

Psychological Studies on Attitude and Social Norms after the 2011 Great East Japan Earthquake

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Dissertation

Psychological Studies on Attitude and Social Norms
after the 2011 Great East Japan Earthquake

(東日本大震災後の態度・規範に関する心理学的研究)

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EXECUTIVE SUMMARY

Japanese behavior after the 2011 East Japan earthquake disaster was impressive, showing calmness and a sharing attitude. Ten studies were conducted within 3 years after the disaster, aiming to provide information regarding social norms of community cooperation at local and national levels and also through a cross-country comparison.

This thesis consisted of five objectives to 1) explore and analyze post-disaster panic-cooperative behaviors among citizens in disaster-affected areas, 2) clarify post-disaster culture and determine how social norms changed after the 2011 Japan earthquake disaster, 3) explore public nuclear attitude after the 2011 disaster and the relationship between this and the reconstruction activities, 4) examine regional differences concerning attitudes and emotions toward reconstruction activities along with the effects of distance, level of damage, and historical disasters, and 5) study the perceptions of the 2011 disaster and Japanese behavior from the viewpoints of neighboring countries.

The first chapter covers literature reviews; introduces the background, theoretical concepts and objectives. Theoretical concepts in this thesis compose of sociological theories concerning behavior in emergency; arguments between disorderliness and calmness, panic, rumors, and the theory of disaster utopia, while also focusing on theories of crowd and collective behavior. The main focus is on “Emergent Norm theory” (Turner & Killian, 1972) which emphasizes the replacement of institutional norms with new ones

better suited to the situations that look deviant in eyes of others. This chapter also explains psychological theories concerning altruism in disaster; reasons why people become altruistic, and expectations for helping because of kin attachment, social exchange, and social norm. Evolutionary theory concludes that people prefer helping those with blood connections. Social categorization theory and in-group favoritism are examined from the helping state that individuals feel more sympathy toward people who are in-groups by categorizations including nationality, or personal experience than outgroups. Last but not least, this chapter reviews theories related to public nuclear attitude, and feedbacks from local people leading to conflict among areas concerning cooperation in reconstruction policies after the 2011 disaster, the area effects and other related concepts.

Working on the first purpose of this study, **Chapter 2** consists of two studies which depict states of human behavior one month after the disaster from photos, diaries, or blogs (study 1) and an open-ended questionnaire detailing unusual events that occurred after the disaster (study 2). The conclusion is drawn that even if small disagreements and disorganization occurred in disaster-affected areas, mutual aids and altruism were found everywhere and people behaved in a very orderly manner.

To explore the second objective, **Chapter 3** examines disaster social norms compared to ordinary norms by regions. Study 3 presents preliminary results comparing levels of unforgiveness against deviant behaviors in normal and emergency situations among college students in disaster-affected prefectures. We found that ‘buying things up’ and ‘sales on favoritism’ were more difficult to forgive in an emergency than in a normal

situation. ‘Illegal dumping’, ‘walkway parking’, and ‘electricity theft’ were easier to forgive in a disaster situation. Study 4 compares different areas. A sample of 3,836 adults was drawn from Iwate, Miyagi, Fukushima, Kyoto, Shiga, and Aichi Prefectures (640 respondents from each prefecture, 636 responses from Fukushima) via an internet survey. Interaction effects of area and behavior indicated that residents in affected areas found it significantly more difficult to forgive illegal dumping and vending machine theft than residents in non-affected areas in both normal and disaster situations. Results identified a slightly higher force for compliance with the social norm for people living in disaster-affected areas than those in other regions.

In **Chapter 4**, to study the public nuclear attitude in 2011 post-disaster, study 5 revises the attitudes of Japanese college students in Miyagi prefecture and Tokyo metropolitan area toward nuclear power plants. The objectives of the study are to 1) determine regional and gender differences regarding attitudes toward nuclear power after the Fukushima power plant accident, and 2) discover relationships between attitudes toward nuclear power plants and the post-disaster reconstruction policy in 2011, Japan. Factor analysis confirmed three attitudes toward nuclear power plants as efficiency, trust in institutions, and fear of radioactive contamination. Higher levels of fear regarding radioactive contamination negatively predicted acceptance of debris with lower than standard radiation levels ($p < .05$), acceptance of debris with higher than standard radiation levels ($p < .001$), and support for foods produced in affected areas ($p < .001$). Furthermore, higher levels of fear from radioactive contamination predicted higher levels

of vigilance related to foods produced in affected areas ($p < .001$). In contrast, nuclear power plant efficiency and trust in institutions did not significantly predict opinions related to post-disaster policies.

Fear is the emotion that affected public attitude toward post-disaster policies. To achieve the fourth objective, a series of study 6-8 in **Chapter 5** focuses mainly on attitudes and emotions concerning policies and examines their effects on distance, level of damage, and disaster history. Study 6 tests regional effects on attitudes and emotions toward reconstruction among college students in Miyagi Prefecture, Tokyo Metropolitan Area, and Kobe City. We found regional differences between residents in Miyagi and the other areas. Residents in Miyagi had a more positive attitude toward post-disaster activities, with less positive emotion to non-cooperative individuals than other areas. Studies 7 and 8 use the same data set but focus on the separated parts as regional differences of attitudes toward the post-disaster activities (study 7) and emotions concerning the supporters and dissenters of post-disaster reconstruction (study 8). There were 779 responses from Iwate, Miyagi, and Fukushima Prefectures (severely affected disaster area), Akita and Yamagata Prefectures (neighboring area/slightly affected disaster area), Tokyo metropolitan area (middle distance from disaster-affected area/slightly affected disaster area), and Kyoto, Hyogo, and Hiroshima Prefectures (far distance area/non-affected disaster area). Results of both studies supported that residents living closer to the disaster-affected sites had a more supportive attitude toward reconstruction, with higher negative emotions and lower positive emotions toward dissenters of reconstruction. In addition, distant areas affected

by the disaster such as Tokyo, where people were impacted by electric blackout, responded similarly to Akita and Yamagata located next to disaster-affected prefectures. Also, negative evaluations about dissenters in Hiroshima and Hyogo were stronger than in Kyoto, even though further away. We assumed that because Hiroshima had faced the atomic bomb and Hyogo had experienced the great Hanshin-Awaji Earthquake, residents in these two areas responded sympathetically to disaster victims regardless of their locations.

Chapter 6 introduces two studies detailing response from foreign countries in response to the fifth aim. study 9 presents results from an interview conducted in Taiwan seven months after the disaster. We found that people no longer trusted the safety of nuclear power in their countries after the disaster. They were afraid of buying products from Japan or visiting Japan, even though less than 20% of participants knew the correct location of the earthquake epicenter and the name of the leaking nuclear power plant. Study 10 notes the results of interviews in South Korea 11 months after the disaster. Similarly, respondents stated their fears regarding the safety of using nuclear power in their country, while fears of products from Japan included foods and merchandise that made contact with the body. One suggestion to lessen the negative impact of people watching disasters transmitted by the media was to replace images that can cause trauma with more positive depictions. For instance, Japan and other national governments should portray images of recovery, together with efforts by the Japanese Government to improve the safety of the population and safeguard Japanese exports.

Chapter 7 presents a general discussion regarding the development of our assumptions and understanding regarding social change post-disaster. According to the five objectives we found 1) there was very little panic and confusion in disaster-affected areas and extraordinary trust and mutual care, 2) people in disaster-affected areas tended to follow strict social norms compared to those from distant areas in both normal and disaster situations, 3) fear of radiation was a key factor for cooperative attitudes in post-disaster policy, 4) the distance and level of damage by the current disaster and disasters in the past affected attitudes and emotions with respect to cooperation with post-disaster activities, and 5) people from neighboring countries feared and distrusted the safe use of Japanese products, visiting Japan, and nuclear power plant operation in their own nations. In conclusion, people in disaster-affected areas tend to follow stricter social norms than people from other areas, with reduced feelings of trust and connection reflecting objections regarding cooperation in post-disaster activities. We suggest that regional differences in attitudes concerning cooperation result from not only distance but also from damage caused by current and past disasters with some limitations.

TABLE OF CONTENTS

		page
	Executive Summery	I
	Table of Contents	VII
Chapter 1	Introduction	1
	1. Background of the study	1
	2. Research objectives and theoretical background	3
	3. Patterns of disaster behavior from the view of sociology	5
	3-1 Crime and disorderliness after disaster	5
	(1) Routine Activity Theory	5
	(2) Panic	6
	(3) Panic myth	8
	(4) Rumor, mass hysteria, and moral panic	8
	(5) Post-disaster utopia	10
	(6) Emotional stages of survivors the four phases of disaster	10
	3-2 Crowd and collective behavior in a disaster situation	12
	(1) Types of the crowd	12
	(2) Collective behaviors	13
	(3) Collective behavior in the disaster aftermath	16
	(4) Emergent norm theory and the re-examination of reasonableness of behaviors	18
	(5) Disaster culture	19
	4. Altruism and helping during disaster aftermath	20
	4-1 Why do people help others?	20
	(1) Kinship	20
	(2) Reciprocity and social exchange	21
	(3) Social norms of altruism	22
	(4) Rewards and punishment in altruism	23
	(5) Deviance as a sanction	25
	4-2 The favoritism of altruistic decision	26
	(1) Social categorization theory	26
	(2) Ingroup favoritism	27
	4-3 Altruism in emergency: Latané and Darley's model of helping	30

5	The 2011 East Japan Disaster: Attitude toward the nuclear power and post-disaster policy	31
	5-1 General Information about the Great 2011 Japan disaster and its social phenomena	31
	(1) The earthquake, tsunami, and nuclear accident in Fukushima	31
	(2) Evacuating lives in an orderly manner: Worldwide admiration	34
	(3) Actual state of crimes in the affected area: Analyzing police data	36
	5-2 Attitude toward nuclear power and nuclear power plant	37
	5-3 The objecting voices of local people	40
	(1) Emotional conflicts among areas	40
	(2) The study of harmful rumor and the loss of mutual trust among areas	43
	(3) Effects of geographical difference in attitude about nuclear and reconstruction	46
	(4) Gender difference on attitude toward nuclear and the reconstruction	47
	(5) Emotion toward nuclear power and the reconstruction activities	49
6	Summary of the research purposes and literature reviews	51
Chapter 2	Deviant behaviors vs. altruistic behaviors after the 2011 Japan disaster	54
1	<u>STUDY 1</u> : The survey of behavior after the 2011 Japan disaster by diaries, blogs, and photographs	54
	1-1 Method	55
	1-2 Results	55
	1-3 Discussion	58
2	<u>STUDY 2</u> : The survey of behavior after the 2011 Japan disaster by open-ended questionnaire	59
	2-1 Methods	59
	2-2 Results	60
	2-3 Discussion	62
3	Conclusion	63

Chapter 3	The disaster subculture and social norms after the 2011 Great East Japan Earthquake	65
1	<u>STUDY 3</u> : The survey of forgiveness for deviant behaviors after the 2011 Great East Japan Earthquake (Preliminary survey)	66
	1-1 Method	66
	(1) Participants	66
	(2) Measurements	66
	(3) Procedures	67
	1-2 Results	68
	1-3 Discussion	69
2	<u>STUDY 4</u> : The survey of forgiveness for deviant behaviors after the 2011 Great East Japan Earthquake	70
	2-1 Method	70
	(1) Participants	70
	(2) Measurements	72
	(3) Procedures	72
	2-2 Results	73
	(1) Changes of unforgiveness on deviant behaviors	73
	(2) Effects of gender, age, anger, and shame/ embarrassment on forgiveness of deviant behaviors	75
	2-3 Discussion	78
3	Conclusion	80
Chapter 4	Structures of attitude toward the Fukushima nuclear disaster and its relationship with opinions about post-disaster reconstruction policies	82
1	<u>STUDY 5</u> : The questionnaire survey of Japanese university students' attitudes toward the Fukushima nuclear disaster	82
	1-1 Methods	83
	(1) Participants	83
	(2) Measurements	84
	(3) Procedures	86
	1-2 Results	87
	(1) Structure of attitudes about the Fukushima nuclear accident	87

	(2) Gender and regional differences in attitudes about the Fukushima nuclear accident	92
	(3) Hierarchical multiple regression analysis predicting opinions about post-disaster reconstruction policies	94
	1-3 Discussion	99
	(1) Structure of attitudes about the Fukushima nuclear accident	99
	(2) Gender and regional differences in attitudes about the Fukushima nuclear accident	100
	(3) Hierarchical multiple regression analysis predicting opinions about post-disaster reconstruction policies	103
	(4) Limitations	104
	(5) Conclusions	107
Chapter 5	Attitude and emotion towards the reconstruction activities after the 2011 Great East Japan Earthquake	108
1	<u>STUDY 6</u> : The preliminary survey of attitude and emotional evaluation towards the reconstruction activities after the 2011 Great East Japan Earthquake	108
	1-1 Method	109
	(1) Participants	109
	(2) Measurements	109
	(3) Procedures	113
	1-2 Results	113
	(1) Attitudes toward the reconstruction activities of 2011 disaster	113
	(2) Structure of emotional evaluation on people related to reconstruction of 2011 disaster	115
	(3) Regional differences of emotional evaluations on people related to reconstruction of 2011 disaster	118
	1-3 Discussion	120
2	<u>STUDY 7</u> : The survey of attitudes toward the reconstruction activities after the 2011 East Japan Earthquake	123
	2-1 Method	124
	(1) Participants	124
	(2) Measurements	125

(3) Procedures	126
2-2 Results	126
2-3 Discussion	129
3 <u>STUDY 8</u> : The survey of emotional evaluations toward the reconstruction activities after the 2011 Great East Japan Earthquake	132
3-1 Method	132
(1) Participants	132
(2) Measurements	133
(3) Procedures	135
3-2 Results	135
(1) Structure of emotional evaluation on people related to reconstruction of 2011 disaster	135
(2) Regional differences of emotional evaluations on people related to reconstruction of 2011 disaster	137
3-3 Discussion	140
Chapter 6 Perceptions of the 2011 disaster from the viewpoints of neighboring countries	145
1 <u>STUDY 9</u> : The interview survey of perception about the 2011 East Japan disaster and its impacts in Taiwan	145
1-1 Method	146
(1) Participants	146
(2) Measurements	147
(3) Procedures	
1-2 Results	147
(1) Sources of the information about the 2011 disaster and emotional responses	147
(2) Estimation of Japan's recovery	149
(3) Attitude about the nuclear power plant and Japanese products	150
(4) The perception on nuclear power use	151
(5) Perceived dangerous area in Japan, recognition of the earthquake's epicenter and the location of Fukushima nuclear plant	153

1-3 Discussion	156
2 <u>STUDY 10</u> : The interview survey of perception about the 2011 East Japan disaster and its impacts in South Korea	160
2-1 Method	161
(1) Participants	161
(2) Interview agenda	161
(3) Procedures	162
(4) Analysis	163
2-2 Results	163
(1) Impressions of the 2011 East Japan disaster	163
(2) Anxiety about radiation exposure	164
(3) Perception of necessity and safety of nuclear power	165
(4) Intention to purchase Japanese products	165
(5) Perceptions of the behavior of Japanese refugees and predictions of citizens' responses to the disaster	166
(6) Preparedness strategies applied and needed	167
2-3 Discussion	167
Chapter 7 General Discussion	171
1 Summary of the findings	171
2 Limitations	178
2-1 Time constraint	178
2-2 Representative of samples	179
2-3 Cultural barriers	180
3 Application of the findings	180
Reference	182
Acknowledgement	201

CHAPTER 1

INTRODUCTION

1. BACKGROUND OF THE STUDY

The Great East Japan Earthquake was the most detrimental disaster in Japanese history with magnitude 9.1, ranking as the highest magnitude ever in Japan and third overall in the world after the 1960 Chile earthquake (M 9.5), the 1964 Southern Alaska earthquake (M 9.2). It was matched only by the 2004 Sumatra earthquake (M 9.1). At least 92% of more than 19,000 deaths resulted from the tsunami which washed away houses, roads, and communities living near the sea and the rivers (International Bank for Reconstruction and Development, 2016: fig. 16, p. 14). The tsunami even destroyed the world's largest sea wall in Kamaishi which had only recently been completed in 2009. Most importantly, the earthquake and subsequent tsunami caused a nuclear accident at the Fukushima Dai-ichi nuclear power plant. This accident was the most severe nuclear disaster on record since the 1986 Chernobyl disaster.

Seven years have passed since the occurrence of that disaster. The recovery is also partially developing smoothly including the rebuild of infrastructure, and encouraging travelers to visit the area for economic purposes. On the other hand, many mental problems have been left unsolved. In particular, the rebuilding of people's lives

after the disaster seems to be retarded by the exaggerated fear of radiation. While national and local agencies tried to promote emotional ties among the nation's population in the hope of enriching resiliency in the victims, prejudice against radioactive contamination from the land, products, and even people from disaster-affected areas became acute. For example, vegetables and fruit produced in either Fukushima or Ibaraki prefectures were left unsold even they were proved to be safe and sold at low prices (BBC News Asia, 2012b). Snow from Aomori prefecture which is located many hundreds of kilometers from the nuclear accident was banned from being used in the Snow festival in Okinawa because people were worried about the radiation (BBC News Asia, 2012a).

As a victim of the 2011 earthquake and observer of post-disaster life in Miyagi prefecture, a site located 100 km from the Fukushima nuclear power plant, and an area which was severely affected by the earthquake and tsunami, the author aims to record and explain the movement of social forces in Japan one year after the earthquake, tsunami, and nuclear accident.

Contrasting with heated discussions and worries about the safety of living in Japan, citizens in the area stayed calmly together and were praised around the world (Abe, 2012; 2013). Japan is a country that is famous for its etiquette and mores. In the situation where food and water were both scarce, electricity was nearly nonexistent, and survivors lacked information, very few examples of crime or disruption were found at the scene. People made lines to receive things or even to buy them. Breaking the vending machines

or using electricity in public places were thought inappropriate actions among the disaster-affected citizens.

2. RESEARCH OBJECTIVES AND THEORETICAL BACKGROUND

Conflicts of interest between strict etiquette in a disaster-affected area, and over-exaggerated fear of radiation in other areas could break the intimate social connection among Japanese citizens and even possibly last forever. Therefore, this thesis consists of 5 aims: 1) to explore and analyze the post-disaster panic-cooperative behaviors among citizens in disaster-affected areas; 2) to clarify disaster culture in post-disaster and determine how social norms change after the 2011 disasters; 3) to explore the structures of nuclear attitude after the 2011 disasters and the relationship between nuclear attitude and attitude about the reconstruction activities; 4) to examine regional differences on attitude and emotion toward the reconstruction activities along with the effects of distance, level of damage by the disaster, and the disaster in history; and 5) to study the perceptions of the 2011 disasters and Japanese behaviors from the viewpoint of neighboring countries and explore new cultural comparisons research.

The uniqueness of this study lies in the integrated use of sociological and psychological approaches to explain various social movements which occurred after the 2011 Japan disaster. The theory of crowd “collective behavior” began with Gustave LeBon in his book, “The Crowd: A Study of the Popular Mind”, first published in 1895, which argued that when people are in a group, they act differently from when they are

alone. Because the prediction of group behavior is complicated, psychological theories cannot go further to any great extent. Behaviors in a group are sometimes chaotic and unpredictable but are argued to be reasonable for particular reasons because the institutional behavior of our daily life is shaped by culture. Theorists of collective behavior try to picture how collective behavior is formed and how it ends. Moreover, most of them concluded that there are no rules to explain the occurrence and ending of collective behaviors, no patterns, nor incidences. In this thesis, psychological theories are related to the social norms for cooperation; for example, social categorization theory and in-group favoritism are applied to fill these gaps to explain why Japanese people decided to demonstrate collective behaviors after the disaster. Norms are vigorous and unitedly applied in Japanese society which pays great respect to the wholeness rather than individuality. People would be perceived as abnormal or deviant when their behaviors do not go along with the norm. One of the explanations why the Japanese comply with their social norms is their tendency toward uncertainty avoidance (Hofstede, 1980). The Japanese love everything to be predictable. One of the more prominent examples is the attempt to predict and prepare for natural disasters, in which their success is admired by many countries. Furthermore, a strong sense of conformity to the country's norms restrains people from taking someone else's property or breaking other social rules even in circumstances where such actions might reasonably be justified. The sight of Japanese victims making a long line in front of many facilities impressed people around the world and made the Japanese famous for their manners and etiquette (Lah, 2011).

Therefore, the study of the social norms in the disaster-affected areas will contribute to future research on the formation of disaster social norms and their differences among subcultures. By using emergent norm theory, we could expect that the formation of social norms after a disaster is patternless but rational in response to the current situation. This thesis will apply theories of group norms (i.e., social categorization theory and in-group favoritism) to the expectations of cooperation with the 2011 disaster reconstruction policy that is currently delayed by harmful rumors of radionuclide pollution (Nihei, 2014). We hope to gain a better understanding of the flaws in social capital that should be one of the most significant factors hindering disaster resiliency, and which delayed the reconstruction plan and disunited people in this country.

3. PATTERNS OF DISASTER BEHAVIOR FROM THE VIEW OF SOCIOLOGY

3-1 CRIME AND DISORDERLINESS AFTER DISASTER

(1) *ROUTINE ACTIVITY THEORY*

Crime has long been a problem of society, especially post-disasters. A theory about ecology and crime, the Routine Activity Theory (Cohen & Felson, 1979), mentioned three factors that correspondingly increase the output of deviant behaviors such as crime and looting. Those factors are the following: 1) motivated offender, 2) suitable target, and 3) the absence of a capable guardian. When a motivated offender (a person who has the motivation to commit a crime) meets a suitable target, a crime is more

likely to be committed in the absence of a capable guardian. For example, when a person wants to steal a box of chocolate from a convenience store, the presence of the surrounding people, the store staff, and the surveillance camera, will all play the role of guardians to prevent the crime happening.

This theory mentioned the presence of humans as a factor of crime; even when the human works as a guardian, all of them have a chance to be crime offenders and victims. Therefore, it also turns out that if a woman is walking down a dark street, she might merely be assaulted. If the crime scene represents an area which was affected by a disaster, the number of potential offenders with a need for survival will increase, and the number of guardians would decrease.

However, this theory is based on the assumption that every person has their own motivation to commit a crime. There is no mention of how the motive to commit a crime is built, or how people stop that motivation through a higher order of motivation to be a good person.

(2) PANIC

People believe that disaster comes with panic. Panic, in the Cambridge dictionary, is defined as “a sudden strong feeling of fear that prevents reasonable thought and action”, and “to suddenly feel so worried or frightened that you cannot think or behave calmly or reasonably”. The connection between panic and non-reasonable action is vividly found. In the field, the crowd panic over directions to an evacuation shelter care

represents a further hazard. Many times, the shutdown of information to prevent panic can itself cause panic. For example, in the 2011 Great East Japan Earthquake and subsequent tsunami and nuclear accident, worldwide media showed pictures of the nuclear accident while most of the Japanese media did not provide progress reports on the situation. Also, the evacuation of residents living 20 km from the plant also accelerated the emigration of other families in Fukushima (Reconstruction Agency of Japan, 2013).

Many studies argue that panic is rare (Clarke, 2002; Fahy & Proulx, 2009; Quarantelli & Dynes, 1970; Wenger, Dykes, Sebok & Neff, 1975). Even the atomic bombing in Hiroshima did not produce panic (Janis, 1951) and the Committee on Disaster Studies has found that natural disasters such as tornados, floods, and explosions almost never produce panic (Brown, 1965). If there is any social norm observed in collective behavior, that situation is not called panic. And in most cases, panic is depicted in movies as requiring an extraordinary reaction, primarily from the decision makers whom the movies choose to produce the protective action of the precipitating panic, or so-called Elite Panic (Clarke & Chess, 2008).

In most cases, panic is generated by people's intention to protect themselves from the unknown danger that they believe they are facing. Therefore, panic after a natural disaster is blamed for the failure of the evacuation system. In fact, the earthquake and tsunami evacuation practices are conducted at least once a year in Japan, but the

accident in the nuclear power plant in Fukushima made things far more difficult to control.

Even though Japan had a terrible experience of nuclear disaster in World War II, through the attacks on Hiroshima and Nagasaki, those cities were the targets of atomic bombs. That might amplify the fears of the threat to health rather than alleviating them. As a result, those fears are assumed to tear apart social connections (or ‘Kizuna’ in Japanese) that are necessary for the reconstruction of the community in the disaster-affected area.

