. Rahkonen, A. Karisto, A. Uutela, Social participation, trust and self-rated health: a study among ageing people in urban, semi-urban and rural settings, Health Place 14 (2) (2008) 243–253.
[74] J.C. Buckner, The development of an instrument to measure neighborhood cohesion, Am. J. Community Psychol. 16 (6) (1988) 771–791.
[75] S. Riger, P.J. Lavrakas, Community ties: patterns of attachment and social interaction in urban neighborhoods, Am. J. Community Psychol. 9 (1981) 55–66.
[76] J. Lee, D. Yi, Still a new democracy? Individual-level effects of social trust on political trust in South Korea, Asian J. Political Sci. 26 (2) (2018) 201–220.
[77] M. Skidmore, H. Toya, Natural disaster impacts and fiscal decentralization, Land Econ. 89 (1) (2013) 101–117.
[78] M.R. Cope, J. Flaherty, K.D. Young, R.B. Brown, Olympic Boomtown: the social impacts of a one-time mega-event in Utah's Heber Valley, Sociol. Spectr. 35 (2) (2015) 136–160.
[79] Michael R. Cope, Tim Slack, Troy C. Blanchard, Matthew R. Lee, It's not whether you win Or lose, It's how you place The blame: assessing perceptions of blame for the deepwater horizon oil spill, Rural Sociol. 81 (3) (2016) 295–315.
[80] J. Flaherty, R.B. Brown, A multilevel systemic model of community attachment: Assessing the relative importance of the community and individual levels1, Am. J. Sociol. 116 (2) (2010) 503–542.
[81] D.W. Edgington, Reconstructing Kobe: The Geography of Crisis and Opportunity, UBC Press, 2011.
[82] M. Woolcock, D. Narayan, Social capital: implications for development theory, research, and policy, World Bank Res. Obs. 15 (2) (2000) 225–249.
[83] D.P. Aldrich, T. Fraser, All politics is local: judicial and electoral institutions' role in Japan's nuclear restarts, Pac. Aff. 90 (3) (2017) 433–457.

Juheon Lee is a PhD candidate in political science at Northeastern University. His research interests center on social capital, community resilience, environmental politics, social and political identities.

Timothy Fraser is a PhD student in the political science department at Northeastern University. He is the author of several articles on renewable energy and nuclear power in Japan and was a Fulbright Fellowship recipient in Japan from 2016 to 2017.