(3) *PANIC MYTH*

Presumably, people hold the conventional belief that chaotic conditions such as panic and looting are representative of conditions following a natural disaster. However, abundant sociological and psychological studies have highlighted the scarcity of deviant behaviors such as panic and looting after catastrophes. The socially accepted idea of the aftermath is nothing but artificial imagery fostered by the mass media: so-called panic myths (Clarke, 2002; Keating, 1982) or disaster myths (Quarantelli, 1994; Tierney, Bevc & Kuligowski, 2006).

(4) *RUMOR, MASS HYSTERIA, AND MORAL PANIC*

Rumor is defined as information that is spread without “secure standards of evidence” (Fine, 2013). A rumor may turn out to be true, but it is often false or at least is exaggerated or is a distortion of the facts. Rumors have been tightly linked to the analysis

of collective action and are sometimes treated as a form of collective behavior because they are often found in situations involving panic and crowd behavior. Rumor is a form of intensified information seeking. The certain goal of those who gather collectively is to discover the proper norms and expectations for behavior. As a result, social actors are judging appropriate actions and often utilizing information that they believe they can trust (Turner & Killian, 1972). Shibutani (1966) suggested that rumors constituted a form of improvised news as people communicate without the means to ascertain the truth from what they hear, attempting to build confidence about the ambiguous events that swirl around them. Misleading information can be harmful to others, and the existing social norms.

Mass hysteria refers to widespread, intense fear of and concern for danger that turns out to be false or greatly exaggerated. A moral panic is closely related to mass hysteria. It refers to widespread concern over a perceived threat to the moral order that turns out to be false or greatly exaggerated. Their strongly held moral views about the situation heighten their concern, and they often seek legislation or take action to try to battle the ethical problems.

The connection among three of these concepts is the ambiguity of critical information for which people are searching. When people are confronted with a novel and unclear situation, they turn to others who are in the same situation for cues on how to respond (Turner & Killian, 1972).

(5) *POST-DISASTER UTOPIA*

Wallace (1956) pointed out that altruistic behavior predominates over egoistic action during the short periods after a disaster. People do put others' welfare on a higher level than their own to bring happiness to damaged communities. Wolfenstein (1957) named the state of altruism that occurs soon after a disaster and remains for a short period a post-disaster utopia.

During the few days of a disaster's aftermath, an overall image of disaster-affected areas reveals that actions taken for the sake of others are regarded as the norm. In contrast, civil disturbances are prohibited and occur very rarely. Although it is apparently rare, one cannot say that deviant behavior does not occur at all. Frailing (2007) reviewed reports of crimes after the 1906 San Francisco earthquake, the 1976 Tangshan earthquake in China, and Hurricane Agnes in 1972, and argued that sufficient evidence exists to prove that crime did occur after Hurricane Katrina in 2005.

(6) *EMOTIONAL STAGES OF SURVIVORS THE FOUR PHASES OF DISASTER*

Despite a huge variability of disasters, emotional responses tend to progress in a rather predictable pattern. Myers, Zunin, and Zunin (1990) suggests seven phases of disaster composed of: the warning (or threat phase), impact phase, rescue or heroic phase, remedy or honeymoon phase, inventory phase, disillusionment phase, and the reconstruction or recovery phase (DeWolfe, 2000).

The inclusion of the *warning or threat phase and impact phase* may be dependent on the type of disaster, as many disasters such as tornadoes and earthquakes typically do not give of warning. If the disaster occurs when the warning sign is poorly communicated, survivors may feel unsafe, anxious, confused, fearful of future threats, and feel incapable of protecting themselves, their loved ones, and their homes. In contrast, those who did not respond to a warning sign of an imminent disaster may feel guilt and self-blame for any personal loss incurred from such disaster. Depending on the level of impact of the disaster, survivors may feel shocked, paralyzed, powerless, and disorganized.

Immediately after the impact phase, a high level of energy and adrenaline is used (*rescue or heroic phase*) for survival, rescuing, searching for people, gathering food supplies and obtaining medicine, etc. This may last anywhere from a few hours to several days after the disaster. In this phase, altruism is high among survivors and aid workers.

After the flood of assistance and resources from the government and volunteers, community bonding and survivor optimism is high (*remedy or honeymoon phase*). Groups form spontaneously and develop as survivors share their experience of victimization with one another. They become hopeful that their lives and community will recover and return to normal quickly. Volunteers during this phase are more easily accepted and find it easy to build rapport with the disaster victims.

Over time, in the *inventory phase*, survivors begin to realize the limits of the available resources. Physical exhaustion easily occurs for those people affected while the

restoration of their homes and lives cannot be completed easily. Survivors become fatigued and discouraged by the tasks that have to be done for the reconstruction process. As fatigue sets in, the *disillusionment phase* begins. The reality of the contrast between needs, losses and the availability of assistance are shown unavoidably. In addition, feelings of abandonment, resentment, and injustice may arise as government assistance and volunteers pull out.

In the last phase, the *reconstruction or recovery phase*, survivors gradually come to realize that they are the ones who are responsible for rebuilding their own lives. Most people are able to resume their previous functions even after a temporary period of distress.

3-2 CROWD AND COLLECTIVE BEHAVIOR IN A DISASTER

SITUATION

(1) TYPES OF THE CROWD

A crowd is a group of people acting together with some shared objectives. Sociologist Herbert Blumer (1969) distinguished four types by the purpose of the crowd: casual crowds, conventional crowds, expressive crowds, and acting crowds. A fifth category, protest crowds, has been distinguished by other scholars. A casual crowd is a collection of people who happen to be in the same place at the same time without a bond, purpose, or identity. A conventional crowd is a collection of people gathering for a specific purpose; a movie, a concert, a lecture, etc. An expressive crowd is a collection

of people who collect primarily to be excited and to express one or more emotions in the crowd; for example, they shout, scream, clap, and stomp their feet to express their emotions in concerts. An acting crowd goes one step beyond an expressive crowd because people in this crowd behave violently or destructively, engaging in actions such as looting, or panic. A protest crowd, as identified by Clark McPhail and Ronald T. Wohlstein (1983), is a collection of people who gather to protest about a political, social, cultural, or economic issue (McPhail & Wohlstein, 1983).

(2) *COLLECTIVE BEHAVIORS*

Collective behavior is the explanation of human behavior in a crowd when it cannot be explained merely by individual or group behavior. In a crowd, individuals act differently from the way they act when alone. Furthermore, these kinds of groups are settled without clear objectives or the communication of the shared emergent values.

This concept is prevalent in sociology because of its wide range to explain the influence of groups on humans' deviant behavior that could only happen in extraordinary situations, such as fads, crazes, mobs, and disasters. Simple examples can be raised, such as a bargain sale in a highly ranked superstore, where people are crashing each other rushing for the shelves to grab as many things they can, and the mob can frequently slip into violence. People fight with each other, taking opposite sides as if they are not human. This is where the superego and conscience are lost in the crowd.

On the origins of collective behavior and crowds, Emily Durkheim is an influential developer of both collective behavior theory and general sociology. She underlined the importance of groups on human behavior. However, a man who was mentioned as the founder of collective action is Gustave LeBon. His famous book refers to "the psychology of the crowd" that emphasizes the crowd as the model of group behavior. He concluded that, "in the crowd, the old is destroyed and therefore it may be replaced by the new". However, he failed to explain the circumstances in which collectivity could be formed. Also, the father of psychoanalytic theory, Sigmund Freud, paid attention to collective behavior. Herbert Blumer gave the clearest definition for collective behavior. He declared, "The student of collective behavior seeks to understand the way in which a new social order arises, for the appearance of a new social order is equivalent to the emergence of new forms of collective behavior" (Turner & Killian, 1957: p.8). In other words, a new social order gives hints to the formation of new norms that are not yet understood by people outside the group. That is why collective behaviors are seen as unreasonable and deviant. In fact, these emergent norms are concordant with the new shared goals more than the former norm.

Four theories explain why collective behaviors occur: contagion theory, convergence theory, emergent norm theory and value-added theory. Gustave LeBon developed the contagion theory of collective behavior in his book titled "The Crowd: A study of the Popular Mind" (Le Bon, 1895). In his book, he wrote that when individuals are by themselves, they act rationally. But when they are in a crowd, they come under its

almost hypnotic influence and act irrationally and emotionally. Throughout the 19th century, many countries were faced with revolution (e.g., in France) and mob violence (in Europe and the United States). Contagion theory argues that collective behavior is irrational and contagious among people. Therefore, the behavior is shaped into similar patterns as if through hypnosis. Convergence theory, in contrast, pays attention to individual motives to join with the crowd. People who have the same attitudes group together and they become a crowd that acts concordantly. Therefore, group behavior is shaped by, and thus can imply, individual beliefs and intentions before a person joins a crowd. Emergent norm theory, which was developed by Ralph H. Turner and Lewis M. Killian just after the mid-20th century, emphasized the spontaneity of the group behavior and values (Turner & Killian, 1972). They said that people initially do not understand how to behave when they start interacting with the crowd. As a response to the change of situation from the ordinary, the old norm will be omitted and replaced with the new one, and it is this which governs behavior, social order, and rationality. As should be clear, emergent norm theory views collective behaviors as more rational than contagion theory does, but less predictable (Barkin, 2011). This theory is also used to explain how deviant behavior such as looting and breaking into someone's property during a disaster can be perceived as an appropriate behavior in the emergent situation where priority is given to survival. Value-added theory, the newest explanation, was developed by Neil Smelser (1963). He added four conditions of the emission of collective behavior; structural strain (problems in society that cause people to gather together), generalized beliefs (the reason why problems occur and how to solve them), precipitating factors (or unforeseen events

that ignite collective behavior), and the lack of social control. Collective action is more likely to happen if potential participants do not expect to be arrested or otherwise hurt or punished.

For the constitution of a crowd, the general circumstances necessary for the emergence of crowd behaviors are: 1) there must be a large number of people, and 2) these people must have two opposite impulses for everyone. One is the impulse to conform with the norm, and the other is not to do so. The conforming impulse must be the dominant one. Furthermore, 3) the situation must be physically open for people to take non-normative action (Brown, 1965).

(3) *COLLECTIVE BEHAVIOR IN THE DISASTER AFTERMATH*

A disaster is a life-threatening event that involves a large number of people and also property. Social psychologists and sociologist scholars focus their interest on collective behavior during the disaster; on how people behave during and after the disaster. A common belief about disasters is that people look out for themselves and they panic. However, many studies say the opposite. People will be extraordinarily calm and generous even after facing disaster.

If people stay calm when they are facing disaster, what could be the explanation for deviant behaviors such as looting and the breaking of the social norms that are usually seen during the disaster? Robert E. Park is the sociologist who founded the field called collective behavior. He believed that collective action played a central part in social

change. He said that crowd movement is the force that represents the final blow to the old existing institutions and introduces the new one. In the meantime, other scholars such as Gustave LeBon in France, Scipio Sighele in Italy, and Sigmund Freud in Vienna began studying about what they had called “crowd psychology”, “collective psychology”, or “group psychology”, which all of them mentioned when discussing irrationality and abnormality of crowds (Turner & Killian, 1972). Those theories applied when there were frequent cases of mobs, terrorism, and lynching. Therefore, the origin of these arguments came from the influence of the craziness of individual behavior on the aggressive nature of the crowd, and those aggressive groups were creating a new norm that makes harming each other become rational. This concept is also used to explain looting, crime, and other deviant behavior in the aftermath of disaster, but mostly without mentioning rage and aggression.

It has been argued that collective behavior is not institutionalized behavior; it is not governed by established norms (Brown, 1965). When the situation reaches far beyond the ordinary situation, the ordinary norm would not be appropriate anymore. In fact, behaviors which people believe more appropriate will be applied. In this case, what can be seen as looting might be acceptable in the context of people’s need to search for and gather food to survive, since this is much more necessary than simply invading someone's property. The hacking of vending machines to get food and water may be seen in the same light. We need to consider the meaning of the action rather than considering how deviant people’s actions might be compared with the ordinary situation. One puzzling thing is, as

mentioned in Turner and Killian (1957), that the emergence of the new norm is unpredictable. Because the new norm is spontaneous rather than formalized, we cannot direct what kind of pattern will emerge, nor when it happens and how long it lasts.

Indeed, not only they do not fall into panic, people facing disaster tend to help each other first, and take care of themselves next. Empathy and helping among disaster victims are implicitly observed as group behaviors. Yet even this cannot be explained in terms of why it happens, so we should consider the fact that people in disasters behave differently from normal. Both falling into panic in response to fear and anxiety (although this is rarely found), and staying calm and helping each other in an emergency, are possible reactions as collective behavior and seem to be reasonable for the threat after the disaster period.

(4) *EMERGENT NORM THEORY AND THERE-EXAMINATION OF REASONABLENESS OF BEHAVIORS*

Descriptions of the crowd mentioned in contagion theory presented by LeBon often emphasize the irrational and emotional parts of the crowd. However, emergent norm theory omits those facets. In the book, “Collective Behavior” written by Turner and Killian (1957) it is mentioned that

“Emotion and reason are not today regarded as irreconcilables. Emotion may accompany the execution of a well-reasoned plan, and no arousal of emotions may accompany the inadequately-reasoned plan. The ration-irrational dichotomy seems to have two distinct kinds of meanings. Based on external criteria, behavior can be called rational when it is an efficient way of achieving

some goals. By this definition, a much institutional behavior is irrational, and much collective behavior is rational."

"Using internal criteria, a behavior is irrational when the individual does not weigh all possible alternatives of which he can be aware in deciding his course of action. By this definition, most of the institutional behaviors are irrational, since social norms narrow the range of alternatives which the individual can consider. While each of the major types of collective behavior has its own characteristic ways of such restricting attention within the range of potential alternatives, collective behavior is not different from other types of behavior in this respect." (Turner & Killian, 1957, p.17).

According to the paragraphs mentioned earlier, it is possible that the pioneer collective theorists would assume observed behavior that is deviant from institutional norms and unpredictable to be irrational and emotional. They perceived their institutional norms as common sense by not realizing that these were shaped by the current social norms and values.

(5) *DISASTER CULTURE*

Disaster culture is firstly mentioned by Moore (1964) in the book titled "And the Winds Blew". This concept tries to group what people believe they should do when the disaster comes as a culture of those communities. The disaster culture is a type of social norm. In many cases, individuals have to choose between safety and their fondness for the place so that they decide whether to move out of the area or not. In fact, this concept is still an abstract term which has not been clearly defined. It is complicated to determine the scope of what is precisely the disaster culture, and also hard to separate other subcultures of the area and individual differences from the concept.

4. ALTRUISM AND HELPING DURING DISASTER AFTERMATH

4-1 WHY DO PEOPLE HELP OTHERS?

Throughout our history, primary human activities like hunting and sharing meals with each other are found since the first human beings. Is helping a kind of generic continuation among humans? The theory of kin selection (Hamilton, 1964) focuses on cooperation among individuals who are genetically closely related, whereas the theory of reciprocity focuses on the incentives people will receive from cooperation in long-term interactions. On the other hand, some scholars believe that there is also help that is designed solely for others.

(1) *KINSHIP*

Evolutionary theorists believe that the tendency to help others, at least in part, is a fundamental feature of human nature. Therefore, people decide to help even if it can be costly to themselves. In an evolutionary sense, survival of the individual is less important than the survival of one's genes. Burnstein, Crandall and Kitayama (1994) asked students in the US and Japan to report how they would respond to situations in which someone needed help. The students said they would be more likely to help a person who was closely related to them (i.e., a sibling, parent, or a child) than a person who was more distantly related. People are more likely to donate kidneys to relatives than to

strangers (Borgida, Conner & Manteufel, 1992), and even children indicate that they are more likely to help their siblings than they are to help a friend (Tisak & Tisak, 1996).

Similarly, we help members of our ingroups more than we help members of outgroups, and we help people who are more similar to us more generally (Dovidio et al., 1997; Krupp, Debruine & Barclay, 2008; Stürmer, Snyder, Kropp & Siem, 2006). It is entirely possible that similarity is an essential determinant of helping. Cialdini, Brown, Lewis, Luce and Neuberg (1997) have proposed that it is the sense of perceived similarity; in other words, the thought of oneness between the helper and the individual in need that motivates most helping.

(2) *RECIPROCITY AND SOCIAL EXCHANGE*

Another explanation of why we help people to whom we are not related is based on the principle of reciprocal altruism (Trivers, 1971). Reciprocal altruism is the idea that if we help other people now, they will return the favor when we need their help in the future. Accordingly, we could increase the chances of survival and reproductive success of both ourselves and others by helping. Reciprocal altruism means that people may even help a total stranger, based on the assumption that doing so is useful because it may lead others to help them back in the future. This reciprocal altruism also can be found in animals; dolphins may support sick animals by swimming under them and pushing them to the surface so they can breathe.

Reciprocal altruism is one example of the social exchange system. We frequently use this give and take system to help protect ourselves from harm. Also, this may become effective in the environment where we can expect this kind of return from others; in other words, the society which helps is strongly perceived as a social norm. Therefore, people in the community can give rewards and punishment to those who did or did not cooperate by helping.

(3) *SOCIAL NORMS OF ALTRUISM*

Cooperation in human societies is mainly based on social norms, even in modern societies, where legal enforcement of rules can control the strictness of cooperation. Social norms are standards of behavior that are based on widely shared beliefs of how an individual as a member of a group should act in a given situation (Elster, 1989; Fehr & Horne, 2001; Fischbacher, 2004). The demand for a social norm arises when actions cause positive or negative side-effects for other people, such as environmental pollution, or the team's total output by individuals' efforts. However, prioritizing group benefit as a 'public good' goal rather than individual self-interest might not come from purely wishes for goodness. Group members might obey the norm voluntarily if their goals are in line with the results of cooperation, or they might be forced to cooperate via sanctions from the other group members (Fehr & Fischbacher, 2004).

Also, the term of social norms of morality emphasizes that helping is one of the standards of behavior (Eisenberg & Fabes, 1998). The norm of reciprocity is a social norm reminding us that we should follow the principles of reciprocal altruism; if someone

helps us, then we should help them in the future, and we should help them now with the expectation that they will help us later when we need it. Equally important, the social responsibility norm suggests that we should try to help others who need assistance, even without any expectation of future payback. The social responsibility norm involves a sense of duty by which people are expected to respond. The teaching of many religions based on this type of norm hold that we should reach out and help other people as good human beings. Still, even though many motivations for helping do not need a return, helping will increase if there is less cost that we have to pay. The costs of helping are extraordinarily high when the situation is potentially dangerous, such as providing help when there is the risk of being physically harmed.

(4) *REWARDS AND PUNISHMENT IN ALTRUISM*

Until now, it is clear that helping is both a part of our fundamental human biological nature and also in part learned through our social experiences with other people (Batson, 2011). Principles of social learning suggest that people will be more likely to help when they receive rewards for doing so. People who do good things are praised by others whereas those who act more selfishly are reprimanded.

None the less, to maintain the rule of reciprocity in society, punishment for those who do not cooperate is required. Most penalties often turn costly. People who give punishment have to take action and pay something, at least in terms of time and effort to do so. The terms for individual punishments, although the penalty is costly for them and yields no material gain include Altruistic Punishment (Fehr & Gächter, 2002). Fehr and

Gächter explained that “the punishment of free riders constitutes a second-order public good. The problem of second-order public goods can be solved if enough humans apply altruistic punishment, that is if they are motivated to punish free riders even though it takes cost and yields no material benefits for the punishers”. They also said, “free riding may cause strong negative emotions among the cooperators and these emotions, in turn, may trigger their willingness to punish the free riders”, and “punishment increased with the deviation of the free rider from the average investment of the other members. Negative emotions became more intense as the free rider deviated further from the others’ average investment”.

In the review study of Fehr and Fischbacher (2004), the authors suggested that human cooperation is mostly based on a social norm of “conditional cooperation”. This norm suggests that people would cooperate if the other members also cooperate, while the defection of others is a legitimate excuse for individual defection. This is similar to the formation of cooperation in the repeated prisoner dilemma paradigm. Data collected among the Ache, a group of South American forager-horticulturists, indicate that those who shared and produced more than the average (signaling cooperative intent and/or ability to produce) were rewarded with more food from more people when injured or sick than those who shared and delivered below average. These results, framed within the context of tradeoffs between short-term and long-term fitness, may provide insight into motivations behind costly expenditures for establishing and reinforcing status and reputation (Gurven et al., 2000).

(5) *DEVIANCE AS A SANCTION*

Deviance is behavior that violates social norms and arouses adverse social reactions. When the norm is broken, social control refers to the ways in which a society tries to prevent and sanction those behaviors (Barkin, 2011). Formal social control is used to control behavior that violates formal norms while informal social control is for controlling the violation of informal social norms. The examples of formal social control are all legal systems (e.g., police, judges), while those for informal social control are anger, disappointment, ostracism, and ridicule.

Emily Durkheim, a founder of sociology, said that deviance is a relative concept. It can be comparable to space and time. That means some behaviors are acceptable in one society but not in others. Also, it cannot be accepted at one time but can become a favorite decades later. Cutting in line is strongly deviant in Japan, but still not yet being controlled in many Asian countries.

Also, Durkheim believed that deviance has several functions: 1) it has a vital role in clarifying social norms and increasing conformity in the society; 2) it strengthens social bonds among people reacting to the deviant, and 3) it can help lead to positive social change.

Additionally, social control theory (also known as social bonding theory) by Travis Hirschi (1969), supports Durkheim's argument that strong social norms reduce deviance. Hirschi added bonds to conventional social institutions such as family and

school keeping people from violating social standards. Four bonds hold people together in society: attachment, commitment, involvement, and belief.

1. *Attachment* refers to how much we feel loyal to these institutions and care about the opinions of people. The more attached we feel to our family and community, the less likely we are to be deviant.
2. *Commitment* refers to how much we value our participation in everyday activities. The more committed we are, and the more time and energy we have in them, the less deviant we will be.
3. *Involvement* refers to the amount of time we use for conventional activities. The more time we spend, the less opportunity we have to be deviant.
4. *Belief* refers to our acceptance of society's norms. The more we believe in those rules, the less we deviate.

4-2 THE FAVORITISM OF ALTRUISTIC DECISION

Helping does not happen to everyone equally. Stereotypes lead to a preferred and less preferred type of person who receives help. Because we want to maximize the benefits from our helping action, we select those whom we think deserve our help, and stereotyping makes the decision process easier.

(1) SOCIAL CATEGORIZATION THEORY

Social categorization theory refers to the natural cognitive process by which we place individuals into social groups. Social categorization occurs when we think of

someone belonging to some specific group (e.g., gender, nationality, age, and so on: Allport, 1954; 1979) and we respond to people in a group more as a member of those groups than as individuals.

People categorize others because it helps us to know better about an individual. We recognize someone as police by his/her uniform and we would ask them for help when we are worried about our safety. We give our seats to the disabled, children, and the elderly without personally knowing about them. Likewise, we can save time in processing information about others. Using stereotypes to size up another person might just make our life easier (Macrae, Bodenhausen, Milne & Jetten, 1994).

A negative side of social categorization is that it distorts our perceptions such that we tend to exaggerate the differences between people from different social groups while at the same time perceiving members of groups (and particularly outgroups) as more similar to each other than they really are. This overgeneralization makes it more likely for us to treat all members of a group similarly. Tajfel and Wilkes (1963) experimented with judging the length of lines and found that the lines were perceived as a different couple when they were categorized, such that the differences between the groups and the similarities within the groups were emphasized.

(2) *INGROUP FAVORITISM*

Social categorization becomes more critical and has potent effects upon our reactions to others when the categorization becomes more emotionally involved, and

particularly when it turns into liked ingroups and outgroups (Amodio & Devine, 2006). Henri Tajfel and his colleagues (Tajfel, Billig, Bundy & Flament, 1971) demonstrated how incredibly powerful the role of self-concern is in group perceptions. Ingroup favoritism is the tendency to respond more positively to people from our ingroups than we do to people from outgroups. The trend of developing ingroup bias starts in young children from 3 years and almost immediately begins to influence their behavior (Aboud, 2003; Aboud & Amato, 2001). Ingroup favoritism is found in many different types of social groups, in many situations, and cultures (Bennett et al., 2004; Pinter & Greenwald, 2011). People tend to like someone who is a favorite in their ingroup more than other kinds of people (i.e., neutral and disfavored: Castelli & Carraro, 2010). Ingroup favoritism is also found in trait ratings such that ingroup members are rated as having more positive characteristics than outgroup members (Hewstone, 1990). Also, they take credit for the successes of other ingroup members, remember more positive than negative information about ingroups, are more critical of the performance of outgroup than of ingroup members, and believe that their own groups are less prejudiced than are outgroups (Shelton & Richeson, 2005). These actions allow us to spread positive characteristics to all members of our ingroup but reserve negative aspects of individual group members, thereby protecting the group's image.

People also make trait attributions in ways that benefit their ingroups, just as they make trait attributions that benefit themselves. This is so-called "ultimate attribution error" (Hewstone, 1990). Negative behavior of the outgroup and positive action of the

ingroup are seen as caused by group characteristics as a whole. On the other hand, adverse reactions from the ingroup and positive behavior from the outgroup are more likely to be assumed to be caused by temporary situational variables or by individual characteristics; they are less likely to be attributed to the group. We prefer ingroups because we perceive other ingroup members as similar to us, and also because they are more familiar to us (Zebrowiz, Bronstand & Lee, 2007). However, the most crucial determinant of ingroup favoritism is self-enhancement. We want to feel good about ourselves, and positively seeing our ingroup helps us to do so (Brewer, 1979). Being a member of a group that has positive characteristics provides us with the feelings of social identity; positive self-esteem that we receive from group memberships.

4-3 ALTRUISM IN EMERGENCY: LATANÉ AND DARLEY'S MODEL OF HELPING

Social psychologists, Bibb Latané and John Darley, created a model of how help is generated in an emergency situation. They have four stages of recognition that lead to intervention and help in a dangerous event. First, people have to notice the event. Numerous research studies suggested that people easily recognize unusual circumstances when they are alone more than they do when in groups. Therefore, in large cities; for example, Tokyo, New York, or Bangkok, crowds and confusion distract individuals from recognizing if something is wrong.

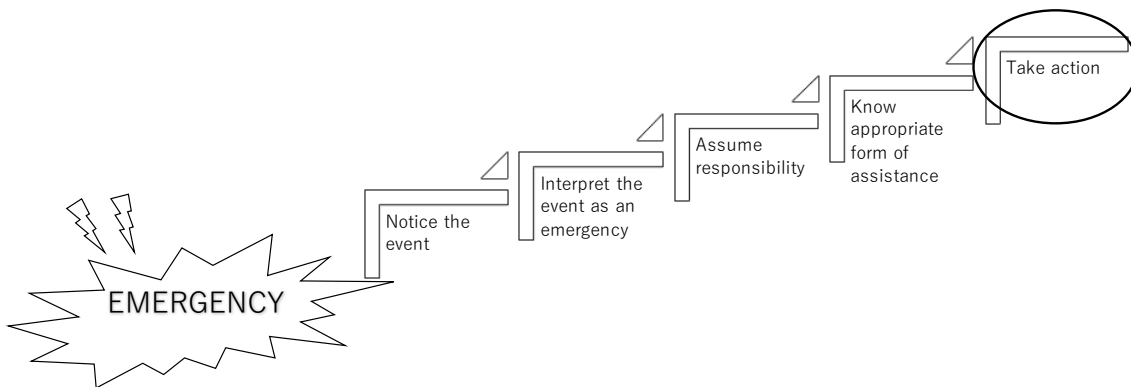


Figure1. Latané and Darley’s five stages of helping

Retrieved from: B. Latané and J. M. Darley (1970)

Next step is the interpretation of the event as an emergency. Because emergencies are rare and because we tend to assume that activities are benign, we may be likely to treat an ambiguous case as not an emergency. In these cases, people typically interpret the situation by looking to others (but they often do not understand the situation well either). The third step after recognizing that an event is an emergency is that people still need to decide whether it is their responsibility to do something or not. They will look for the person in charge, such as the police nearby. Also, if the number of bystanders becomes larger, the responsibility for the events will spread more because they think it might be someone else in the situation who will take action (See also Darley and Latané, 1968; Markey, 2000; Garcia, Weaver, Moskowitz & Darley, 2002). The fourth step in this helping model is knowing how to help. Of course, for many of us, the best ways to help another person in an emergency are not that clear. People who do have training in

how to act in an emergency are more likely to help. Therefore, if these four steps could not happen in the situation, no help would be provided. However, in a massive disaster situation, it is quickly noticed and recognized as an emergency, not many of the people in charge will be present at the disaster scene, and even if they are, they would be treated as victims similarly to the others. Finally, people might not know how to help, but it is more comfortable to take action together to make the situation better.

5. THE 2011 EAST JAPAN DISASTER: ATTITUDE TOWARD THE NUCLEAR POWER AND POST-DISASTER POLICY

5-1 GENERAL INFORMATION ABOUT THE GREAT 2011 JAPAN DISASTER AND ITS SOCIAL PHENOMENA

(1) *THE EARTHQUAKE, TSUNAMI, AND NUCLEAR ACCIDENT IN FUKUSHIMA*

The most massive earthquake on record in Japan, with a magnitude of 9.0 on the Richter scale, struck on March 11, 2011. The earthquake and subsequent tsunami caused extensive and severe damage in Japan, particularly in Miyagi, Iwate, and Fukushima prefectures (East Tohoku region). The National Police Agency of Japan confirmed death toll from the earthquake and tsunami as 15,880 (9,535 in Miyagi prefecture, 4,673 in Iwate prefecture, and 1,606 in Fukushima prefecture) and missing people as 2,700 (1,314 in Miyagi prefecture, 1,171 in Iwate prefecture, and 211 in

Fukushima prefecture) (National Police Agency of Japan, 2013). Although the most severely affected area was the Tohoku region, even Tokyo and Chiba prefecture, which are about 350 km far from the epicenter, were affected. People in Chiba prefecture were affected by soil liquefaction caused by the tremors. Similarly, approximately 94,000 people in Tokyo metropolitan area and the surrounding areas were unable to return home because of traffic congestion (Yomiuri Shimbun, 2011c). Looking back at the strongest earthquakes in recent Japanese history, the predominant cause of death in the 1923 Great Kanto earthquake was fire. During the 1995 Great Hanshin-Awaji earthquake, building collapses accounted for most deaths. During the 2011 Great East Japan earthquake, the death toll was high because of the huge tsunami, which exceeded all expectations. According to the post-mortem examinations conducted one month after the disaster, 92% of all disaster-related fatalities (12,143 / 13,135) in the Tohoku region were the direct result of drowning (National Police Agency of Japan, 2011).

The 2011 East Japan earthquake and tsunami together constitute the most destructive natural disaster in the world in recent years. A significant consequence of the earthquake and tsunami was the nuclear accident at the Fukushima Dai-ichi nuclear power plant, where three reactors melted down. On March 12, 2011, the Japanese government ordered the evacuation of residents living within 20 km of the stricken nuclear power station. On March 25, 2011, residents living 20–30 km from the plant were also told to evacuate. Approximately 154,000 people have been evacuated from Fukushima

prefecture, of whom 109,000 people were residents of the evacuation order area (Reconstruction Agency of Japan, 2013).

The Fukushima nuclear accident, the largest nuclear accident since the 1986 Chernobyl disaster, has given rise to severe social and political problems in Japan. For instance, the disposal of disaster debris in the affected prefectures became a severe problem in Japan because an estimated 22.53 million tons of disaster debris was generated in Iwate, Miyagi, and Fukushima prefectures by the 2011 East Japan earthquake and tsunami. After the March 2011 triple disaster, officials in tsunami-stricken areas reported that increasing mountains of debris are hampering reconstruction efforts (Japan Today, 2011). Therefore, the Ministry of the Environment in Japan has called on local governments outside the three prefectures to accept some debris from Miyagi and Iwate (not Fukushima) on the condition that its radiation levels are confirmed as safe (The Japan Times, 2012). Nevertheless, many prefectures expressed reluctance to accept debris for incineration because of fears that it was radioactive contaminated. In fact, the Tokyo metropolitan government received hundreds of complaints from citizens by phone, fax, and email when it announced its agreement to accept rubble (Japan Today, 2011).

One year after the disasters, only 5% of the debris generated by the devastating earthquake and tsunami had undergone incineration or disposal. The Ministry of the Environment called for increased cooperation from local governments nationwide in dealing with this gargantuan effort (The Japan Times, 2012). However, local governments outside the affected areas remained reluctant to accept debris because of

objections from their own residents. Kitakyushu city, Fukuoka prefecture, eventually accepted disaster debris from Ishinomaki city, Miyagi prefecture, to facilitate its disposal. Nevertheless, although radiation levels of the debris were low and confirmed as safe, protestors blocked the road for 8 hours over fears that incinerating the debris would spread radiation to areas that had not been contaminated by the nuclear disaster (McAteer, 2012). These circumstances reflect the fact that fear of radiation from the Fukushima nuclear accident has persisted as an important social issue. It is, therefore, need to ascertain how Japanese people's attitudes about the Fukushima nuclear accident were related to their opinions about post-disaster reconstruction policies in Japan.

**(2) *EVACUATING LIVES IN AN ORDERLY MANNER: WORLDWIDE
ADMIRATION***

On March 14, 2011, only three days after the disaster's occurrence, a particular Tokyo Broadcasting System television news program, and later many newspapers, reported that overseas media had praised the residents of disaster-affected areas for their patience and lack of confusion. For example, the Kahoku Shimpo (2011), the dominant local newspaper of the Tohoku region, reported that the American media had published articles full of admiration for the orderly lines of people waiting for food without looting or engaging in illegal activity. Presumably, people hold the conventional belief that chaotic conditions such as panic and looting are representative of conditions that follow a natural disaster. However, abundant sociological and psychological studies have highlighted the scarcity of deviant behavior such as panic and looting after disasters (e.g.,

Clarke, 2002; Fahy & Proulx, 2009; Quarantelli & Dynes, 1970; Wenger et al., 1975). The socially accepted idea of the aftermath is just artificial imagery named as panic myths (Keating, 1982; Clarke, 2002) or disaster myths (Quarantelli, 1994; Tierney, Bevc & Kuligowsk, 2006).

Altruistic behavior predominates over egoistic behavior during the short periods after a disaster (Wallace, 1956). People do put others' welfare on a higher level than their own in order to bring happiness to damaged communities. Wolfenstein (1957) named the states of altruism that occur soon after a disaster and remain for a short period a post-disaster utopia.

During the few days of a disaster's aftermath, an overall image of disaster-affected areas reveals that actions taken for the sake of others are regarded as the norm. In contrast, civil disturbances are prohibited and occur very rarely. Although it is apparently rare, one cannot say that deviant behavior does not occur at all. Frailing (2007) reviewed reports of crimes after the 1906 San Francisco earthquake, the 1976 Tangshan earthquake in China, and Hurricane Agnes in 1972, and argued that sufficient evidence exists to prove that crime did occur after Hurricane Katrina in 2005.

We examined the question of the actual status of areas that were affected by the 2011 Great East Japan disaster, where the global media praised residents for their gentle manner.

(3) ACTUAL STATE OF CRIMES IN THE AFFECTED AREA:

ANALYZING POLICE DATA

First, the official statistics from police in Japan were analyzed (See also Abe, 2013). Referring to the data released on the website of the Miyagi Prefectural Police in June 2011, the number of reports to the police of penal code offenses in the city of Sendai from January through April 2011 was 8% lower than during the same period the previous year (the data included cases occurring before the disaster: January 1 – March 10, 2011). Intellectual offenses and moral offenses were 55% and 40% lower, respectively. Conceivably, even for potential criminals who lived in the disaster-affected area, opportunities to commit crimes were fewer, which could have led to a lower crime rate.

Furthermore, according to the *Crime Statistics Document* (a comparison of same period data for the current and previous year) released by the National Police Agency of Japan (July 15, 2011), the *serious crimes index* (murder, robbery, arson, rape, abduction and human trafficking, and indecent assault) and *larceny offenses index* (burglary theft, motor vehicle theft, purse snatching, and pick-pocketing) in Japan were 6% less in January-June 2011 than in the first half of 2010. Notably, the most severely damaged areas of the Tohoku region (Iwate, Miyagi, and Fukushima prefecture) showed a 30% lower serious offenses index and larceny offenses index. Slightly damaged areas in the Tohoku region (Aomori, Akita, and Yamagata prefectures) showed 27% fewer offenses compared to the prior year. Regarding burglaries, the national crime rate was 10% lower, as it was in slightly damaged areas of the Tohoku region. Nonetheless, among severely

damaged areas in Tohoku region, data showed 19% fewer burglary thefts in Iwate, and 3% fewer burglary thefts in Miyagi, but in contrast, 41% more burglary thefts were reported in Fukushima. It is reasonable to infer that burglars would have targeted homes that were left empty by the evacuation in Fukushima.

As Quarantelli and Dynes (1970) reported, crimes after a disaster are rarely committed by people in the affected areas (insiders). They tend to be caused by outsiders. Crimes committed in the 2011 Great East Japan disaster aftermath show convergent conclusions.

5-2 ATTITUDE TOWARD NUCLEAR POWER AND NUCLEAR POWER

PLANT

Previous studies were undertaken to assess individuals' attitudes about nuclear power plants multidimensionally (Newcomb, 1986; Peters & Slovic, 1996; Visschers & Siegrist, 2013). For instance, Newcomb (1986) investigated nuclear attitudes associated with the threat of nuclear war and the possibility of accidents at nuclear power plants. Results showed that nuclear attitudes were constructed based on four factors: nuclear concerns, nuclear support, fear of the future, and nuclear denial. In a more recent study, Truelove (2012) demonstrated that emotional and cognitive perceptions about energy sources explained significant amounts of variation in support of energy sources. Also in Japan, several researchers have examined attitudes and acceptance related to nuclear power. Their results indicated that Japanese residents' attitudes about nuclear power

plants were constructed by risk perception, benefit perception, and trust in the government and electric utility companies (Katsuya, 2001; Shimooka, 1993; Tanaka, 2004). For example, Tanaka (2004) examined major psychological factors determining public acceptance of the location of nuclear facilities. He found, under generally prevailing circumstances, that both perceived risk and perceived benefit were important for public acceptance of nuclear facilities. Furthermore, concerning location, perceived risk was significant for the public acceptance of nuclear facilities, although perceived benefit had little effect. Results also showed that trust in institutions was important for public acceptance of the location of nuclear power plants, but not for public acceptance of the location of high-level radioactive waste repositories (Tanaka, 2004). Nevertheless, little is known about how the Fukushima nuclear accident affected Japanese people's attitudes related to nuclear power.

Recently, several reports have described how the Fukushima nuclear power plant accident changed public attitudes about nuclear power among citizens in many countries (Hartmann, Apaolaza, D'Souza, Echebarria & Barrutia, 2013; Prati & Zani, 2012; Visschers & Siegrist, 2013). For instance, Prati and Zani (2012) investigated Italian people's perceptions of nuclear power and values one month before and after the Fukushima nuclear accident. They reported that the Fukushima nuclear accident reduced trust in nuclear power, reduced trust in environmental organizations, and altered pronuclear attitudes in Italy. Visschers and Siegrist (2013) examined how the Fukushima nuclear accident changed people's trust, their perceptions of benefits and risks, and their

acceptance of nuclear power in German-speaking areas of Switzerland. They reported that the perceived benefits and risks determined the acceptance of nuclear power stations, both before and after the Fukushima nuclear accident. Moreover, the results showed that trust strongly affected the perceptions of benefits and risks (Visschers & Siegrist, 2013). Furthermore, Hartmann et al. (2013) found, one year after the Fukushima nuclear accident, Spanish people's emotional fear arousal motivated their nuclear opposition and green electricity. These findings suggest that popular attitudes about nuclear power were constructed from cognitive and emotional components after the Fukushima nuclear accident. However, all of those studies were conducted in countries other than Japan. Therefore, this study investigated Japanese people's multidimensional attitudes about the Fukushima nuclear accident. Notably, Japanese university students' attitudes about the Fukushima nuclear accident are hypothesized as having been constructed not only from cognitive components such as risk perception of nuclear power or trust in institutions. The attitudes were also based on emotional components such as fear of radioactive contamination. The theoretical framework is derived from well-known dual-process models that posit two systems of information processing (Chaiken & Trope, 1999; Epstein, 1994; Sloman, 1996), but which have not been applied to Japanese attitudes related to the Fukushima nuclear accident.

An additional change expected to be a result of these events is the perception or attitude toward nuclear power. After the Chernobyl accident (1986) in Ukraine, attitudes about the use of nuclear power changed dramatically. For a country that had less

of a visible impact, this would merely be a temporary setback. In contrast, most countries affected by the fallout displayed a negative attitude toward nuclear power and exhibited exaggerated behaviors, such as purchasing portable radiation monitors and overstocking food and canned goods, which subsequently led to a shortage of products in stores. These behaviors all reflected persistent anxiety over radioactivity. Renn (1990) demonstrated that the diminished acceptance of the use of nuclear power after the Chernobyl accident might be a result of a change in the opinions of undecided responders. He referred to this theory as the ‘inoculation effect of attitude formation and commitment’ (McGuire, 1985; Renn, 1984; cited in Renn, 1990). Also, he argued that this effect makes individuals with a positive attitude immune to adverse incidents, while an uncommitted person would easily use the incident as an incentive to take a side. Thus, our cognitive processes try to avoid the intake of or exposure to information that would directly go against a previously formed attitude or perception (Cotton, 1985). Accordingly, selective exposure and the downplaying of counterevidence are two mechanisms for avoiding cognitive dissonance (Festinger, 1957).

5-3 THE OBJECTING VOICES OF LOCAL PEOPLE

(1) *EMOTIONAL CONFLICTS AMONG AREAS*

Damage from the earthquake, tsunami, and the nuclear accident on March 11, 2011, were spread nationwide. An accident at the nuclear power plant in Fukushima as a result of the tsunami made the disaster more severe, and its reconstruction became more

complex through the fear of nuclear pollution. Further production of agriculture and marine products was suspended, and strict inspections of existing agriculture and marine products were made to check the cesium level, while those goods from the disaster-affected area could not be sold. Also, other unrelated products or even people from disaster-affected area faced resistance from other areas, while people were reluctant to visit the 6 prefectures in the Tohoku region.

Influence from the anxiety about nuclear contamination of the land and its produce was responsible for the deferral of the reconstruction, and especially the post-disaster debris management. Iwate and Miyagi prefectures were affected most by the tsunami and its debris. According to the records from the Ministry of Environment (2014), Japan had approximately 200 million tons of waste from the earthquake and approximately 110 million tons of tsunami debris. Other than Fukushima prefecture, which suffered the strongest effects from nuclear pollution, Iwate and Miyagi prefectures had planned to share parts of a vast amount of tsunami debris for disposal in other prefectures since there was insufficient space for them to handle the problem without assistance. All these processes were finished at the end of March 2014 (Ministry of Environment, 2014).

However, distributing the tsunami debris to other areas met with resistance from residents in the target delivery areas. Many cases ended with the cancelation of the plan, and that debris was sent back. For example, in Kanagawa prefecture, after the project to help manage disaster debris was announced, the officers could not calm the

objecting crowd. There were people shouting, “Don't bring nuclear poison in our town!” Everyone’s emotions pointed in one direction (Yomiuri Shimbun, 2013).

Another emotional conflict among people was about the 2011 Bonfire Festival. There was a plan to bring to Kyoto 340 woodblocks from Rikuzentakata, a town in Iwate prefecture which was wiped out in the March 11 tsunami and gained fame from the story of a “miracle pine tree” which was the only one from 7,000 pine trees along the Iwate coast which could survive the tsunami. The wood was tested for cesium and showed no sign of radioactivity (Makino, 2011). The wood was scheduled to be burned in ritual bonfires on one of the five mountains surrounding Kyoto on August 16. Prayers and messages to family members lost in the tsunami were written on the woodblocks. For instance, “Big sister, you were a great cook”, and “I want to see you”, according to local media (Japan Bullet, 2011). They would be burned in the Bonfire Festival in the belief that the messages would make their way to the lost ones; five giant bonfires written in Chinese characters would be lit on mountains surrounding the city.

Despite good hopes from the event’s managing staff, the use of those woodblocks in the Bonfire Festival in 2011 was canceled in response to worries about the radioactive threat among the local people. After a long time argument, the pine trees were sent back to Rikuzentakata, Iwate prefecture (Yomiuri, 2011a; 2011b). This brought contempt from the people in disaster-affected areas. Some people have criticized the Kyoto Municipal Government and the organizers as being “narrow-minded” over the

latest case, while others appreciated their decision as “calm judgment not being overwhelmed by emotion”.

Futoshi Toba, mayor of Rikuzentakata, said that he was sorry about the incident. “Kyoto and the other parties’ good intentions became a disaster, and I regret that this happened”, Toba said. “It caused much anxiety to the citizens of Kyoto”. He added that “new rumors will now spread about the disaster-stricken areas”, causing more anxiety to the residents (Makino, 2011).

(2) *THE STUDY OF HARMFUL RUMOR AND THE LOSS OF MUTUAL TRUST AMONG AREAS*

A study of regional differences and social capital from Yoshiaki Nihei (2014) was conducted in the areas which were severely affected (Iwate, Miyagi, and Fukushima prefectures), neighboring areas (Ibaraki and Tochigi prefectures), and distant areas (Tokyo and Kanagawa prefectures). The results showed regional differences in the feelings of trust and connection after the disaster. More than half the people from distant areas felt that compared with before the disaster, trust and connections among people were “increased”, and “rather increased”. On the other hand, 70% of the people from 3 prefectures in the disaster-affected area and two prefectures from neighboring areas felt that trust and connections among people were “probably partially increased but also partially decreased”. He concluded that the cause of bad rumors about radiation in the disaster-affected area was from various types of “psychological generalization”.

Generalization is the concept in which humans and animals use past learning in present situations if the conditions in the new situations are regarded as similar to those of the past. For instance, “the generalization of space” referred to the spread of radiation in the air. Therefore, it could flow into other areas nearby. “Category generalization” referred to the cross-category spread of radiation such as from water and land to vegetables, and from vegetables to clothes. This generalization of radiation created gaps between areas and broke apart connections among regions. More importantly, it is highly possible that people in the areas have still not recognized this feeling of distance and the weakening of social capital. The results from Nihei’s study are compatible with the “identifiable victim effect” (Schelling, 1968) whereby the further apart people stay, the less connected they would feel with others. Distance might be the key factor behind the levels of cooperation among areas.

Considering the levels of the effects from the disaster in each area, Yamagata and Akita prefectures were close to the earthquake epicenter and the sea, but they suffered nothing from the tsunami because they connected to the other side of the sea. Meanwhile, Chiba prefecture is located farther from the epicenter but was affected by the tsunami. According to a report from the National Police Agency (2015), casualties in Akita prefecture were 0, with 2 in Yamagata, and 21 in Chiba (plus two missing persons). Tokyo had seven casualties, and approximately 5 million could not reach their homes because of the temporary halt in transportation and electric systems. Higher losses were from Iwate prefecture with 5,802 dead or missing, Miyagi prefecture with 10,788 dead or

missing, and Fukushima prefecture with 1,814 dead or missing (National Police Agency, 2015).

For disasters in the past, Iwate prefecture had faced repeated tsunamis since a hundred years ago (the Great Meiji Tsunami in 1896, the great Showa Sanriku Tsunami in 1933, and the Chile Tsunami in 1960). Miyagi prefecture had faced the Miyagi earthquake (1978), and Fukushima prefecture had comparatively fewer disasters in the past but now was severely affected by the Fukushima nuclear accident which was the most severe since the accident in Chernobyl (1986). Akita and Yamagata faced the Niigata earthquake (1964), and Nihonkai Chubu earthquake (1983). Tokyo had met with the great Kanto earthquake (1923), and the air-raid (1944-1945) over the past century. Kyoto has been comparatively safe from disaster in Japan and is the stage of the bonfire festival that was harshly disrupted in 2011. Hyogo was severely affected by the Hanshin-Awaji earthquake (1995). Hiroshima was affected by the atomic bomb in 1945. Many people in and outside Japan visit the peace memorial dome in Hiroshima and recognize the brutality of radiation and war. The aforementioned history and losses from disasters could be considered as factors building empathy and supportive attitude to the 2011 disaster victims who faced similar fates.

To have shared experiences of victimization might increase favoritism by engaging personal feelings for the victims and enhance the sense of ingroup. Social categorization theory explained that people decide what to say and how to act with others by their category rather than by the self. Levine and Thompson (2004) studied social

identity and charitable behaviors in British citizens. They concluded that when the European identity was induced, they were more willing to pay for European people who suffered from disaster than when the British identity was induced. In other words, ingroup identity developed support for the disaster recovery. Referring to this ingroup identity, we hypothesized that sharing experiences of similar disasters might increase sympathy and intention to offer support from the other people in Japan.

(3) *EFFECTS OF GEOGRAPHICAL DIFFERENCE IN ATTITUDE ABOUT NUCLEAR AND RECONSTRUCTION*

Some reports have described the impact of geographic differences in residents' views about nuclear power (Greenberg, 2009; Venables, Pidgeon, Parkhill, Henwood, & Simmons, 2012). For instance, Greenberg (2009) investigated public preferences for energy sources in the U.S., including residents living within 50 miles of a major nuclear facility. Results showed that those who lived near nuclear services were more likely to favor increasing the use of nuclear power than respondents from a national sample.

The Fukushima nuclear accident has entailed not only the radioactive debris problem but also the problem of numerous harmful rumors about products manufactured in disaster-affected prefectures. For example, Paul Blustein, a former Tokyo correspondent for The Washington Post, described the situation as follows: “Large segments of the population are so petrified, and so militant in their fear, that most local governments outside northeastern Japan (Tohoku) Region are refusing to accept for burial

some of the millions of tons of rubble left by the tsunami. ... In a town near where I live, officials rejected the debris, saying that even if the radiation emissions were zero, local farmers and fishermen might suffer from *huu hyou higai*—financial losses because of baseless rumors—just as many Tohoku producers are already.” (Blustein, 2012). In fact, many Japanese people avoided purchasing products from Fukushima and nearby prefectures despite official assurances of safety because they did not believe that the products were safe and because they did not trust the government (BBC News Asia, 2012). As a result, a government panel in Japan drafted a plan to compensate food producers for losses caused by harmful rumors about radioactive fallout from the Fukushima nuclear accident (The Asahi Shimbun, 2011). In daily life activities, the Ministry of Agriculture, Forestry and Fisheries of Japan has been conducting a campaign: “Let’s Support Eastern Japan by Eating!”. These eventualities suggest that Japanese attitudes about the Fukushima nuclear accident influenced the acceptance of radioactive debris and the support for products manufactured in disaster-affected prefectures. However, few reports in the relevant literature describe studies examining the key predictors of Japanese opinions about post-disaster reconstruction policies.

(4) *GENDER DIFFERENCE ON ATTITUDE TOWARD NUCLEAR AND THE RECONSTRUCTION*

Previous studies have revealed that men and women had different attitudes, beliefs, and emotional reactions related to nuclear disasters and environmental pollution. For example, Newcomb (1986) reported that women expressed significantly more nuclear

concern, less nuclear support, greater fear of the future, and less nuclear denial than men did. Rabow, Hernandez, and Newcomb (1990) reported similar nuclear attitudes with gender differences observed in American, British, and Swedish students. A recent study by Keller, Visschers, and Siegrist (2012) investigated affective imagery related to nuclear power and the acceptance of replacing nuclear power plants. They found that men had a higher acceptance of replacing nuclear power plants than women did. Moreover, the affective image association related to nuclear power plants differed between men and women.

However, some reports have described that patterns of gender differences of concern about technology and the environment are not universal (Davidson & Freudenburg, 1996; Finucane et al., 2000; Flynn, Slovic, & Mertz, 1994). For example, Flynn et al. (1994) reported that white men in the U.S. judged risk as less than women did, but this gender difference was not found between non-white men and white women. In a more recent study, Finucane et al. (2000) obtained replicate findings from those reported by Flynn et al. (1994) and pointed it out as a white male effect. They also found that Asian men in the U.S. assigned lower risk ratings to six risk items, including contaminated foods, than white men did. Whitfield, Rosa, Dan, and Dietz (2009) reported that nuclear attitudes did not vary by gender, age, education, income, or political orientation, although non-white people were found to be more supportive than white people were. In light of the results of the studies described above, gender differences in risk judgments require further research. Therefore, we investigated Japanese attitudes

about the Fukushima nuclear accident along with gender differences. We hypothesized that Japanese women had their own attitudes about the Fukushima nuclear accident and that their opinions about policies were more negative than those of men.

The relevant literature includes reports only of studies of attitudes about prior nuclear power plant accidents (Eiser, Spears, & Webley, 1989; Lindell & Perry, 1990; Verplanken, 1989) and changes in non-Japanese people's attitudes about the Fukushima nuclear accident (Hartmann et al., 2013; Prati & Zani 2012; Visschers & Siegrist, 2013). Nevertheless, the characteristics of Japanese attitudes about the Fukushima nuclear accident and public opinions about the post-disaster policies remain unclear.

(5) *EMOTION TOWARD NUCLEAR POWER AND THE RECONSTRUCTION ACTIVITIES*

Earlier studies have revealed that public support for nuclear policies was influenced not only by a person's gender (Keller et al., 2012; Newcomb, 1986; Rabow, Hernandez & Newcomb, 1990) and geographical location (Greenberg, 2009; Venables et al., 2012) but also by their attitudes about nuclear power. These findings from earlier studies related to the dual-process models suggested that emotional and cognitive aspects of people's attitudes about nuclear power characterize their support for nuclear policies. For example, a study conducted in Japan revealed that trust in institutions was necessary for public acceptance of nuclear power plant location, but not for public acceptance of the location of high-level radioactive waste repositories (Tanaka, 2004). Furthermore,

Siegrist, Cvetkovich, and Roth (2000) reported social trust as a critical predictive factor of the perceived risks and benefits of nuclear power: social trust positively influences the perceived benefits and negatively affects the perceived risks. A more recent study by Visschers and Siegrist (2013) revealed that trust strongly affected perceived benefits and risks in Switzerland before and after the Fukushima nuclear accident. Additionally, they reported that Swiss people's perceived benefits of nuclear power plants were more important than perceived risks as determinants of the acceptance of nuclear power.

Emotional components of nuclear attitudes also determine support for nuclear policies. For example, Finucane, Alhakami, Slovic, and Johnson (2000) reported that affect evoked by nuclear power might be an essential determinant of the perceived benefits and the perceived risk of nuclear power. Furthermore, Sjöberg and Drottz-Sjöberg (2009) pointed out that fear of radiation is an essential determinant of the public risk perception of nuclear waste. A more recent study by Hartmann et al. (2013) revealed that Spanish people's emotional fear arousal motivated their nuclear opposition after the Fukushima nuclear accident. In dual-process models, cognitive and emotional components are interactive. They guide behavior (Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2004). Therefore, several recent studies were undertaken to investigate relations between emotions and cognitive beliefs about energy sources and support for energy sources (Keller et al., 2012; Truelove, 2012). However, we still have not known how Japanese attitudes about the Fukushima nuclear

accident were associated with their opinions about post-disaster reconstruction policies in Japan.

6. SUMMARY OF THE RESEARCH PURPOSES AND LITERATURE REVIEWS

The Great East Japan Earthquake had unique characteristics in that it was comprised of both earthquake and tsunami natural disasters and a subsequent accident at the nuclear power plant in Fukushima. The main purpose of this thesis is to study how this unique disaster affected social change in Japan within the period of one year after the disaster happened. To go into more detail, we first need to explore and analyze post-disaster panic-cooperative behaviors among citizens in disaster-affected areas. Second, we aim to clarify post-disaster culture and determine how social norms changed after the 2011 Japan earthquake disaster. Third, because nuclear accidents have occurred only a few times in our history, it is necessary to clarify the current structure of nuclear attitudes, and their relationship with attitudes toward the reconstruction policies of the 2011 Japan disaster. Forth, the demographic information, such as regional and gender differences, might be found to influence nuclear attitudes and attitudes toward reconstruction activities because of the distance, level of damage from the 2011 disaster, and disasters in history. Last, we should examine the perceptions of the 2011 disaster and Japanese behavior from the viewpoints of neighboring countries.

Behaviors after the disaster have been assumed as hazardous and without any pattern because of crime and deviant behaviors found at the scene. Sociologists provide a vast amount of evidence that behaviors during post-disaster periods were calm and more cooperative than in ordinary situations, like a kind of utopia. People will not turn to panic, and panic may exist only in the movies to exaggerate human reactions toward huge disasters. Crime and deviant behavior, in contrast, have their meaning as a response to the newly emerged situation that forces us to give up our institutional norms and form a new norm that is more appropriate and reasonable in the exceptional case. The author assumed that this process should help communities shape a more suitable pattern of behaviors in the disaster aftermath and form a unique, different culture in response to the coming disaster.

Helping is necessary for the peace of human society. People will take altruistic action more when the one who receives help is their relative, or in the same community whereby giving support is equal to the return from others in the future. The reciprocity of helping norm will be strengthened if the society has effective reward and punishment systems so that they can guarantee other's cooperation. Because help is costly, we have to process all the information in front of us in order to decide whether or not to help. Social categorization theory helps people analyze information about others and to identify whom we should help. Ingroup favoritism shows our inclination to be kind to persons who are similar to us, as in our ingroup. We assume that social bonds among people in the disaster-affected area will strengthen the feeling of ingroup formation among citizens

that creates higher cooperation for the reconstruction of the community. The aims of this dissertation are listed as follow.

- 1) To explore and analyze post-disaster panic-cooperative behaviors among citizens in disaster-affected areas
- 2) To clarify post-disaster culture and determine how social norms changed after the 2011 Japan earthquake disaster
- 3) To explore public nuclear attitude after the 2011 disaster and the relationship between this and the reconstruction activities
- 4) To examine regional differences concerning attitudes and emotions toward reconstruction activities along with the effects of distance, level of damage, and historical disasters
- 5) To study the perceptions of the 2011 disaster and Japanese behavior from the viewpoints of neighboring countries.

CHAPTER 2

DEVIANT BEHAVIORS VS. ALTRUISTIC BEHAVIORS

AFTER THE 2011 JAPAN DISASTER

The survey in this chapter is designed to collect behavioral data of the 2011 disaster victims. As mentioned in Chapters 1, panic after a natural disaster is very rare, and people in the affected area keep supporting each other until the emergency situation becomes calm. For the 2011 disaster in Northeastern Japan, this harmony among disaster victims has been appraised. The following data are the proof that the Japanese etiquette is vigorously applied even under conditions of natural disaster.

1. STUDY 1: THE SURVEY OF BEHAVIOR AFTER THE 2011 JAPAN DISASTER BY DIARIES, BLOGS, AND PHOTOGRAPHS

No matter how strongly the memory of the disaster had been imprinted in a person's mind, memories fade and change over time. Diaries and photographs taken in real time are profoundly invaluable. Consequently, this work examined the circumstances of the emergency period after the 2011 Great East Japan earthquake by gathering real-time records such as diaries and photographs from volunteers (See also Abe, 2012).

1-1 METHOD

With support from *Kahoku Shimpō* (A Japanese language daily newspaper which is published in Sendai, Japan), we placed an advertisement on May 5, 2011, calling for diaries, snapshots, and any real-time documents of the 2011 East Japan disaster circumstances from volunteers.

1-2 RESULTS

In all, 91 local people volunteered to share their diaries, digital photographs, memos or blogs for the study. Of those people, six sent us diaries, 19 sent photos, 21 sent memos, 31 sent blogs, six sent photos and blogs, and eight sent memos and photos.

Most of the photographs depicted disaster-affected scenes. However, one showed people charging batteries from electric generators at a subway construction site in Sendai (No. 27) or from a junction in a shopping area (No. 85). Another was a picture of a shuttered convenience store, apparently barricaded by trash cans in front of the door (No. 28) (Figures 1a–1c).



Figure 2. Odd scenes after the 2011 Great East Japan earthquake

a: Photograph No. 27 — charging batteries from electric generators at a subway construction site (March 12, 2011, in Sendai)

b: Photograph No. 85 — charging batteries from a junction in a shopping area (March, 13 in Sendai)

c: Photograph No. 28 — shuttered convenience store, with doors apparently barricaded by trash bins (April 3, 2011, in Sendai)

Besides, diaries, memos, and blogs reflect people's lives during the disaster aftermath. Some of the contents are the following (names withheld).

No. 1: Sunday, March 13, got tanks of water, rice, tea, yogurt, dried plums, apples, and vegetable juice from a neighbor, N. Got salmon, oranges, apple, banana, miso soup, dried bread, and pickles, from neighbor, I. Tuesday 15 March, got information that supermarket X is open from N. *Numerous people were lined up there.* It is a 22-hour wait... They're selling things at meager prices; I felt *a great sense of gratitude* to the seller.

No. 2: May 6, 10:30, I found *a very long shopping queue* in front of the supermarket, which made me wait for about 1–2 hours. Some shops have limited the number of items that may be purchased. One time, I saw an older person's misbehaving. The person had let some friends and acquaintances *cut into the line* that I was waiting in (giving them the opportunity to get the items they wanted before people further back in the line). What's worse, the older person complained about how a staff member handled the incident.

No. 6: Sunday, March 13, 7 a.m. I was called out to by a woman (as I was walking). *She gave me a lot of food and offered to drive me home.* I thought I would reach home soon, so I refused her. At 10 a.m. I arrived back and checked to ensure that my family members were safe!!

No. 56: On Sunday, March 13, in the morning, I walked to the taxi pool at North Sendai station. Halfway there, I saw the police were trying to address *some quarrels at the (gasoline) filling station.* On March 14, I confirmed the scale of the disaster and left home to buy some food. At that time, product transportation was not fully functioning, and the shops had few products for sale. Despite all this, I saw that they were very polite and *waited calmly in line.* The situation was similar to what I had been told. My mother and grandmother recalled that people had acted in a similar, peaceful fashion during the aftermath of the 1978 earthquake (author's note: Miyagi earthquake in 1978, Mw. 7.4, death toll 28).

No. 72: On March 12, when I reached the spot to which the water truck would come (the distribution point), people who had come to get water had *already made a line*. I saw *some helping disabled people and elderly people*. I thought they were kind. On March 13th, I had a walk nearby. Many buildings had been damaged. I saw a car used by an electrician parked at a convenience store. The registration number showed the worker's car was from Niigata prefecture. The fact that they had come here from so far away made me feel glad and thankful, from my soul, my heart.

1-3 DISCUSSION

Results show that every piece of information described mutual aid despite difficult and inconvenient conditions in the aftermath. However, disorderly behavior was probably not absent. Photographs from case No. 27 and No. 85 might show acts of looting of electricity. In addition, arranging trash cans as barricades in front of the convenience store was intended to prevent some expected trespass or looting. Besides, a diary of case No. 2 tells us of the existence of an elderly person who did not observe queues, and case No. 56 highlights quarrels.

Solnit (2009) argued that, in an emergency, taking others' belongings, which is perceived as looting or theft in an ordinary sense, should be recognized as reasonable and appropriate *requisitioning* in an abnormal situation. Although they sometimes seem to commit deviant behavior to survive, the results emphasize that residents affected by the

2011 disaster revealed a strong sense and actions of mutual aid and altruism without severe confusion or infighting.

2. STUDY 2: THE SURVEY OF BEHAVIOR AFTER THE 2011 JAPAN DISASTER BY OPEN-ENDED QUESTIONNAIRE

Data obtained from diaries included real-time accounts and photographs, which kept those records fresh and lent them a high degree of reliability. Nevertheless, all those materials were given from certain readers of a newspaper. It is unreasonable to make any quantitative discussion according to the data. Therefore, before too long a time had passed after the emergency, another survey was administered to collect information about what happened during that disaster and its aftermath.

2-1 METHOD

During May–June 2011, a questionnaire was administered to 161 participants, all of whom lived in areas affected by the 2011 East Japan disaster. They were college students in Fukushima prefecture (14 participants, aged 20–22 years), college students at a university in Sendai (39 participants, all women aged 19–22 years), college and graduate students at another university in Sendai (90 participants, aged 19–28 years), and participants in an open lecture given to local citizens at Marumori, about 50 km south of Sendai (18 participants, aged 18–84 years).

They were asked to describe odd scenes or atypical behaviors in the aftermath of the event, and particularly what seemed to differ from usual, along with date, time and area information if possible.

2-2 RESULTS

Each response was considered for inclusion into multiple categories and was duplicated and included in all relevant categories. Therefore, 514 items in all were analyzed. Each of the two authors categorized all items into groups separately. Then items in categories that had been assigned by both authors were counted. Results are presented in Table 1.

Those of category 'Altruistic or orderly behavior' were 202 cases. Those who responded 'Deviant behavior' were 75. Results show that 'Altruistic behavior or orderliness' reports were 2.7 times higher than those of 'deviant behavior.' For the felt 'Emotional change,' the 'Positive change' (16 items) was higher than the 'Negative change' (6 items).

Table 1. Categories of odd scenes or behaviors in aftermath observed by participants

Essential utilities	126	Electricity	22	Deviant behavior	75	Ill-mannered	12
		Gas	4			On-street parking	1
		Water	7			Favoritism sale	4
		Fuel	35			Price gouging	2
		Telephone	3			Electricity theft	8
		Food and drinking water	41			Thefts	10
		Transportation	14			Prejudice	1
Social change	254	Appearance of people in the past	4	Altruistic or orderly behavior	202	Quarrel	7
		Clothing	10			Self-decontrolled	1
		Landscape	50			Overreaction	6
		Found ordinary scene even in emergency	12			Cutting the queue	5
		Awareness of nature problem	6			Buying up goods	18
		Concerns of looting	22			Calm attitude	36
		Rumor	9			Strengthen of communication	58
		On-street selling	5			Revival of Communication	9
Change in media	23	Donation	5				
Supply shortage	20	Price reducing	15				
Queuing	82	Mutual aid	41				
Nuclear plant	11	Sharing	27				
Change in perceptions	22	More blunted	8	Others	35	Self-control	11
		More sensitive	14			Others	35
Emotional change	22	Negative way	6				
		Positive way	16				
Bodily change	2	Pathology	2				

Note. Numbers show frequencies of response

Translated from Abe (2013)

2-3 DISCUSSION

The 'Deviant behavior' category included a subcategory related to the disruption of the peacefulness in refugee communities or crimes. Some examples are 'Ill-manners', 'Electricity theft', 'Thefts' and 'Quarrels'. However, 'Altruistic or orderly behavior' is described as a 'Calm attitude', 'Strengthening of communication', 'Mutual aid', 'Sharing', and other behavior that promoted the health and lives of those being evacuated and prevented crimes of any kind. Because there were more examples of 'Altruistic or orderly behavior' than 'Deviant behavior', it can be inferred that the cognition kept in the memory of the disaster victims was an image of peaceful behavior and a cooperative mindset.

However, it had to be noticed that deviant behavior existed, although it was rare. Theft and electricity theft were regarded as crimes. Instances of 'Theft' related to gasoline, vending machines, and convenience stores were reported. Eyewitness accounts of behavior included observations such as, "someone pumped gasoline from a car that had been flooded (by the tsunami)", "I found someone who got drinks by breaking into a vending machine", "My friend's sister had wanted to steal something from a convenience store, but it had already been stolen before she got in", "Someone burned the school's chairs to boil water", etc. Even if they did it because it was necessary for survival, one cannot avoid the fact that such behavior threatened the peace in communities during the aftermath.

For the subcategory ‘Quarrel’, it was reported of some that “They fought because they mismanaged the line (the service staff and a customer at a filling station)”, “Some people were cutting in line for gasoline. People around there got angry very easily, and their reactions were stronger than normal”.

It must be emphasized that mutual aid occurred everywhere, even among complete strangers. However, some criminal and deviant behavior were also found in the disaster’s aftermath, as people sought fundamental assistance for survival. Such behavior is unsuitable under normal conditions, but might be considered permissible during emergencies as proper behavior.

3. CONCLUSION

Even in the case of the 2011 Great East Japan Earthquake and the tsunami which resulted, several reports of deviant behavior have arisen. Regarding their criminal significance, they were minor and were conducted in an atmosphere of emergency by people sensing no alternative. Most images held in the victims’ minds were those of active self-control, selfless behavior, and cooperation, as would befit a description of *a post-disaster utopia*.

During a disaster’s aftermath, the emergent norms differ from ordinary norms and are based on and formed by the emergent situation (Turner & Killian, 1972). The behavior of the Japanese admired by many after the 2011 Great East Japan disaster

probably derived from the proper creation of emergent norms, which protected the community in replacing traditional norms.

CHAPTER 3

THE DISASTER SUBCULTURE AND SOCIAL NORMS AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE

This chapter focuses on the concrete social norm changes by measuring how people feel about specific deviant behaviors that are found in daily life and the disaster aftermath. Most deviant behaviors found in disaster aftermath are argued to be appropriate responses under extraordinary situations to which social norms need to be adapted; the so-called “emergent norm” (Turner & Killian, 1972). Also, Wolfenstein (1957) reported altruism and well-organized community behaviors, and also self-reliance during disasters. He also named this calm and peaceful post-disaster stage as a “disaster utopia”. A profound example of utopia during the post-disaster stage is the Great East Japan Earthquake and the tsunami which followed on March 11, 2011. Our previous studies showed the profoundly higher percentage of well-mannered behavior and social support, while deviant behaviors were not often mentioned.

A pilot questionnaire and an internet survey were designed to clarify the shape of norm change which occurred in the 2011 East Japan disaster. These two studies aimed:

- 1) to clarify characteristics of post-disaster deviant behaviors in the 2011 East Japan disaster;
- 2) to find any effect of residential area on the level of forgiveness on deviant

behaviors, and 3) to consider the effects of two behavioral inhibiting emotions: anger, and shame/embarrassment on the forgiveness of deviant behaviors.

1. STUDY 3: THE SURVEY OF FORGIVENESS FOR DEVIANT BEHAVIORS AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE (PRELIMINARY SURVEY)

1-1 METHOD

(1) *PARTICIPANTS*

172 college students and graduate students from two universities in Sendai city, Miyagi prefecture, and college students from a university in Fukushima prefecture participated in this study. After rejecting incomplete questionnaires, we had 170 responses for analysis (average age 20.4 years old, SD 1.53, male 69 responses and female 101 responses).

(2) *MEASUREMENTS*

Questionnaire items: The questionnaire was composed of three parts as follows: (a) general information: age, gender, residential area, hometown, experience of disaster; (b) lists of deviant behaviors; (c) forgiveness scale, and (d) witness questions. For the lists of deviant behaviors in (b), those used in this study were selected from the questionnaire in the study 2. There were eight items: illegal dumping; cutting in line; buying things up;

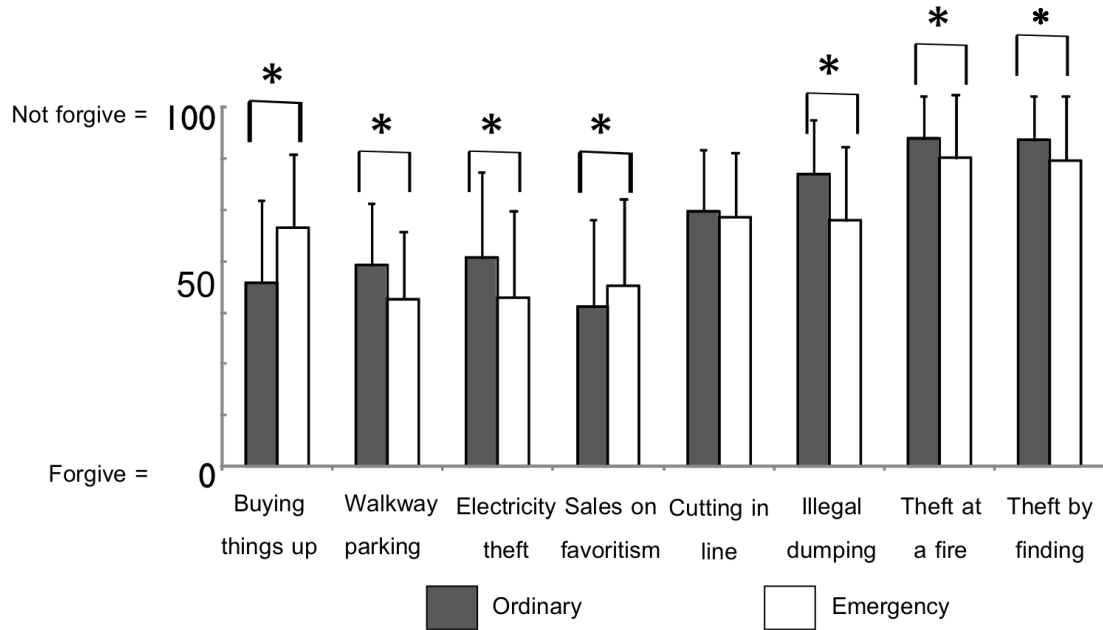
theft by finding; theft at a fire; sales on favoritism; electricity theft, and walkway parking. Participants were asked to rate six items of forgiveness on a scale for each behavior item in the list twice: once is the rating in an ordinary situation, and the other is for emergency situations. The scale for six items of forgiveness contained: “We must not do ○○ because this will trouble others or make them suffer”; “○○ is clearly a bad thing so we must not do it”; “We must not do ○○ even if no-one will notice it”; “If many people do ○○, it will be ok if I do so” (reversed item), “We cannot do ○○ even for any reason”, and “If we fall in a hard situation, we can do ○○.” (reversed item) (Cronbach’s alpha = .73 - .91). The rating is 8-scale starting from “0”, totally disagree, to “7”, totally agree. Questionnaire items were originally created from the discussion among researchers. Finally, they were asked whether they saw each of those behaviors in the 2011 disaster or not.

(3) *PROCEDURES*

The questionnaires were distributed between June – July 2011, approximately three months after the 2011 East Japan disaster. We asked for permission from the class instructors and collected volunteers in the classrooms. Filling in questionnaires would not benefit or cost the participants so they could choose to give consent and participate or just leave the room by their own will. This study obtained ethical approval from the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

1-2 RESULTS

The scores of forgiveness in ordinary situations and emergency situations, and the percentage of witnesses for each deviant behavior are presented in Figure3.



* $p < .001$

Figure 3 Mean scores and standard deviation of forgiveness in ordinary and emergency situations

The relationships between deviant behaviors (8 items), and situations (2 situations) were tested by using the two-way analysis of variance. The main effects of deviant behaviors ($F(7,1085) = 191.50, p < .001$), and situations ($F(1,155) = 20.16, p < .001$) were found. The interaction effect between these two factors ($F(7,1085) = 56.29, p < .001$) was also significantly found. Ryan's method posthoc test of multiple comparisons

indicated the level of forgiveness toward deviant behaviors that, ‘theft at a fire’, and ‘theft by finding’ were the most difficult to forgive. Next, ‘illegal dumping’, and ‘cutting in line’ were higher than ‘buying things up’, ‘electricity theft’, ‘walkway parking’, and ‘sales on favoritism’, respectively ($ps < .01$). Importantly, we found that ‘illegal dumping’, ‘electricity theft’, ‘walkway parking’, ‘theft at a fire’, and ‘theft by finding’, were easier to forgive in an emergency situation ($ps < .001$). In contrast, ‘buying things up’, and ‘sales on favoritism’ were more difficult to forgive in an emergency. There was no significant difference between situations for the forgiveness of ‘cutting in line’.

1-3 DISCUSSION

Results of this preliminary questionnaire found a different level of acceptance based on situations. Behavior that is ordinarily unacceptable will become more forgivable if the situation is problematic and we have few options but to act in that way. Interestingly, ‘buying things up’ and ‘sales on favoritism’ were found to be less acceptable in an emergency. This can also imply the influence of the situation to the norm, and importantly, the expectations of mutual altruism and empathy were highlighted in these results. People who “buy a lot more than what is necessary when the resource is not abundant” are likely to give priority to themselves over others who similarly fall into the hard situation. We can observe the trend of the social norm change in an emergency and the tendency of social sanctions upon those who broke the newly created norm.

Furthermore, it is not yet clear whether other areas in Japan were affected by the emergent social norm or not. And if they were, we should examine how far the emergency social norm spread around. To test the effect of area on the formation of the new social norm and its application, we conducted another internet survey in many areas across the main island of Japan.

2. STUDY 4: THE SURVEY OF FORGIVENESS FOR DEVIANT BEHAVIORS AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE

2-1 METHOD

(1) *PARTICIPANTS*

A sample of 3,840 adults was drawn from Iwate, Miyagi, Fukushima, Kyoto, Shiga, and Aichi prefectures (640 respondents for each prefecture). Iwate, Miyagi, and Fukushima prefectures were those severely affected by the 2011 Great East Japan Earthquake and tsunami and the following nuclear accident, so these were chosen and classified as disaster affected areas. On the contrary, Aichi, Kyoto, and Shiga prefectures were affected least by those disasters and were known for none of the severe disasters (e.g., earthquake, tsunami, volcanic eruption) being recorded (Emergency and Disaster Security Headquarters, National Police Agency, 2015).

For each prefecture, 160 men and women from 4 groups of age: 20s (20-29 years), 30s (30-39 years), 40s (40-49 years), and 50s (50-59 years) were collected. Because the

population decreased in Fukushima after the disaster, we received only 76 of 80 responses from the 20s men living in Fukushima. 3,836 completed questionnaires were obtained, and 27 responses from the non-affected areas were cut from the analysis because they reported severe losses from this disaster. Eventually, 947 male participants (average age 39.93 ± 11 years), and 946 females (average age 39.55 ± 11 years) from non-disaster affected areas, and 956 males (average age 39.78 ± 11 years) and 960 females (average age 39.46 ± 11 years) from the disaster-affected areas participated in the study. There was no statistical gender and age difference between the two areas ($\chi^2_{\text{gender}}(4) = .00, p = .95$; $\chi^2_{\text{age}}(3) = .02, p = 1.0$). In total, 3,809 sets of data were analyzed.

For the non-disaster affected area, 99.5% lived in the same place as before the disaster happened; the other 0.4% moved back to the same place after staying in the evacuation shelter or temporary housing, and 0.1% moved to another place in the same prefecture. Most of the respondents were not affected by the 2011 disaster (97.9%), lived alone (86.1%), and were in urban areas (54.9%). For the disaster-affected area, 65.1% reported some small losses from disaster, 19.5% were severely affected, and 15.4% were not affected. Ninety-two percent of them did not change their address after the disaster while 2.7% had already moved back to the same place, 1.4% were still living in the temporary houses, and 3.7% moved to another place in the disaster-affected prefecture. Most of them were living in the urban zone (54.2%) and lived alone (86.2%). People from the disaster-affected area were facing significantly higher moving out rates than people from the non-affected area ($\chi^2(4) = 127.36, p < .001$).

(2) *MEASUREMENTS*

The questionnaire items consisted of demographic information (residential area, age, and gender) and six sets of 10 items of deviant behaviors (shown in Table2). Those deviant behavior items were picked up predominantly from the results of our preliminary study. Participants were asked to rate three evaluative emotions (unforgivable, angry, and shame/embarrassed) in 2 situations (normal and disaster) on a 6-point Likert scale starting from 0 (do not feel it at all) to 5 (strongly feel it). Unforgivable and angry are emotions which occurred when seeing the others perform those behaviors while shame/embarrassed (‘Haji’ in Japanese is used for both meanings) is for the participants feelings about themselves if they did it.

(3) *PROCEDURES*

The questionnaire was conducted during February 28 – March 6, 2014. Participants were recruited via a survey company in Japan. They were people who had already registered through a website with verified personal information such as name, gender, age, and home address. For consent of participation, all of the registered members who matched the criteria of the residential area, age, and gender were sent an email about the study with the link to the web-based questionnaire. After they carefully read the conditions, purposes, and objectives of the study, participants who were willing to participate either continued answering the questions or quit the survey. They can quit the process at any time during the survey. Thus, the consent was assumed if participants

completed the entire survey and submitted their answers. Participants will get 500 tokens for exchanging to cash (500 JPY) or gifts. Data were collected until the numbers of responses reached the goal of each demographic condition. For the ordinary situation, participants were guided to think about their daily life and routine habits with some of the pictures of towns and nature. Then, they were asked to rate the three evaluative emotions (i.e., unforgivable, angry, shame/embarrassed) for ten items of deviant behaviors.

After finishing this part, participants were then asked to imagine if they were facing a great earthquake like the 2011 East Japan disaster, when buildings collapsed, there was disruption to electricity, gas, tap water, and a lack of food in the disaster condition. Together with the messages, some pictures of those situations were presented. Next, they completed the question set as presented in the first part again. This study obtained ethical approval from the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

2-2 RESULTS

(1) *CHANGES OF UNFORGIVENESS ON DEVIANT BEHAVIORS*

Mean and standard deviation scores of each behavior item in normal and disaster situations, and the total scores of each emotional evaluation (i.e., unforgiveness, anger, and shame/embarrassment) toward all behaviors are presented in Table 2. Next, we examined significant differences of unforgiveness varied by the residential area (disaster-affected area and non-affected area), and situation (normal and disaster) using

multiple analysis of variance (MANOVA) on every behavior listed. For the results of MANOVA, a multivariate main effect of situation ($F(9, 3799) = 235.99, p < .001$; Wilk's $\lambda = .64$; *partial* $\eta^2 = .36$), residential area ($F(9, 3799) = 5.59, p < .001$; Wilk's $\lambda = .99$; *partial* $\eta^2 = .01$), and interaction effect of situation and residential area ($F(9, 3799) = 3.28, p < .01$; Wilk's $\lambda = .99$; *partial* $\eta^2 = .01$) emerged. The interaction effects were attributed to denying cooperation in local activities ($F(1, 3807) = 7.45, p < .01$; *partial* $\eta^2 = .00$), illegal dumping, and vending machine theft ($F_s(1, 3807) = 4.43 - 4.86, p_s < .05$; *partial* $\eta^2 = .00$). The posthoc multiple comparisons test indicated that residents in affected areas found it more difficult to forgive illegal dumping and vending machine theft than residents in non-affected areas (normal; $p_s < .01$, disaster; $p_s < .001$), and those behaviors in disaster situations were easier to forgive than in normal situations (disaster affected and non-affected areas; $p_s < .001$). In contrast, denying cooperation in local activities in disaster time was more difficult to forgive than in normal situations in both areas ($p_s < .001$).

Table 2. Mean and standard deviation of unforgiveness on each behavior and overall unforgiveness, anger, shame/embarrassment separated by situation.

	Normal				Disaster			
	affected area		non-affected area		affected area		non-affected area	
	M	SD	M	SD	M	SD	M	SD
Cutting in a line	4.17	1.00	4.05	1.10	4.13	1.1	3.99	1.1
<i>Illegal dumping</i>	4.09	1.10	3.99	1.10	3.65	1.3	3.45	1.3
<i>Vending machine theft</i>	4.05	1.20	3.94	1.20	3.50	1.4	3.3	1.4
Theft by finding	3.48	1.20	3.38	1.30	3.40	1.3	3.28	1.3
Walkway parking	3.20	1.20	3.19	1.20	2.93	1.4	2.9	1.4
Buying things up	3.15	1.30	2.99	1.30	3.32	1.3	3.23	1.3
Open-air fire	3.08	1.30	3.00	1.30	2.42	1.5	2.37	1.5
<i>Denying cooperation in local activities</i>	2.55	1.20	2.51	1.20	2.87	1.3	2.93	1.3
Persimmon theft	2.30	1.30	2.38	1.30	2.19	1.5	2.19	1.5
Overall unforgiveness	30.10	7.00	29.40	7.30	28.40	8.7	27.6	8.8
Overall anger	29.00	7.70	28.60	7.50	28.10	9.1	27.4	9.2
Overall shame/embarrassment	32.70	8.40	32.00	8.70	30.50	9.5	29.7	9.6

Note. Behaviors which are attributed to interaction effects are written in bold and italic style.

(2) EFFECTS OF GENDER, AGE, ANGER, AND SHAME/EMBARRASSMENT ON FORGIVENESS OF DEVIANT BEHAVIORS

To test the effects of age, gender, anger, and shame/embarrassment on forgiveness of deviant behavior, we performed hierarchical multiple regressions separately by situation (normal and disaster situations). Gender (male = 0, female = 1) and age (20s = 1, 30s = 2, 40s = 3, 50s = 4) was added at step1 of the regression. For

step2 of the normal situation, anger and shame/embarrassment in the normal situation were added as the independent variable. In the disaster situation, anger and shame/embarrassment in both normal situations and disaster situations were added. The model explained 2.5% ($p < .001$) and 4.7% ($p < .001$) of the variance in their unforgiveness about deviant behaviors (see Table 3). For step 1 of the regression analyses, gender and age were significant predictors of unforgiveness in a normal situation ($\beta_{\text{gender}} = .06, p < .001; \beta_{\text{age}} = .21, p < .001$). For the unforgiveness in a disaster situation, age was also found to be a significant predictor ($\beta_{\text{age}} = .16, p < .001$). After controlling for demographic factors (gender and age), those emotions accounted for 73% ($p < .001$) to 86% ($p < .001$) of the variances in their unforgiveness of deviant behaviors. For step 2 of the regression analyses, age was still a significant predictor ($\beta = .02, p < .01$). Higher levels of anger and shame/embarrassment in a normal situation positively predicted unforgiveness in a normal situation ($\beta_{\text{anger}} = .71, p < .001; \beta_{\text{shame/embarrassment}} = .19, p < .001$). Stronger levels of anger and shame/embarrassment in a disaster situation and unforgiveness in a normal situation positively predicted unforgiveness in a disaster situation ($\beta_{\text{anger}} = .76, p < .001; \beta_{\text{shame}} = .10, p < .001; \beta_{\text{unforgiveness}} = .10, p < .001$).

Then, we confirmed the effects of age and gender on overall forgiveness scores in both situations by using MANOVA. The results showed no interaction effect but main effects of gender ($F(2, 3800) = 7.76, p < .001; \text{Wilk's } \lambda = 1.0; \text{partial } \eta^2 = .00$), and age ($F(6, 7600) = 30.67, p < .001; \text{Wilk's } \lambda = .95; \text{partial } \eta^2 = .02$).

The posthoc test of multiple comparisons (Bonferroni) confirmed that for the ordinary situation, women showed lower forgiveness of deviant behaviors than men ($p < .001$), and older residents had a lower level of forgiveness of deviant behaviors (not forgive: the 50s > 40s > 30s > 20s; $ps < .01$). For disaster situations, the pattern of responses among age groups was similar to the ordinary situation ($ps < .05$), except that the difference between the 20s and 30s was insignificant (See Table 3).

Table3. Summary of regression coefficients for each hierarchical multiple regression analysis on forgiveness

	Step	Variable	β	R ²	R ² change	F
S1	1	Gender	.06***	0.05	0.69	92.98***
		Age	.21***			
	2	Gender	0	0.73		
		Age	.02**			
		Anger(S1)	.71***			
	Shame/Embarrassment (S1)	.19***				
S2	1	Gender	0.03	0.03	48.75***	
		Age	0.16***			
	2	Gender	0	0.86	0.83	3309.05***
		Age	0.01			
		Anger(S2)	.76***			
		Shame/Embarassment(S2)	.10***			
		Unforgiveness (S1)	.10***			
		Anger(S1)	0.02			
	Shame/Embarrassment (S1)	0				

Notes: S1 = Ordinary situation, S2 = Disaster situation; ** $p < .01$, *** $p < .001$

2-3 DISCUSSION

The results confirmed many previous studies which held that deviant behaviors were perceived more positively when they were seen during emergency situations(Drury, Novelli & Stott, 2013; Quarantelli, 1960; Quarantelli & Dynes, 1972). Vending machine theft, persimmon theft, and theft by finding can be classified as looting behaviors, while walkway parking, illegal dumping, open-air fires, and cutting in line may represent civil disorder in Japanese society. Those behaviors become more rational and adaptable to the circumstances of a need for food and drinking water during the disaster period. Also, social norms will lose their priority to the matter of rescuing people and survival, and this can thus make civil disorder acceptable (Drury, Novelli & Stott, 2013; Fahy & Proulx, 2009). However, buying things up and denying cooperation in local activities are perceived as deviant in daily life but become more important and more difficult to forgive in the emergency situation in which people need a high level of cooperation rather than acting in a self-serving manner (Li, Li, Decety & Lee, 2013; Tomasello, 2009).

The effect of disaster history in the residential area did not confirm our assumption that being in the area that was affected by the disaster will make the residents rate deviant behaviors more negatively than residents from other areas when imagining a large-scale disaster occurred. The results showed a lower level of acceptance in both normal and disaster situations in the disaster-affected area. However, the lower acceptance can imply a higher standard of social norm that resulted from being in a disaster scene and the feelings of emergency in people's minds have not entirely gone.

Because this questionnaire was taken one year after the Great East Japan Earthquake, the freshness of the situation in mind might induce people to strictly maintain the norm standard unconsciously even if it is deviant in a daily situation (Elinder & Erixson, 2012). Another possible explanation is the place attachment that residents have with their community and neighbors. Communities after the disaster might increase their bond together which may lead to the feeling of more attachment to the current place and greater commitment to the community's social norms (Mishra, Mazumdar & Suar, 2010; Ruiz & Hernández, 2014).

For the effects of anger and shame/embarrassment, both are significant predictors of unforgiveness toward deviant behavior and were limited by the situation of the environment. In the normal situation, anger and shame/embarrassment are significant predictors, but anger and shame in the disaster situation, and unforgiveness in the normal situation can predict unforgiveness. That means anger and shame in the normal situation would not be considered as factors leading to forgiveness of the breaking of social rules in the disaster situation. This is similar to what emergent norm theory suggests in that norms in daily life could not be used in the emergency situation (Turner & Killian, 1972). However, unforgiveness in the normal situation can predict unforgiveness in the disaster situation. That is possibly because, when considering the forgiveness in disaster, forgiveness in normal situations will be used as a criterion to evaluate how they feel toward those behaviors. This might be a limitation of the study that takes its responses

through a questionnaire survey where it is difficult to merge between a real disaster emergent and the imagined one.

This study found some effects of demographic factors; age and gender. This was supported by other researchers who found that women were more concerned about breaking social norms and cooperation than men (Eagly, Wood & Fishbaugh, 1981). Moreover, we found the spectrum of age range on forgiveness. This might be a clue to the generation gap between each age group, or the effects of age distribution on commitment toward social norms (Lawrence, 1988). Van Liere and Dunlap (1980) proposed that younger persons are less integrated in the existing social order (Liere & Dunlap, 1980; Nord, Luloff & Bridger, 1998; Fransson & Garling, 1999).

3. CONCLUSION

Two studies in this chapter clarified trends of social norms adapted by situations whereby behaviors which are not acceptable in ordinary situations become more forgivable in disaster situations. In contrast, deviant behaviors which are moderately forgivable become harder to forgive if it showed individual preference in self-interest over others' suffering. Cooperation and mutual trust were found to be most important in disasters (studies 3 and 4), and truly found in the disaster-affected sites (studies 1 and 2).

Importantly, we can conclude from studies 3 and 4 that the sanction of the norm deviation from people in disaster-affected areas was stronger than for people in other areas. The strength of social norms among people in the disaster sites might be the unique

characteristic of the 2011 Tohoku disaster, as we found the appraisal of Japanese manners among disaster victims via the TV, newspapers, and social media. Mutual trust and caring for others' higher expectations of others to do the same were observed. As the results suggest, this increases the informal social controls that make peace in the disaster-affected areas.

CHAPTER4

STRUCTURES OF ATTITUDE TOWARD THE FUKUSHIMA NUCLEAR DISASTER AND ITS RELATIONSHIP WITH OPINIONS ABOUT POST- DISASTER RECONSTRUCTION POLICIES

This chapter showed the results of study 5; the attitude of residents on nuclear power. Because the 2011 East Japan Earthquake and tsunami cause an explosion and leak at Fukushima Dai-ichi nuclear power plant, people living in Japan (and also many countries far away) have concerned of their health effect caused by atomic poisoning. We aimed to explore how the nuclear and health concern effects attitude and social norms among citizen.

1. STUDY 5: THE QUESTIONNAIRE SURVEY OF JAPANESE UNIVERSITY STUDENTS' ATTITUDES TOWARD THE FUKUSHIMA NUCLEAR DISASTER

The primary objective of this study was to examine people's attitudes about the Fukushima nuclear accident. The second objective is, to examine whether gender and residential differences would be observed in the attitudes and opinions about post-disaster reconstruction policies in Japan. We hypothesized that women have attitudes about the Fukushima nuclear accident and that their opinions about the policies are more negative

than those of men, and residents living near nuclear power plants have more positive attitudes about nuclear power than those of people living at greater distances from a nuclear power plant. The third and the last purpose of this study is to explore relations among attitudes about the Fukushima nuclear accident and opinions about post-disaster reconstruction policies. We hypothesized that cognitive and emotional components of attitudes about the Fukushima nuclear accident determine the opinions about post-disaster policies, controlling for the effects of gender and geographical differences.

1-1 METHOD

(1) PARTICIPANTS

The samples examined in this study included undergraduate university students from three Japanese universities, two of which were located in Sendai in Miyagi prefecture and one in the Tokyo metropolitan area. Sendai (population approximate: 1 million), the nearest major city to the earthquake epicenter (130 km), is about 90 km north of the Fukushima Dai-ichi nuclear power plant. In Miyagi prefecture, the Onagawa nuclear power plant is located approximately 60 km northeast from Sendai. Tokyo is more than 350 km from the epicenter and over 200 km south of the Fukushima Dai-ichi power plant. Nuclear power plants have never been situated in Tokyo. The distance between Sendai and Tokyo is about 350 km. During the 2011 East Japan earthquake, the strong ground motion registered at the maximum of 7 on the Japan Meteorological Agency seismic intensity scale (JMA scale) in Kurihara city, Miyagi Prefecture. The aftershock

intensity on the JMA scale was recorded as upper 6 in Sendai and upper 5 in the Tokyo metropolitan area.

Of 304 questionnaires distributed, 289 completed questionnaires (79 men = 63 in Miyagi, 16 in Tokyo; 210 women = 152 in Miyagi, 58 in Tokyo) were returned (95.0% response rate). The proportions of gender were similar in both groups. Respondents between the ages of 18 and 22 made up 97.2% of the sample. Among all participants, 73.0% lived in Miyagi prefecture, and 12.9% lived in the Tokyo metropolitan area. Additionally, 46.4% of participants reported living alone; 49.8% lived with their families. Only two students reported that they had children. Of respondents, 23% reported that their family had suffered or had been damaged somehow by the 2011 East Japan earthquake and tsunami (Miyagi = 31.6%, Tokyo = 6.1%; $\chi^2(1) = 17.06, p < .001$). The relative proportions of those reporting damage did not differ between men and women (men = 24.0%, women = 22.2%; $\chi^2(1) = 0.11, ns$).

(2) *MEASUREMENTS*

Attitudes about the Fukushima nuclear accident: Several studies have administered questionnaires that were designed to assess attitudes about nuclear power (Newcomb, 1986; Peters & Slovic, 1996; Visschers & Siegrist, 2013). Nevertheless, few reports in the relevant literature describe studies that have specifically examined individuals' attitudes about nuclear power plant accidents multidimensionally.

In all, 26 items were newly created to assess individuals' multidimensional attitudes about the Fukushima nuclear accident (see Table 4). Items were designed to assess perceived benefits or efficiencies of nuclear power (e.g., "A nuclear power plant

is an efficient and excellent way to generate electric power.”), perceived risks or fears of nuclear power (e.g., “Nuclear power plants fundamentally have a very low probability of accidents.”), trust in institutions (e.g., “The explanation and response by the Japanese government to the nuclear power plant accident and radioactive contamination were reliable.”), beliefs about nuclear technology or radioactive contamination (e.g., “If a person ingests radioactive material for a long time, no matter how infinitesimal the amount might be, then it will have severe effects on pregnancy and delivery.”), and emotional reactions related to the Fukushima nuclear disaster and radioactive contamination (e.g., “I feel alarmed and frightened about the nuclear power plant accident and the resulting radioactive contamination.”). These items were developed based on the authors’ thorough discussions with two undergraduate students to assess attitudes about the Fukushima nuclear accident. In this survey, participants read the statement “What do you think of nuclear power plant accidents and radiation contamination?” Then they were asked to rate their degree of agreement for each item using a six-point scale with possible responses ranging from I do not agree at all (0) to I strongly agree (5).

Opinions about post-disaster reconstruction policies: Four items were used as indicators of opinions about post-disaster reconstruction policies in Japan. These items included “Non-affected areas should accept debris caused by the earthquake and tsunami as long as they can confirm that radioactive substances contained in them are below threshold levels” (Acceptance of debris with radiation below standard radiation levels), “Non-affected areas should accept debris without hesitation even if radioactive substances in the debris exceed threshold levels” (Acceptance of debris with radiation above standard radiation levels), “Each home should volunteer to buy foods produced in

areas that have been affected” (Support for foods produced in affected areas), and “People should refrain from consuming foods produced in Fukushima and neighboring prefectures to protect their own health and that of their family” (Vigilance related to foods produced in affected areas). In this survey, participants read the statement “What do you think about various opinions or policies related to the 2011 East Japan earthquake and tsunami disaster?” Responses to respective items were given on a five-point rating scale with answers ranging from "disagree" (-2), neither disagree nor agree (0), to "agree" (+2).

(3) PROCEDURES

This study was conducted in December 2011. All participants were provided a questionnaire that included written informed consent, a personal demographic data sheet, and related instruments. Participants were informed that this study was designed to investigate attitudes toward the Fukushima nuclear disaster. Furthermore, they were told that their participation was voluntary and that all responses would be kept confidential. The surveys were conducted at the end of a classroom lesson; the completed questionnaire was returned to the researchers. To check test-retest reliability, 83 university students in Miyagi prefecture were asked to answer a follow-up 26-item questionnaire with contents related to attitudes about the Fukushima nuclear accident one month after the initial survey. This study was approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

1-2 RESULTS

(1) *STRUCTURE OF ATTITUDES ABOUT THE FUKUSHIMA NUCLEAR ACCIDENT*

Factor analysis was conducted using a principal component method to determine the underlying structure of attitudes related to the Fukushima nuclear accident. This analysis showed six factors with eigenvalues greater than 1.00 (6.02, 2.78, 2.05, 1.48, 1.42, and 1.06) and accounted for 56.9% of the total variance. The scree plot showed that the first five factors explained 52.8% of the variance. We, therefore, chose to use a factor analysis using the principal component method for factor extraction with a specified five-factor solution and oblique (Promax) rotation. An oblique rotation was chosen because we did not expect the factors to be mutually uncorrelated. For oblique rotations, the Promax rotation presents the benefits of being fast and conceptually simple (Abdi & Williams, 2010). Moreover, it offers advantages over alternative oblique methods concerning the general robustness of the solutions it provides (Loehlin, 1998). Items with the loading of lower than .40 or items with loadings of higher than .40 on more than one factor (cross-loading) were eliminated (Hatcher, 1994).

Factor analysis revealed the following five attitude dimensions: nuclear power plant efficiency (7 items: e.g., “In relation to the rest of the world, Japan has a high level of nuclear technology.”, Cronbach’s alpha (α) = .82, M (SD) = 2.53 (0.92)), trust in institutions (6 items: e.g., “The explanation and response by the Japanese government to the nuclear power plant accident and radioactive contamination were reliable.”, α = .79,

$M(SD) = 1.80 (0.82)$), fear of radioactive contamination (6 items: e.g., “If a person ingests radioactive material for a long time, no matter how infinitesimal the amount might be, then it will have severe effects on pregnancy and delivery.”, $\alpha = .80$, $M(SD) = 2.83 (0.97)$), length of time needed for complete clean-up of the nuclear disaster (4 items: e.g., “For decontamination of radiation-contaminated soil, not only huge costs, but also a long time will be required.”, $\alpha = .48$, $M(SD) = 3.84 (0.64)$), and self-defense (2 items: e.g., “Nuclear energy experts appearing in the media do not fully understand radiation contamination and its danger to human health.”, $\alpha = .36$, $M(SD) = 2.53 (0.98)$) (see Table 4).

The test-retest reliability of the items was assessed using the mean of the Pearson correlation coefficient, which was significant between the two tests ($r = .70$, $p < .001$). However, inter-consistency reliability for the length of time needed for complete clean-up of the nuclear disaster ($\alpha = .48$) and self-defense ($\alpha = .36$) were unacceptably low. Therefore, those scales were dropped from further consideration. Results of Pearson’s correlations among the three attitudes showed that those related to nuclear power plant efficiency were positively correlated with attitudes related to trust in institutions ($r = .30$, $p < .001$) and that such attitudes were negatively correlated with the fear of radioactive contamination ($r = -.50$, $p < .001$). Trust in institutions was negatively associated with the fear of radioactive contamination ($r = -.28$, $p < .001$).

Table 4. Factor analysis of attitudes about the Fukushima nuclear accident

Items	F1	F2	F3	F4	F5
F1: Nuclear power plant efficiency					
25. In relation to the rest of the world, Japan has a high level of nuclear technology.	.78	.02	-.03	.10	-.27
21. Japanese technology to address nuclear power and radioactive materials is reliable.	.74	.03	-.12	.08	-.23
6. Nuclear power plants fundamentally have a very low probability of accidents.	.72	-.19	-.08	-.21	-.06
10. A nuclear power plant is an efficient and excellent way to generate electric power.	.70	.03	.03	-.01	-.07
2. Nuclear electric generation is an environmentally friendly way to generate electricity.	.69	-.07	-.02	.02	-.30
14. For Japan to continue to develop economically, the existence of nuclear power plants is absolutely imperative.	.67	.08	.00	-.02	.13
7. In many cases, nuclear power plants grant economic benefits to their local societies, even if they experience an accident.	.57	.03	-.13	-.09	.17
F2: Trust in institutions					
26. The explanation and response by the Japanese government to the nuclear power plant accident and radioactive contamination were reliable.	.17	.76	.12	-.10	-.06

Items	F1	F2	F3	F4	F5
17. The Japanese government has been taking a tough approach to various matters accompanying the nuclear power plant accident.	.20	.75	.18	-.05	-.06
18. The power company must conceal facts from the public in relation to the nuclear power plant accident and radiation contamination.	.20	-.70	.22	.02	.08
23. Nuclear power experts appearing in media often are corrupted or co-opted by the government or power companies.	.21	-.68	.22	-.11	.26
8. In terms of the nuclear power plant's accident and its resulting radiation contamination, the electrical utility company has been responding in a trustworthy manner.	.11	.66	.04	.03	.16
20. The information offered by the media about the nuclear power plant accident and the radiation contamination is suspicious.	.15	-.58	-.19	.27	.25
F3: Fear of radioactive contamination					
3. If a person ingests radioactive material for a long time, no matter how infinitesimal the amount might be, then it will have severe effects on pregnancy and delivery.	.04	.09	.85	.02	.26
16. If radioactive materials are ingested for a long time, no matter how infinitesimal the amount might be, then it will cause severe health damage.	-.06	.20	.83	.07	.31

Items	F1	F2	F3	F4	F5
5. People overreact to radiation contamination or health damage caused by radioactive materials.	.09	.15	-.63	.12	.28
24. I feel alarmed and frightened about the nuclear power plant accident and the resulting radioactive contamination.	-.04	-.06	.63	.22	-.12
9. To be frank, I would not like to live in a community with a nuclear power plant.	-.15	-.06	.47	.07	.01
12. The media excessively fuel fears of radiation contamination and its potential for health damage.	.18	.28	-.44	.26	.24
F4: Length of time needed for complete clean up of the nuclear accident					
13. For decontamination of radiation-contaminated soil, not only huge costs, but also a long time will be required.	.01	.02	-.01	.74	.07
4. It will take a longer time than expected to restore a nuclear plant's accident affected areas to a normal state.	-.06	-.12	.04	.61	.22
11. To be frank, the problems related to nuclear power plant accidents and radiation contamination are someone else's affairs.	.06	-.09	-.24	-.51	.38

Items	F1	F2	F3	F4	F5
19. Everyone should study the problems of nuclear power generation or radioactive materials independently, even if they are difficult to understand.	.28	-.20	.27	.43	.06
F5: Self-defense					
1. Nuclear energy experts appearing in the media do not fully understand radiation contamination and its danger to human health.	-.25	-.23	-.01	-.02	.70
22. People have no choice but to protect themselves from health damage caused by radioactive materials.	-.12	-.02	.20	.17	.57
Final eigenvalues	4.80	4.05	3.96	2.20	1.91
% of explained variance	23.14	10.67	7.88	5.70	5.47

Notes. Standardized rotated factors scores of .40 or greater are presented in bold typeface. One item was dropped from the subscale because it did not contribute greatly to any factor (<.40). The item was “Another nuclear power plant accident will probably never occur.”

(2) *GENDER AND REGIONAL DIFFERENCES IN ATTITUDES ABOUT THE FUKUSHIMA NUCLEAR ACCIDENT*

To examine gender and geographical differences in attitudes about the Fukushima nuclear accident, MANOVA was conducted using participants’ gender and the location of the university as grouping variables and the three attitudes scales as dependent variables. These data are presented in Figure 4. A multivariate main effect of

gender emerged ($F(3, 283) = 9.70, p < .001$; Wilk's $\lambda = .91$; $partial \eta^2 = .09$), which can be attributed univariately to attitudes about nuclear power plant efficiency ($F(1, 285) = 19.36, p < .001, partial \eta^2 = .06$). Men ($M(SD) = 3.00(0.87)$) reported a significantly higher assessment of nuclear power plant efficiency than women did ($M(SD) = 2.34(0.87)$). The fear of radioactive contamination was marginally significant ($F(1, 285) = 3.54, p = .061, partial \eta^2 = .01$): women ($M(SD) = 2.90(0.96)$) showed slightly higher fear of radioactive contamination than men did ($M(SD) = 2.62(0.98)$). A multivariate main effect of the location was significant ($F(3, 283) = 2.72, p < .001$; Wilk's $\lambda = .97$; $partial \eta^2 = .03$), which can be attributed to trust in institutions ($F(1, 285) = 6.20, p < .05, partial \eta^2 = .02$). University students in Miyagi prefecture ($M(SD) = 1.84(0.78)$) had higher levels of the trust than students in the Tokyo metropolitan area ($M(SD) = 1.69(0.93)$). No multivariate interaction between gender and location was significant (see Figure 4).

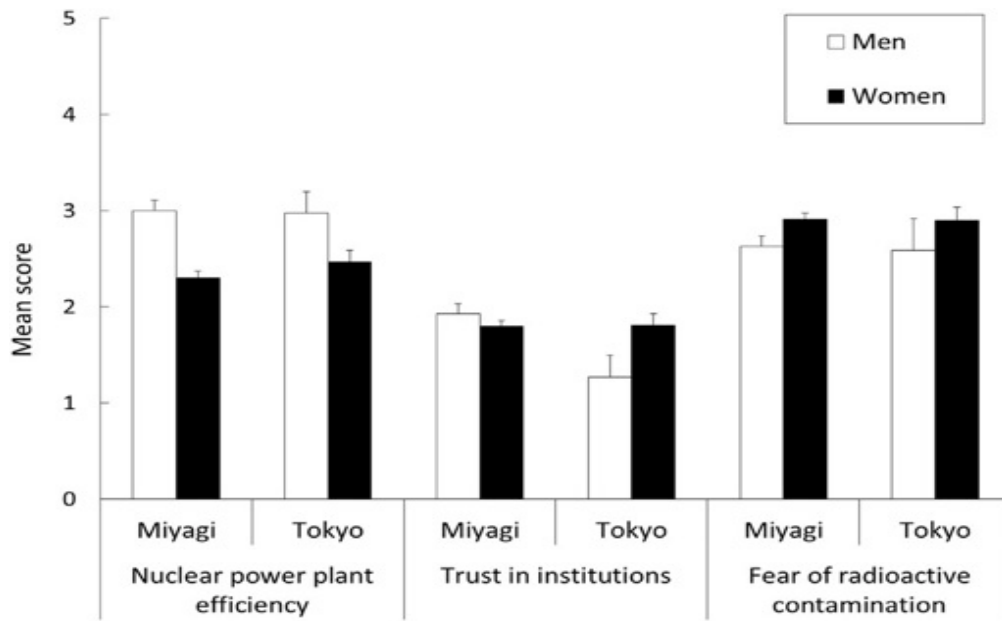


Figure 4. Gender and geographical differences in attitudes about the Fukushima nuclear accident. White bars represent the means of male respondents. Black bars represent the means of female respondents. Standard error bars are shown.

(3) PARTICIPANTS HIERARCHICAL MULTIPLE REGRESSION ANALYSIS PREDICTING OPINIONS ABOUT POST-DISASTER RECONSTRUCTION POLICIES

Table 5 shows means, standard deviations, and inter-correlations for opinions related to four policies. A hierarchical regression analysis was conducted to identify the key predictors of opinions about post-disaster reconstruction policies. This analysis can assess the relation between Japanese attitudes about the Fukushima nuclear accident and opinions about post-disaster reconstruction policies, controlling for the effects of gender and geographical differences in opinions about post-disaster policies. Gender (male = 0, female = 1) and location (Miyagi = 0, Tokyo =1) were entered at Step 1. Mean scores for each of the three attitude subscales were entered at Step 2. Analyses were conducted separately for each post-disaster reconstruction policy.

Table 6 presents the results. The models explained between 4% ($p < .05$) and 27% ($p < .001$) of the variance in their opinions about post-disaster policies. For Step 1 of the regression analyses, location was a significant predictor of acceptance of debris, along with lower than standard radiation levels ($\beta = -.13, p < .05$), support for foods produced in affected areas ($\beta = -.12, p < .05$), and vigilance related to foods produced in affected areas ($\beta = .14, p < .05$). For the support for foods produced in affected areas, gender was also found to be a significant predictor ($\beta = .21, p < .001$). After controlling for demographic factors (gender and location), attitudes about the Fukushima nuclear accidents accounted for 2% ($p < .05$) to 24% ($p < .05$) of the variances in their opinions about post-disaster policies. For Step 2 of the regression analyses, higher levels of fear of radioactive contamination negatively predicted acceptance of debris with lower than standard radiation levels ($\beta = -.15, p < .05$), acceptance of debris with higher than standard radiation levels ($\beta = -.32, p < .001$), and support for foods produced in affected areas ($\beta = -.36, p < .001$). Furthermore, higher levels of fear of radioactive contamination predicted higher levels of vigilance related to foods produced in affected areas ($\beta = .51, p < .001$). In contrast, nuclear power plant efficiency and trust in institutions did not significantly predict opinions related to post-disaster policies.

Table 5. Pearson correlations and descriptive statistics for reactions to post-disaster reconstruction policies and expectations of a return to a normal state

	<i>M (S.D.)</i>	2	3	4
1: Acceptance of debris with lower than standard radiation levels	1.03 (1.08)	.26***	.33***	-.30
2: Acceptance of debris with higher than standard radiation levels	-0.59(1.11)	-	.21***	-.30
3: Support for foods produced in affected areas	0.58 (1.20)		-	-.56
4: Vigilance related to foods produced in affected areas	-0.55 (1.13)			-

*** $p < .001$

Table 6. Summary of regression coefficients for each hierarchical multiple regression analysis

	Step	Variable	β	R^2	R^2 change	F
Acceptance of debris with lower than standard radiation levels	1	Gender	.07	.02	.02	3.13*
		Location	-.13*			
	2	Gender	.08	.04	.02	2.40*
		Location	-.13*			
		NE	-.03			
	TI	.02				
	FR	-.15*				
Acceptance of debris with higher than standard radiation levels	1	Gender	.05	.01	.01	1.71
		Location	-.10			
	2	Gender	.07	.12	.11	7.41**
		Location	-.09			
		NE	-.08			
		TI	.09			
	FR	-.32***				

Table 3 (continued)

	Step	Variable	β	R^2	R^2 change	F
Support for foods produced in affected areas	1	Gender	.21***	.05	.05	8.07***
		Location	-.12*			
	2	Gender	.22***	.18	.13	12.71***
		Location	-.11*			
		NE	-.09			
	TI	.10				
	FR	-.36***				
Vigilance related to foods produced in affected areas	1	Gender	-.09	.03	.03	3.85*
		Location	.14*			
	2	Gender	-.13*	.27	.24	21.04***
		Location	.14**			
		NE	.08			
		TI	-.06			
	FR	.51***				

Notes. NE = Nuclear power plant efficiency, TI = Trust in institutions, FR = Fear of radioactive contamination * $p < .05$, ** $p < .01$, *** $p < .001$

1-3 DISCUSSION

The general aims of this study were to investigate the characteristics of attitudes about the Fukushima nuclear accident and to assess public opinions about post-disaster reconstruction policies in Japan. Notably, we solicited Japanese university students' attitudes about the Fukushima nuclear accident and explored relations between respondents' attitudes and their opinions about post-disaster reconstruction policies. Gender and regional differences were also investigated.

(1) *STRUCTURE OF ATTITUDES ABOUT THE FUKUSHIMA NUCLEAR ACCIDENT*

The primary purpose of this study was to examine people's attitudes about the Fukushima nuclear accident. Our results identified the following five aspects of attitudes about the Fukushima nuclear accident: nuclear power plant efficiency, trust in institutions, fear of radioactive contamination, length of time needed for complete clean-up of the nuclear accident, and self-defense. The results, which confirm our hypothesis, correspond to findings by Truelove (2012): the support of energy sources is characterized by emotional and cognitive beliefs about energy sources.

In addition, our correlation analysis of Japanese attitudes about the Fukushima nuclear accident revealed that people who have higher trust in institutions tend to regard nuclear power plant efficiency highly and tend to be less fearful of radioactive contamination. Siegrist et al. (2000) reported that social trust has a positive influence on perceived benefits and a negative impact on perceived risks. Their findings correspond well with our results, which reflect Japanese attitudes about the Fukushima nuclear

accident. Our results demonstrate that a good perception of nuclear power plant efficiency is negatively correlated with fear of radioactive contamination. This result corresponds well with findings from previous studies that investigated image associations related to energy sources (Keller et al., 2012; Truelove, 2012).

However, results of this study demonstrated that inter-consistency reliability of two subscales (length of time needed for complete clean-up of the nuclear disaster and self-defense) were unacceptably low. The low alpha value of those results might be explained by the fact that the items measuring these subscales were few. The survey timing might also have affected the results: our survey was administered soon after the Japanese government announced that the damaged nuclear reactors at the Fukushima power plant had been stabilized, finally, after a long period of repairs (BBC News Asia, 2011). During that period, the Japanese media had been critical of this government announcement (Reynolds, 2011). Therefore, future studies might need to develop an attitudes scale with higher validity and reliability.

(2) GENDER AND REGIONAL DIFFERENCES IN ATTITUDES ABOUT THE FUKUSHIMA NUCLEAR ACCIDENT

The second purpose of this study is to examine whether gender and geographical differences are observed in the attitudes and opinions about post-disaster reconstruction policies in Japan. We hypothesized that Japanese women have attitudes about the Fukushima nuclear accident and that their opinions about the policies are more negative than those of men. Our results demonstrated that men reported higher perceived nuclear power plant efficiency than women did, whereas women showed slightly higher fear of radioactive contamination than men do. The results are consistent with those of previous

studies (Keller et al., 2012; Newcomb, 1986; Plous, 1991; Rabow et al., 1990). For example, Keller et al. (2012) pointed out that men had a higher acceptance of replacing nuclear power plants than women do, which is explainable by gender differences in the affective image association about nuclear power plants. Moreover, women report more worry in relation to nuclear power and environmental pollution than men do (Brody, 1984; Drottz-Sjöberg & Sjöberg, 1991). Our findings provide further evidence that men and women have different attitudes about nuclear accidents and environmental pollution.

Furthermore, our results demonstrated that trust in institutions was quite low and that levels did not differ between men and women. These results suggest that trust in institutions has decreased drastically since the Fukushima nuclear accident, irrespective of gender. The 2012 Edelman Trust Barometer reported that Japanese trust in government dropped by 26% in the aftermath of the catastrophic earthquake that struck the country in early spring. The survey also showed that trust in the energy industry fell from 75% to 29%, and that trust in the media industry decreased from 54% to 33% (Edelman Trust Barometer, 2012). These findings and our results indicate that the Fukushima nuclear accident shattered most Japanese people's trust in institutions. Similar findings were obtained in Switzerland by Visschers and Siegrist (2013). They reported that people's trust of nuclear power plants was more negative after the Fukushima nuclear accident. Moreover, Prati and Zani (2012) said that Italians' trust in nuclear power was lower after the Fukushima nuclear accident. The present study administered a questionnaire survey to Japanese university students nine months after the Fukushima nuclear accident. It might be difficult to detect significant gender differences related to the trust in institutions because so little time had passed after the Fukushima nuclear accident.

This study also investigated regional differences in relation to the attitudes about the Fukushima nuclear accident. In Miyagi prefecture, the Onagawa nuclear power plant is located about 60 km northeast from Sendai. In contrast, no nuclear power plant is located in the Tokyo. Some previous studies showed geographical differences in residents' attitudes about nuclear power (Greenberg, 2009; Venables et al., 2012). Therefore, we hypothesized that residents living near nuclear power plants have more positive attitudes about nuclear power than those of people living at greater distances from a nuclear power plant. Our results showed that university students in Miyagi had higher levels of the trust than students in Tokyo did. That result corresponds to our hypothesis and findings from previous studies (Greenberg, 2009; Venables et al., 2012).

However, we did not find regional differences in their attitudes about the Fukushima nuclear accident, except for levels of the trust in institutions. This phenomenon might stem from the fact the Onagawa nuclear power plant in the Miyagi successfully withstood the 2011 East Japan earthquake and tsunami and was, in fact, the closest nuclear power plant to the March 2011 earthquake epicenter (Maeda & Janowski, 2011). Furthermore, it is possible to explain that the distances from the Fukushima Dai-ichi power plant between Miyagi (adjacent to Fukushima) and Tokyo are not much different. For those reasons, it might be difficult to detect other differences between the groups. Future studies should be undertaken to ascertain the effects of distance from the Fukushima Dai-ichi nuclear power plant on individual differences among people in attitudes toward nuclear power.

**(3) *HIERARCHICAL MULTIPLE REGRESSION ANALYSIS
PREDICTING OPINIONS ABOUT POST-DISASTER
RECONSTRUCTION POLICIES***

Our results from hierarchical regression analyses revealed that gender and location are significant predictors of opinions about post-disaster reconstruction policies. Findings from geographical differences corresponded to our hypothesis, but our results showed that women were more likely to agree to support for foods produced in affected areas than men were. This gender difference is not prominent, but this result does not correspond with our assumption. One possibility is that it reflects gender differences in charitable giving. Support for foods produced in affected areas is one of the charitable behavior after the 2011 Great East Japan disaster. Previous studies have been reported that women are more charitable and give more to charity than men (Mesch, Brown, Moore, & Hayat, 2011; Mesch, Rooney, Steinberg, & Denton, 2006; Piper & Schnepf, 2008). Unfortunately, the male respondents in our study were few, which limits our confidence in this result. Therefore, gender differences in Japanese people's attitudes about the Fukushima nuclear accident and their opinions about post-disaster reconstruction policies should be assessed in future research.

The third purpose of this study was to explore relations among attitudes about the Fukushima nuclear accident and opinions about post-disaster reconstruction policies. Previous studies have revealed that public support for nuclear policies is influenced not only by gender (Keller et al., 2012; Newcomb, 1986; Rabow et al., 1990) and location (Greenberg, 2009; Venables et al., 2012), but also by attitudes about nuclear power (Finucane, Alhakami et al., 2000; Hartmann et al., 2013; Keller et al., 2012; Siegrist et

al., 2000; Sjöberg & Drottz-Sjöberg, 2009; Tanaka, 2004; Truelove, 2012; Visschers & Siegrist, 2013). Furthermore, previous studies demonstrated that attitudes about health and environmental problems are associated with environmental and consumer behavior (Shrum, McCarty, & Lowrey, 1995; Rundmo, 1999; Sjöberg & Drottz-Sjöberg, 2009). Therefore, we hypothesized that cognitive and emotional components of attitudes about the Fukushima nuclear accident determine the opinions about post-disaster policies, controlling for the effects of gender and geographical differences. Our results revealed that Japanese people's opinions about post-disaster policies were strongly characterized by the level of fear of radioactive contamination. This finding suggests that emotional components are critical factors influencing public opinion related to post-disaster reconstruction policies. More specifically, the fear of radiation was significantly associated with the acceptance of radioactive debris and the support for products manufactured in disaster-affected prefectures. Our results support the findings of previous studies (Finucane, Alhakami et al., 2000; Hartmann et al., 2013; Sjöberg & Drottz-Sjöberg, 2009). More importantly, they provide new evidence about the strong relation between the fears of radiation and public opinion prevailing after the Fukushima nuclear accident.

However, our results provided no evidence that the cognitive components of attitudes predict the acceptance of radioactive debris and support for products manufactured in disaster-affected prefectures. The findings did not confirm some aspects of earlier studies related to the cognitive components as determinants of public reactions about nuclear policies. For example, Tanaka (2004) reported that trust in institutions is important for public acceptance of nuclear power plant location, but such trust is not important for public acceptance of the location of high-level radioactive waste

repositories. The salient difference between our study and that of Tanaka (2004) might derive from the fact that Japanese people's trust decreased drastically after the Fukushima nuclear accident (Edelman Trust Barometer, 2012). Future studies should be conducted to examine changes of Japanese attitudes about the Fukushima nuclear disaster over time. Furthermore, our results did not correspond with those of Visschers and Siegrist (2013), who conducted a longitudinal study in Switzerland before and after the accident in Fukushima. They reported that Swiss people's perceived benefits of nuclear power plants were the most important determinant of their acceptance of nuclear power, even after the Fukushima nuclear accident. This discordance might result from Switzerland's great distance from Japan. In fact, Visschers and Siegrist (2013) pointed out that people in countries closer to Japan might be expected to respond differently to the nuclear accident. However, no cross-national study of nuclear attitudes after the Fukushima nuclear accident has ever been investigated. Further research must be undertaken to examine differences in nuclear attitudes and public opinion about nuclear power in various countries after the Fukushima nuclear accident.

(4) *LIMITATIONS*

Several limitations should be considered when interpreting these findings. First, our results were obtained only from Japanese university students in Miyagi prefecture and the Tokyo metropolitan area. We cannot be sure that their attitudes can be generalized to other counties in Japan. In addition, our findings are difficult to generalize to different age groups because our participants were mostly young adults. Drottz-Sjöberg and Sjöberg (1991) reported that, compared with a national sample dominated by adults,

adolescents, especially boys, had more positive attitudes about nuclear power and rated risks of nuclear technology lower than adults. Further study is necessary to examine the influence of age differences in attitudes about nuclear power as well as differences associated with various residential areas. In fact, Greenberg (2009) observed not only regional differences in residents' attitudes about nuclear power but also effects of age. Second, our study obtained few findings related to individual differences in nuclear power attitudes. For example, Mayton (1986) investigated the effects of a threat of nuclear war on self-concept and other personality constructs. Results showed that perception of a nuclear threat was significantly but minimally associated with lower general self-esteem, lower evaluations of one's emotional stability, lower self-control, and a lowered sense of well-being. This finding implies that attitudes toward the Fukushima nuclear disaster might be associated with several personality traits. The future study requires investigation of whether personality traits characterize attitudes about the Fukushima nuclear accident. Finally, we examined Japanese people's attitudes about the Fukushima nuclear accident along with gender differences. Results show that men reported higher perceived nuclear power plant efficiency than women did, whereas women showed slightly higher fear of radioactive contamination than men did. Results of several studies indicate that gender differences in risk perception can be better explained using a biological perspective than by a sociopolitical perspective (Finucane, Slovic et al., 2000; Flynn et al., 1994). However, our study results do not clarify whether sociopolitical factors explain gender differences.

(5) *CONCLUSIONS*

Despite these limitations, our results revealed five aspects of Japanese people's attitudes about the Fukushima nuclear accident. Attitude components include nuclear power plant efficiency, trust in institutions, and fear of radioactive contamination. We regard our attitude scale as well-constructed because our results also showed that the attitude scale had high test-retest reliability, with adequate internal consistency except for the length of time needed for complete clean-up of the nuclear disaster and the self-defense. Our study also revealed gender and geographical differences in attitudes. Men reported higher perceived nuclear power plant efficiency than women did, whereas women showed slightly higher fear of radioactive contamination than men do. University students in Miyagi had higher levels of the trust than students in Tokyo did. An important finding from our study is the fact that, after controlling for the effects of gender and geographical differences, attitudes about the Fukushima nuclear accident were found to be associated with opinions about post-disaster reconstruction policies in Japan. Notably, our results implicate fear of radioactive contamination as a critical factor influencing the opinions about post-disaster reconstruction policies and about nuclear power plant issues after the Fukushima nuclear accident.

CHAPTER 5

ATTITUDE AND EMOTION TOWARDS THE RECONSTRUCTION ACTIVITIES AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE

One year had passed after the great loss in Northeastern Japan to the earthquake and tsunami, and people from all fields did their best to recover from the disaster in the affected areas to bring the community's strength back. However, some of the reconstruction activities from the severely affected area did not gain much attention and these hindered feelings of connection among people, and among communities.

1. STUDY 6: THE PRELIMINARY SURVEY OF ATTITUDE AND EMOTIONAL EVALUATION TOWARDS THE RECONSTRUCTION ACTIVITIES AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE

The first purpose of this preliminary survey is to study how Japanese university students perceive and feel about the reconstruction policy and its regional differences. We chose Miyagi prefecture to represent to people a seriously disaster-damaged area, the Tokyo metropolitan area (slightly damaged area, approximately 300 km from Miyagi prefecture), and Kobe city (non-damaged area, approximately 650 km from Miyagi

prefecture). The second purpose is to shape the structure of emotional evaluation that points to people who did and did not cooperate with the reconstruction activities. The reason why we examine emotional responses toward people instead of behavior is because it is easier for people to imagine and observe emotions toward people than toward things or events. The third purpose is to find the regional differences in emotions for those who cooperated and those who did not cooperate with the reconstruction activities.

1-1 METHOD

(1) PARTICIPANTS

416 college students in Miyagi prefecture (63 men and 162 women), Tokyo metropolitan area (17 men and 60 women), and Kobe city (114 women) participated in this study. The average age of the participants was 20.1 years old ($SD = 1.5$).

(2) MEASUREMENTS

The questionnaire contained items covering participants' demographic information (gender, age, residential area, etc.), participants' attitudes about the reconstruction policy of the 2011 disaster, and emotional evaluations. Attitudes about the reconstruction policy consisted of 8 items; 'Planned power outage', 'Refrain from festivals in non-affected area', 'Promote festivals in the disaster-affected area', 'Do sightseeing at the disaster-affected area', 'Accept disaster debris disposal with low cesium', 'Accept disaster debris disposal with high cesium', 'Continue to buy food from

disaster-affected areas', 'Refrain from buying foods from disaster-affected areas' (See Table7). Participants were asked to rate through -2 (disagree), -1, 0 (neither agree nor disagree), 1, +2 (agree; 5-point Likert scale). The emotional evaluation scale contained 10 emotional items (sadness, discomfort, disappointment, disgust, anger, compassion, disdain, admiration, gratefulness, and respect). Those emotions were used to rate how the participant felt about 5 types of people (two supporters: 'The workers at the damaged Fukushima nuclear power plant (Nuclear power plant workers)', and 'The volunteers dealing with the tsunamis debris in Fukushima (Nuclear waste disposal volunteers)' and 3 dissenters: 'Dissenter of accepting the tsunami debris from disaster-stricken areas to their own area (Dissenter of accepting the debris)', 'Refuser of buying food produced in the affected areas and nearby areas (Refuser of buying food)', 'Dissenter of accepting the pine trees from disaster-stricken areas for use in the Bonfire Festival in Kyoto (Dissenter of accepting the pine trees)', shown in Table 8. The rating was a 6-point Likert scale from 0 (do not feel it at all) to 5 (very strongly feel it) and was used to rate the 10 emotions toward 5 types of people.

Table 7. Activities in favor of and against the reconstruction listed in studies 6 and 7 (and their abbreviations)

1	To reduce demand for electric usage, the country-wide power blackout was planned (Planned power outage)
2	Self-refrain from festivals in non disaster-affected areas (Refrain from festivals in non-affected area)
3	To promote festivals in the disaster-affected area (Promote festivals in the disaster-affected area)
4	Go sightseeing at the disaster-affected area for economic support (Do sightseeing at the disaster-affected area)
5	Willing to accept disaster debris disposal in non-affected areas after confirmation that the level of cesium in the debris is safe (Accept disaster debris disposal with low cesium)
6	Willing to accept disaster debris disposal in non-affected areas even it contains high cesium levels (Accept disaster debris disposal with high cesium)
7	Continue to buy food produced in disaster-affected areas for personal use (Continue to buy food from disaster-affected areas)
8	Refrain from buying foods produced in disaster-affected areas for the sake of family's health (Refrain from buying foods from disaster-affected areas)

Table 8. Persons related to the reconstruction activities as targets of emotional evaluations in Study 6

Supporters of the reconstruction activities
The workers at the damaged Fukushima nuclear power plant (Nuclear power plant workers)
The volunteers dealing with the tsunamis debris in Fukushima (Nuclear waste disposal volunteers)
Dissenters of the reconstruction activities
Dissenter of accepting the tsunami debris from disaster-stricken areas to their own area (Dissenter of accepting the debris)
Refuser of buying food produced in the affected areas and nearby areas (Refuser of buying food)
Dissenter of accepting the pine trees from disaster-stricken areas for use in the Bonfire Festival in Kyoto (Dissenter of accepting the pine trees)

(3) *PROCEDURES*

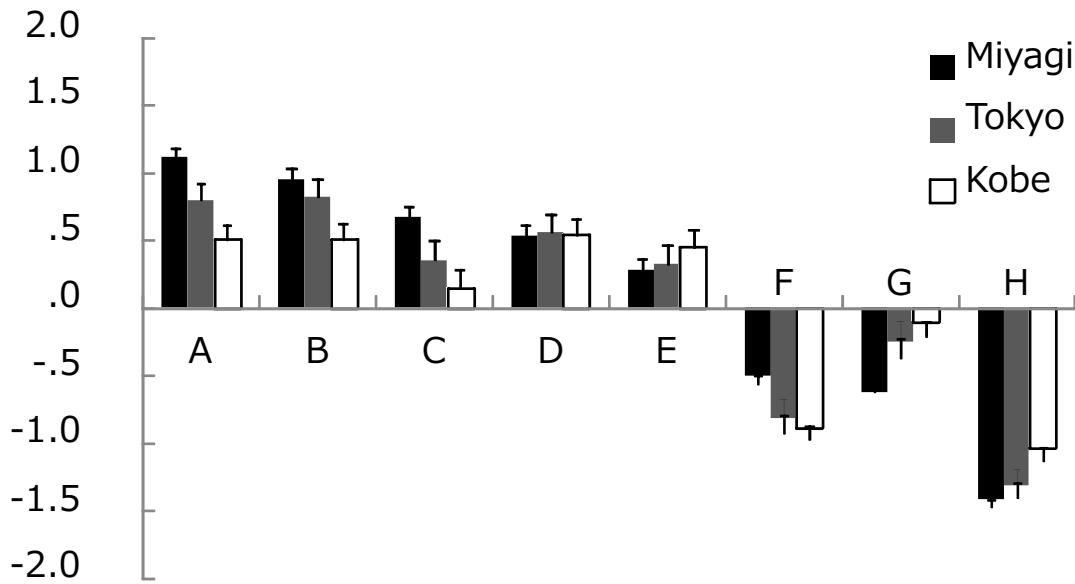
The survey was conducted in December 2011 at classrooms in two universities in Miyagi prefecture, a university in Tokyo, and a university in Kobe city. The purpose and outline of the study were explained to the students and the questionnaire was distributed only to those who were willing to participate. Participants would not benefit or lose anything for deciding to participate or not to participate in the study. This study was approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

1-2 RESULTS

(1) *ATTITUDES TOWARD THE RECONSTRUCTION ACTIVITIES OF 2011 DISASTER*

Means and standard deviations of attitude about reconstruction policies are shown in Figure 5. 'Accept disaster debris disposal with low cesium' received the highest score. Other items which received positive scores were, 'Do sightseeing at disaster-affected areas', 'Continue to buy food from disaster-affected areas', 'Promote festivals in the disaster-affected areas', and 'Planned power outages', respectively. In contrast, items that received objection were, 'Refrain from festivals in non-affected areas', 'Refrain from buying foods from disaster-affected areas', and 'Accept disaster debris disposal with high cesium', respectively.

Because there was no significant difference in evaluation between participants from Tokyo and Kobe, these two groups were merged together as ‘disaster non-affected areas’. The two-sample T-test was used to prove the significant difference of attitude about disaster reconstruction policies between the disaster-affected area (Miyagi prefecture) and non-affected areas (Tokyo metropolitan area and Kobe city). From the results, people from disaster-affected areas were more positive with ‘Accept disaster debris disposal with low cesium’ ($t(375.43) = 4.51, p < .001$), ‘Do sightseeing at disaster-affected areas’ ($t(376.25) = 2.70, p < .01$), ‘Continue to buy food from disaster-affected areas’ ($t(382.51) = 3.56, p < .001$), and ‘Accept disaster debris disposal with high cesium’ ($t(414) = 3.34, p < .001$) but were more negative with ‘Refrain from buying foods from disaster-affected areas’ ($t(415) = 4.03, p < .001$), and ‘Refrain from festivals in non-affected areas’ ($t(355.84) = 2.67, p < .01$) than people from the non-affected areas.



Notes. A = Accept disaster debris disposal with low cesium, B = Do sightseeing at disaster-affected areas, C = Continue to buy food from disaster-affected areas, D = Promote festivals in the disaster-affected areas, E = Planned power outages, F = Accept disaster debris disposal with high cesium, G = Refrain from buying foods from disaster-affected areas, H = Refrain from festivals in non-affected areas.

Figure 5. Mean and standardized error of the attitudes about reconstruction activities of respondents from Miyagi prefecture, Tokyo metropolitan area, and Kobe city.

**(2) *STRUCTURE OF EMOTIONAL EVALUATION ON PEOPLE
RELATED TO RECONSTRUCTION OF 2011 DISASTER***

Next, to form the structure of emotional expressions about people related to post-disaster reconstruction activities, exploratory factor analysis (Maximum likelihood) with Promax rotation was performed separately for 10 emotional expressions for 5 types of people related to reconstruction policy. The results showed different patterns between the supporters and dissenters (See Tables 9 and Table 10). Three factors (positive,

negative, and empathetic emotions) were extracted for the 2 supporters. In contrast, 2 factors (positive and negative emotions) were extracted for the 3 dissenters. Positive emotions for the supporters and dissenters comprised admiration, gratefulness, and respect ($\alpha = .82-.92$). Negative emotions for dissenters refer to 7 emotions (disgust, discomfort, disappointment, disdain, anger, sadness, and compassion, $\alpha = .91-.92$) while negative emotions for supporters refer to disgust, discomfort, disappointment, disdain, and anger ($\alpha = .82-.91$). For supporters, sadness and compassion were extracted separately from negative emotions, and named as empathetic emotions ($\alpha = .63-.75$).

Table 9. Factor analysis of attitudes for the supporters of the post-disaster reconstruction activities.

	Worker of nuclear powerplant				Volunteer tacking nuclear crisis			
	Neg.	Pos.	Em.	Comm.	Neg.	Pos.	Em.	Comm.
Disgust	.85	.08	.01	.71	.82	-.02	.08	.75
Discomfort	.87	.02	.05	.78	.73	.00	.14	.63
Disappointment	.61	-.13	.02	.43	.92	.02	.02	.85
Disdain	.67	.01	-.10	.41	.94	.04	-.11	.78
Angry	.41	-.06	.03	.19	.76	-.05	-.07	.57
Sadness	.06	.09	.62	.43	.05	.02	.78	.65
Compassion	-.05	-.09	.74	.52	-.05	-.02	.77	.55
Admiration	.01	.73	-.10	.51	.02	.88	-.04	.76
Gratefulness	-.10	.73	.09	.61	-.02	.85	.06	.74
Respect	.03	.81	.01	.64	-.01	.85	-.02	.72
Factor correlation								
with Pos.	-	-.25	.35		-	-.29	.44	
with Neg.	-	-	.15		-	-	.04	
α	.82	.79	.63		.91	.90	.75	
Cumulative %		52.3%				70.0%		

Notes. Pos. = Positive emotion, Neg. = Negative Emotion, Em. = Empathy, Comm. = Communality

Table 10. Factor analysis of attitudes for the dissenters of the post-disaster reconstruction activities.

	Dissenter-tsunami debris			Dissenter-Products			Dissenter-Pine tree		
	Neg.	Pos.	Comm.	Neg.	Pos.	Comm.	Neg.	Pos.	Comm.
Disgust	.88	-.04	.79	.94	.01	.87	.91	-.03	.85
Discomfort	.86	-.09	.78	.94	-.04	.90	.90	-.06	.84
Disappointment	.77	-.06	.62	.83	-.01	.69	.80	-.05	.66
Disdain	.84	.02	.71	.82	-.03	.70	.88	.03	.76
Angry	.83	.02	.68	.82	.00	.67	.85	.04	.71
Sadness	.56	.08	.30	.65	.00	.42	.60	-.03	.37
Compassion	.57	.15	.32	.54	.11	.27	.49	.13	.22
Admiration	.00	.72	.52	.00	.89	.79	-.05	.78	.63
Gratefulness	.07	.80	.62	.03	.89	.77	.05	.89	.76
Respect	.00	.82	.67	.01	.92	.84	.05	.94	.85
Factor correlation		-.18			-.31			-.29	
α	.91	.82		.92	.92		.91	.89	
Cumulative %		60.2%			69.2%			66.5%	

Notes. Pos. = Positive emotion, Neg. = Negative Emotion, Em. = Empathy, Comm. = Community

(3) REGIONAL DIFFERENCES OF EMOTIONAL EVALUATIONS ON PEOPLE RELATED TO RECONSTRUCTION OF 2011 DISASTER

To test the relationship of regional differences on emotional expressions about the people related to the reconstruction activities, three-way analysis of variance (emotion, people, and area) was performed separately between the dissenters (3 types) and the supporters (2 types). For the supporters of the activities, the main effects of people ($F(1, 401) = 362.18, p < .001$), emotion ($F(1.83, 735.14) = 1958.05, p < .001$), and the

interaction effect between people and emotion ($F(1.65, 661.14) = 304.86, p < .001$) were proved significant. The post hoc test (Bonferroni) revealed that both types of supporter received the highest scores in positive emotion, then empathetic emotion, and negative emotion respectively ($ps < 001$). For the comparison between the supporters, nuclear power plant workers gained higher positive emotions and empathetic emotions than nuclear waste disposal volunteers ($ps < 001$). For the dissenters of the activities, the main effects of people ($F(2, 800) = 46.93, p < .001$), emotion ($F(1, 400) = 504.82, p < .001$), and the interaction effect between emotion and people ($F(1.78, 711.90) = 129.75, p < .001$), and emotion and area ($F(2, 400) = 5.39, p < .01$) were proved significant. The post hoc test (Bonferroni) revealed that residents in Kobe gave slightly higher positive emotion scores to the dissenters than residents in Miyagi did ($p < .001$) (See Figures 6 and 7).

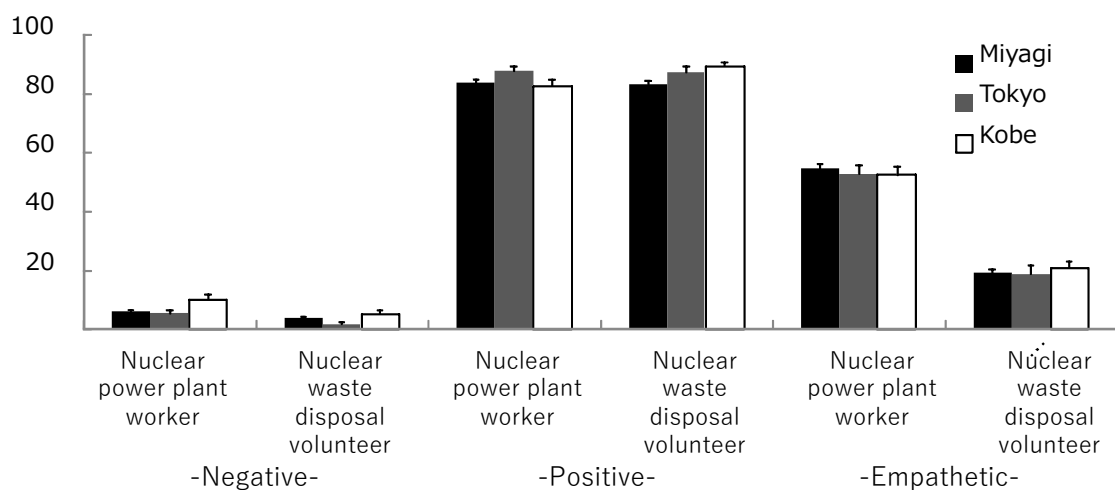


Figure 6. Emotional evaluations toward the supporters of the reconstruction activities

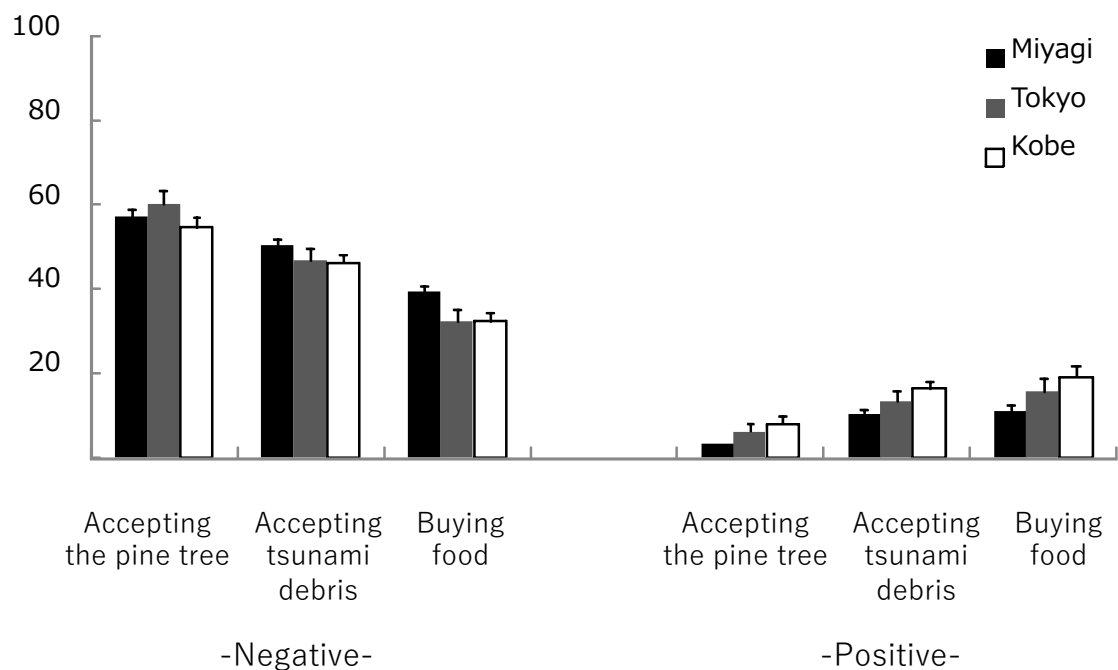


Figure 7. Emotional evaluations toward the dissenters of the reconstruction activities

1-3 DISCUSSION

This study preliminarily examined how people perceived the post-disaster reconstruction activities in both the attitude and emotional dimensions, and their regional differences between Miyagi prefecture (disaster-stricken area), Tokyo metropolitan area (disaster slightly affected area), and Kobe city (disaster non-affected area). Attitudes for the reconstruction activities show positive feedback to economic help (e.g. sightseeing or buying food produced in disaster-stricken areas), emotional help (e.g., to promote festivals in disaster-stricken areas), and help related to tackling the nuclear problem (e.g., accepting tsunami debris with low levels of cesium) but not the help that harms others who give their assistance (e.g., accepting tsunami debris with high levels of cesium); also, not showing the intention to help brings resistance from people. This tendency seems

higher among people in disaster-stricken areas than in people in faraway communities. From the results, we did not discover any regional difference between Tokyo and Kobe's participants. Therefore, we considered both of them as the disaster non-affected areas. People from disaster-affected areas felt more positive with cooperative policies, and felt more negative with selfish acts such as refraining from buying food produced in disaster-affected areas as a result of fears over nuclear contamination.

For the structure of emotional expression toward dissenters and supporters of the reconstruction activities, all emotions played different roles. Positive emotion toward goodness is a kind of commitment of the evaluator to the norm while negative emotion to those who did not follow the norm can imply a kind of social sanction. Contrarily, positive emotion toward non-supportive people and negative emotion toward supportive people can refer to self-concern. The more people show concern for the negative (or possibly negative) outcome of the help, the more they disagree with the help. Also, sadness and compassion played different roles. In emotion toward the dissenter, they might feel sadness and compassion for those who show no concern for cooperation. In contrast, sadness and compassion toward the nuclear power plant worker and nuclear waste disposal volunteers could imply feeling sorry for those supporters who would be indirect victims of this crisis.

For emotional evaluation toward dissenters and supporters, people from all areas gave high positive and low negative emotion to the supporters, and low positive emotion and high negative emotion to the dissenters. Therefore, people from all areas in

this survey perceived in the same way that support for the reconstruction policy is benevolent so they received high positive and low negative emotions while dissent against the policy would gain the opposite reactions. This result supported the reciprocity of social norms whereby people would help the others so that they would return the favor in the future, if such a disaster should ever happen to themselves, and positive and negative emotions act as the rewards and sanctions of the social norm system. Sympathetic emotion for nuclear power plant workers was higher than for volunteers tackling the nuclear crisis. This difference is possibly related to the uncontrollability of the events because being a volunteer is a free decision and it is easier for an individual to quit, while being a worker at the nuclear power plant gave the image of high risk from nuclear contamination whereas volunteers might be less likely to come into contact with such nuclear contamination.

Similar to the attitude component, most participants showed supportive emotions for the reconstruction policy. However, participants from Kobe had a slightly higher positive viewpoint for the dissenters against reconstruction activities compared with respondents from Miyagi, which might be related to the distance from Kobe to the severely affected areas of the earthquake and tsunami. To be far from the scene means that people have less personal connection with the victims, and then become less aware of the importance of cooperation in reconstruction when compared to people who live in the disaster-affected areas.

Even though our findings showed regional differences between Kobe city and Miyagi prefecture in both attitudes and emotions about reconstruction activities, we need to clarify why the regional differences occurred. There are 2 possible concerning factors: distance from the disaster scene and level of damage caused by the disaster. Also, this regional difference might occur because of the gender difference of participants between areas, since we had only 17 male participants from Tokyo and none for Kobe, but 63 male respondents participated from Miyagi. The implications of the area effect should be tested with more areas, and with a range of ages and genders to validate the data with regard to regional differences.

2. STUDY 7: THE SURVEY OF ATTITUDES TOWARD THE RECONSTRUCTION ACTIVITIES AFTER THE 2011 EAST JAPAN EARTHQUAKE

In this study, the range of participants' residential areas were expanded throughout the Japanese mainland. To consider the effect of area, we grouped areas in the study into 3 groups; areas severely affected by disaster (Iwate, Miyagi, and Fukushima prefectures), areas slightly affected by disaster (Akita, Yamagata prefectures and Tokyo metropolitan area), and areas not affected by disaster (Kyoto, Hyogo, and Hiroshima prefectures). Historical backgrounds of disasters in those areas are shown in Table 11. Iwate has faced tsunamis many times, such as the great Meiji Tsunami (1896), the great Showa Tsunami (1933), and the Chile Tsunami (1960). Miyagi has frequently faced

earthquakes but the biggest one was 2011. Tokyo was faced with the great Kanto earthquake (1923) which occurred almost a century ago. Hiroshima was severely affected by the atomic bomb in World War II (1945) and Kobe city in Hyogo prefecture experienced the great Hanshin-Awaji earthquake in 1995. Kyoto was also affected by the Murato Typhoon in 1934, almost a century earlier.

2-1 METHOD

(1) *PARTICIPANTS*

We sent an email to people who registered as members of a survey research center in Japan to ask for their participation. Participants were selected from those who were living in Iwate, Miyagi, and Fukushima prefectures (severely affected disaster areas), Akita and Yamagata prefectures (neighboring areas / slightly disaster-affected areas), Tokyo (a moderate distance from the disaster-affected area / slightly disaster-affected area), and Kyoto, Hyogo, and Hiroshima prefectures (long distance from the disaster / non-affected areas). We received consent from 800 participants who lived in the specified areas as shown in Table 11. After screening, we deleted 21 participants who had immigrated after the 2011 disaster occurred. Finally, we had 400 male and 379 female participants, giving a total of 779 responses for the analysis (aged 20-79 years old, mean = 46.9, *SD* = 15.2).

Table 11. Geographical information of participants in Study 7 and Study 8

Prefecture	City	Distance *	Level of damage from 2011 disaster	Disaster history	Numbers of participants	Average aged (years old)	(SD)
Iwate	Morioka,	Disaster affected area	Severely affected	Tsunami	44 male	49.3	(14.0)
	Miyago, Kama-ishi				51 female	43.3	(13.3)
					95 responses		
Miyagi	Kesenuma,	Disaster affected area	Severely affected	—	56 male	44.6	(12.1)
	Aoba-ku Sendai				41 female	43.2	(13.8)
					97 responses		
Fukushima	Fukushima, Iwaki	Disaster affected area	Severely affected	—	55 male	49.7	(16.0)
					44 female	45.2	(12.9)
					99 responses		
Akita and Yamagata**	Akita, Yamagata	Neighboring area	Slightly affected	—	47 male	47.2	(14.1)
					48 female	45.6	(15.3)
					95 responses		
Tokyo		Middle	Slightly affected	—	53 male	50.9	(16.8)
					45 female	46.1	(16.2)
					98 responses		
Kyoto		Far	Non-affected	(Bon fire festival)	45 male	49.7	(17.0)
					53 female	49	(16.4)
					98 responses		
Hyogo	Kobe	Far	Non-affected	Hanshin-Awaji Earthquake (1995)	50 male	48.6	(15.5)
					48 female	47.1	(16.5)
					98 responses		
Hiroshima	Hiroshima	Far	Non-affected	Atomic bomb (1945)	50 male	45.1	(15.5)
					49 female	45.2	(16.6)
					99 responses		

Notes. * Distance from disaster-affected areas (Miyagi Prefecture). ** Data from Akita and Yamagata prefectures were collected together because of the small number of responses, and similar geographical characteristics of these prefectures

(2) MEASUREMENTS

The questionnaire comprised participants' general information (that was verified by the data registered in the research survey center's database), attitudes toward reconstruction activities (8 items) (See Table 7), and emotion evaluation toward dissenters and supporters of disaster reconstruction policy (materials and results were mentioned in Study 9). For the attitudes toward reconstruction activities, participants

were asked to rate, from -2 (Disagree), 0 (Neither agree nor disagree), to 2 (Agree), on a 5-point Likert scale.

(3) PROCEDURES

The survey was conducted via a survey research center in March 2012, one year after the 2011 disaster. Members of the survey research center were sent the link of the questionnaire via email and the questionnaires were filled in through the internet. Participants who completed the questionnaire received digital points to exchange for goods. This study was approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

2-2 RESULTS

Means and standardized errors of the attitudes toward reconstruction policies are shown in Table 12. The attitude toward reconstruction policies showed negative scores for ‘Refrain from festivals in non-affected areas’, ‘Refrain from buying foods from disaster-affected areas’, ‘Willing to accept disaster debris disposal with high cesium levels’, and ‘Planned power outages’. On the other hand, ‘Promote festivals in the disaster-affected areas’, ‘Continue to buy food from disaster-affected areas’, ‘Sightseeing at disaster-affected areas’, and ‘Willing to accept disaster debris disposal with low cesium levels’ gained positive scores.

Three-way analyses of variance were performed for reconstruction activities (8 items: within-subject variable), gender (male and female: between-subject variable), and residential areas (8 areas: between-subject variable). The results found that the main effect of activity ($F(5, 3937) = 409.26, p < .001$), area ($F(7, 763) = 2.86, p < .01$), interaction effects between activity and area ($F(36, 3937) = 2.90, p < .001$), and interaction effects between activity and gender ($F(5, 3937) = 2.45, p < .05$) were significant. Simple main effect tests of the areas on attitudes about reconstruction activities were conducted. We found significant differences on ‘Sightseeing at disaster-affected areas’, ‘Willing to accept disaster debris disposal with low cesium levels’, ‘Continue to buy food from disaster-affected areas’ ($ps < .001$), ‘Refrain from festivals in non-affected areas’ ($p < .01$), ‘Planned power outages’ and ‘Refrain buying foods from disaster-affected areas’ ($ps < .05$).

The multiple comparison (Bonferroni) showed higher levels of objection from Iwate than from Akita-Yamagata, Tokyo, Kyoto, Hyogo, and Hiroshima, from Fukushima than Tokyo and Kyoto, and from Miyagi than Tokyo in ‘Refrain from festivals in non-affected areas’. Higher objections were seen from Fukushima than Akita-Yamagata, Tokyo, Kyoto, and Hyogo, and from Iwate and Miyagi than Hyogo in ‘Refrain buying foods from disaster-affected areas’. Higher objections from Kyoto and Hyogo than Iwate, Miyagi, and Akita-Yamagata were recorded for in ‘Planned power outages’. Higher support came from Iwate and Miyagi than Kyoto, Hyogo, and Hiroshima, and from Fukushima than Kyoto and Hyogo, from Akita-Yamagata and Tokyo than Hyogo,

and from Hiroshima than Hyogo in ‘Accept disaster debris disposal with low cesium levels’. Higher support from Fukushima than the other areas except Iwate (Miyagi, Akita-Yamagata, Tokyo, Kyoto, Hyogo, and Hiroshima), and from Iwate than Kyoto, Hyogo, and Hiroshima, from Miyagi, Akita-Yamagata and Tokyo than Hyogo came in ‘Do sightseeing at disaster-affected areas’. Higher support came from Iwate than the other areas except Miyagi (Fukushima, Akita and Yamagata, Tokyo, Kyoto, Hyogo, and Hiroshima), from Miyagi than Tokyo, Kyoto, and Hyogo, and from Fukushima than Kyoto and Hyogo in ‘Continue to buy food from disaster-affected areas’ ($p < .05$) (See Table 12).

For the interaction effect between activities and gender, we conducted the simple effect test for gender in attitudes about reconstruction policies. The results were found to be significant only for the planned power outages where males objected more than females ($M = 0.0$ and -0.3 ; $p < .01$).

Table 12. Means (SD) of attitudes toward each reconstruction activity from 8 areas.

Residential area	Refrain from festival in non-affected area	Refrain buying foods from disaster affected area	Accept disaster debris disposal with high cesium	Planned power outage	Promote festival in the disaster affected area	Continue to buy food from disaster affected area	Do sightseeing at disaster affected area	Accept disaster debris disposal with low cesium
Iwate	-1.42 (0.8)	-0.56 (1.1)	-0.30 (1.1)	0.05 (1.2)	0.44 (1.0)	0.95 (1.0)	1.08 (0.9)	1.46 (1.0)
Miyagi	-1.20 (1.0)	-0.52 (1.1)	-0.29 (1.1)	0.01 (1.1)	0.44 (1.0)	0.78 (1.1)	0.99 (1.1)	1.42 (1.0)
Fukushima	-1.24 (1.0)	-0.69 (1.1)	-0.11 (1.4)	-0.23 (1.3)	0.39 (1.1)	0.69 (1.1)	1.18 (1.0)	1.4 (1.0)
Akita-Yamagata	-1.04 (1.1)	-0.31 (1.2)	-0.44 (1.3)	0.05 (1.2)	0.52 (1.1)	0.49 (1.2)	0.91 (1.0)	1.22 (1.1)
Tokyo	-0.91 (1.1)	-0.27 (1.1)	-0.32 (1.2)	-0.12 (1.3)	0.33 (1.0)	0.39 (1.0)	0.88 (1.0)	1.14 (1.2)
Kyoto	-0.93 (1.1)	-0.25 (1.1)	-0.49 (1.2)	-0.45 (1.3)	0.36 (1.0)	0.35 (1.1)	0.76 (1.0)	0.93 (1.2)
Hyogo	-1.09 (1.0)	-0.20 (1.1)	-0.60 (1.2)	-0.40 (1.2)	0.46 (1.0)	0.32 (1.1)	0.6 (1.0)	0.74 (1.1)
Hiroshima	-0.98 (1.1)	-0.42 (1.2)	-0.47 (1.3)	-0.24 (1.2)	0.35 (1.0)	0.61 (1.0)	0.72 (1.0)	1.11 (1.2)
Average	-1.1 (1.0)	-0.41 (1.1)	-0.38 (1.2)	-0.16 (1.2)	0.39 (1.0)	0.58 (1.1)	0.88 (1.0)	1.18 (1.1)

Notes. a. The activities written in bold letters had significant differences among areas in the test of simple effects. b. From the multiple comparison results, cells in which their

areas tended to have higher scores (both plus and minus) are marked with dark grey. Cells in which the areas tended to have lower scores (both plus and minus), are marked with light grey.

2-3 DISCUSSION

Our purpose in Study 7 is to clarify the regional effect of 8 residential areas (Iwate, Miyagi, Fukushima, Akita-Yamagata, Tokyo, Kyoto, Hyogo, and Hiroshima prefectures), and gender on the attitudes about the reconstruction policies via an online survey.

Overall pictures of the attitudes toward reconstruction activities tended to indicate positive views except for the ‘Accept disaster debris disposal with high cesium levels’ item which drew concern because of the potentially harmful effects of cesium on health. Regional differences showed the tendencies of 3 groups classified by severity of damage from the disaster: severely affected, slightly affected, and non-affected, such that individuals from severely affected areas showed higher levels of objection to ‘Refrain from festivals in non-affected areas’, ‘Refrain buying foods from disaster-affected areas’ than those who were connected to or obstructed the development of reconstruction. People in disaster-affected areas tended to support the ‘Planned power outage’, ‘Continue buying food from disaster-affected areas’, ‘Promote festivals in the disaster-affected areas’, and ‘Accept disaster debris disposal with high cesium levels’ more than the other areas. On the contrary, among people from slightly-affected and non-affected areas, Kyoto and Hyogo had a less negative attitude about ‘Refrain buying foods from disaster-

affected areas', had negative feelings toward 'Planned power outages', and showed less support for 'Continue buying food from disaster-affected areas', 'Do sightseeing at disaster-affected areas', and 'Accept disaster debris disposal with low cesium levels' than the other areas. People from slightly-affected areas tended to report responses in the middle of the other two groups. This tendency proved the relationship between severity of damage and attitude toward the reconstruction policies. Severity of damage reflected the need for the reconstruction in their communities to return to normal life. Therefore, people in the severely damaged areas gave positive evaluations to the activities supporting the reconstruction while people from less damaged areas felt less relevance of the reconstruction to themselves, and this reflected the difference of interest among regions. Any support for reconstruction has its cost, in money, time, and also health risk. People from less affected areas are reasonably concerned about the cost of their helping more than its contribution. Conversely, people from Fukushima felt more negatively about the planned power outages than people from other disaster-affected areas, while the neighboring areas, Akita and Yamagata prefectures, felt positive about them, as did other disaster-affected areas. This is possibly because Fukushima was the most seriously damaged area from the accident at the nuclear power plant. Actually, the leaking nuclear power plant was not used for local production, as the power generated was sent for use in Tokyo, so it may not be fair for Fukushima residents to take responsibility again for the electricity problem. Akita and Yamagata prefectures are located next to the severely affected prefectures so they were the first areas which could give prompt help to the

disaster victims, such as, food, water supplies, and gasoline, and this makes people from neighboring areas become familiar with sharing and providing support.

The other point to be concerned about is the disaster history. Among the areas selected in this study, Hiroshima is the farthest from the disaster-affected areas and suffered almost no effect from the disaster in 2011. Nevertheless, their response was similar to the moderately distant areas, and not the areas in the same group: Kyoto and Hyogo. Hiroshima is an area that was severely affected in World War II by the atomic bomb which was similar to the nuclear disaster in Fukushima. We believe that the similarity of disaster experience will generate sympathy and the preference for helping victims by creating an in-group. Even though Hyogo is an area which suffered from a great earthquake in 1995, nuclear disasters and earthquakes might be recognized as different categories, therefore inducing less sympathy than was the case for people in Hiroshima.

In this study, we also found gender differences on the attitude toward planned power blackouts whereby women were in greater agreement than men. Considering all activities which require personal investment: accepting tsunami debris (with low and high levels of cesium), planned power outages, buying products from disaster-affected areas, and sightseeing at the disaster-affected area, the power outage is the only one for which individuals are not concerned about the nuclear pollution risk. Because they are sure that this type of activity does not risk nuclear harm, it is easier for women to feel sympathy with the victims compared to men.

3. STUDY 8: THE SURVEY OF EMOTIONAL EVALUATIONS TOWARD THE RECONSTRUCTION ACTIVITIES AFTER THE 2011 GREAT EAST JAPAN EARTHQUAKE

This study aimed to test the effects of regional and gender differences on emotions toward the supporters and dissenters of the 2011 disaster reconstruction activities. The data was taken from the same respondents as in Study 7 and the emotion scales were applied from Study 6. This study has two purposes: to shape the structure of emotional evaluation that points to people who did and did not cooperate with the reconstruction activities on a larger scale than what was done in Study 6; and to clarify the regional and gender differences in terms of emotions for those who cooperated and those who did not cooperate with the reconstruction activities concerning the effect of distance from the disaster-stricken areas, level of damage caused by the disaster, and the history of other disasters in those areas.

3-1 METHOD

(1) *PARTICIPANTS*

We sent an email to people who registered as members of a survey research center in Japan to ask for their participation. Participants were selected from those who were living in Iwate, Miyagi, and Fukushima prefectures (severely affected areas), Akita and Yamagata prefectures (neighboring areas / slightly affected areas), Tokyo metropolitan area (moderate distance from the disaster-affected area / slightly affected by

the disaster), and Kyoto, Hyogo, and Hiroshima prefectures (far from the disaster area /non-affected by the disaster). We received consent from 800 participants who lived in the specified area as shown in Table 11. After screening, we deleted 21 participants who had immigrated after the 2011 disaster occurred. Finally, we had 400 male and 379 female participants, giving a total of 779 responses for the analysis (aged 20-79 years old, mean = 46.9, SD = 15.2).

(2) *MEASUREMENTS*

For the emotional evaluation toward dissenters and supporters of the disaster reconstruction policy, the arguments of dissenters and supporters related to the reconstruction policy were collected from topics that were broadcast on television, or in newspapers within one year since the day of the disaster in 2011. The dissenters of the reconstruction policies were, ‘Dissenter of accepting the tsunami debris from disaster-stricken area to their area (Dissenter of accepting the debris)’, ‘Refuser of buying food produced in the affected areas and nearby areas (Refuser of buying food)’, ‘Dissenter of accepting the pine trees from disaster-stricken areas for use in the Bonfire Festival in Kyoto (Dissenter of accepting the pine trees)’, and ‘Dissenters of accepting the snow for kids events that was sent from Aomori (Dissenter of accepting the snow)’. The supporters of reconstruction activities selected in this study were similar to study 6: ‘The workers at the damaged Fukushima nuclear power plant (Nuclear power plant workers)’, and ‘The volunteers dealing with the tsunamis debris in Fukushima (Nuclear waste disposal volunteers)’. Emotional evaluation scale used 10 emotional items as applied in study 6

(preliminary study: sadness, discomfort, disappointment, disgust, anger, compassion, disdain, admiration, gratefulness, and respect). Those emotion items were used to rate 6 types of people as shown in Table 13. The rating used a 6-point Likert scale from 0 (do not feel it at all), to 5 (very strongly feel it).

Table 13. Persons related to the reconstruction activities as targets of emotional evaluations in Study 8

Supporter of the reconstruction activities
The workers at the damaged Fukushima nuclear power plant (Nuclear power plant workers)
The volunteers dealing with the tsunamis debris in Fukushima (Nuclear waste disposal volunteers)
Dissenter of the reconstruction activities
Dissenter of accepting the tsunami debris from disaster-stricken areas to their own area (Dissenter of accepting the debris)
Refuser of buying food produced in the affected areas and nearby areas (Refuser of buying food)
Dissenter of accepting the pine trees from disaster-stricken areas for use in the Bonfire Festival in Kyoto (Dissenter of accepting the pine trees)
Dissenters of accepting the snow for kids events that was sent from Aomori (Dissenter of accepting the snow)

(3) *PROCEDURES*

This study used the same set of data from Study 7. After being approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University, the survey was conducted via a survey research center in March, 2012, through the internet.

3-2 RESULTS

(1) *STRUCTURE OF EMOTIONAL EVALUATION ON PEOPLE RELATED TO RECONSTRUCTION OF 2011 DISASTER*

10 emotional evaluations toward people related to reconstruction activities were grouped by using exploratory factor analysis (maximum likelihood) with Promax rotation, separately by each type of person. The maximum likelihood method was chosen because it allows for the computation of a wide range of indices of the goodness of fit of the model and permits statistical significance testing of factor loadings and correlations among factors as well as the computation of confidence intervals (Fabrigar, Wegener, MacCallum & Strahan, 1999). Guttman and Kaiser's criterion that factors' eigenvalues must be higher than 1 was applied. With this criterion, sadness and compassion had eigenvalues lower than 1 and have low communality in both dissenters and supporters (sadness = .18-.49, compassion = .13-.46; Costello & Osborne, 2005) so they were omitted from further analysis. The results of factor analysis are shown in Table 14. Both types of people related to reconstruction activities had 2 factors extracted. First, negative

emotion composed of disgust, discomfort, disappointment, disdain, and anger. The other type comprised positive emotion composed of admiration, gratefulness, and respect (cumulative % = 70.25 – 81.63%).

Table 14. Factor analysis of attitudes about post-disaster reconstruction activities

	Worker of nuclear power plant			Volunteer tacking nuclear debris			Dissenter-tsunami debris		
	Pos.	Neg.	Comm.	Pos.	Neg.	Comm.	Pos.	Neg.	Comm.
Disgust	.94	.08	.85	.89	.02	.79	.96	.00	.92
Discomfort	.97	.06	.90	.91	-.04	.85	.94	-.02	.90
Disappointment	.74	-.05	.56	.85	-.01	.72	.75	-.06	.59
Disdain	.72	-.13	.60	.89	.00	.80	.80	.03	.63
Angry	.73	-.03	.55	.85	.03	.72	.85	.04	.70
Admiration	-.04	.75	.58	-.02	.86	.75	-.06	.73	.56
Gratefulness	-.02	.88	.78	.00	.90	.80	.06	.87	.73
Respect	.03	.90	.79	.02	.92	.84	.00	.90	.81
Factor correlation	-.32			-.31			-.23		
Cumulative %	70.25%			78.19%			72.99%		

	Dissenter-products			Dissenter-pine trees			Dissenter-snow		
	Pos.	Neg.	Comm.	Pos.	Neg.	Comm.	Pos.	Neg.	Comm.
Disgust	.95	-.01	.90	.94	.02	.88	.96	.00	.92
Discomfort	.95	-.03	.91	.93	-.04	.88	.95	-.03	.91
Disappointment	.81	-.03	.66	.82	-.06	.70	.86	-.05	.76
Disdain	.88	.02	.77	.87	.04	.74	.89	.03	.77
Angry	.87	.04	.77	.90	.04	.80	.91	.04	.82
Admiration	-.05	.82	.68	-.03	.89	.81	-.04	.85	.73
Gratefulness	.04	.92	.85	.01	.87	.76	.01	.91	.82
Respect	.01	.93	.87	.02	.89	.79	.03	.90	.80
Factor correlation	-.01			-.24			-.19		
Cumulative %	80.08%			79.37%			81.63%		

Notes. Pos. = Positive emotion, Neg. = Negative Emotion, Comm. = Community (after extraction)

(2) **REGIONAL DIFFERENCES OF EMOTIONAL EVALUATIONS ON PEOPLE RELATED TO RECONSTRUCTION OF 2011 DISASTER**

To test regional differences in emotional evaluation toward the dissenters and supporters of the reconstruction activities, positive emotions and negative emotions represented the emotional evaluation in our study. All emotion scores were adjusted as percentages (0 – 100 point). Three-way analysis of variance was applied for gender (male and female), regional area (8 areas, between-subject variables), and type of people (6 types, within-subject variable) separately by emotion factors. For positive emotion, we found the significant main effect of type of people ($F(2.26, 1698.82) = 2420.31, p < .001$), residential area ($F(7, 763) = 2.50, p < .01$) and interaction effect of area and type ($F(15.59, 1698.82) = 2.50, p < .01$) (Degrees of freedom were corrected by using the Greenhouse-Geisser method because the sphericity was not assumed). A simple effect test was used to confirm the area difference for each of the types of people. The results showed significant effects on the dissenters of accepting pine trees and snow from disaster-affected areas ($ps < .001$), and dissenters of accepting tsunami debris ($p < .01$). Multiple comparison results revealed higher positive emotions from Kyoto, Tokyo, Hyogo, Hiroshima, Akita-Yamagata, and Miyagi, than Iwate, and from Kyoto and Tokyo than Fukushima for the dissenters of tsunami debris. For the not accepting pine trees from disaster-affected areas, positive emotions from participants in Kyoto were higher than in the other areas. For not accepting snow from disaster-affected neighboring areas, positive emotions from participants in Kyoto were higher than the other areas, while participants

from Hyogo were higher than Fukushima, Iwate and Miyagi, and participants from Hiroshima were higher than Fukushima and Iwate ($ps < .05$).

For negative emotion, we found the significant main effect of area ($F(7, 763) = 5.62, p < .001$), type of people ($F(2.73, 2083.09) = 1117.11, p < .001$), and the interaction effect of area and type ($F(19.11, 2083.09) = 4.31, p < .001$) (Degrees of freedom were adjusted by using the Greenhouse-Geisser method because the sphericity was not assumed). A simple effect test of the area found significant differences in all types of dissenters of the reconstruction activities: people who resist the acceptance of tsunami debris, pine trees, and snow from disaster-affected areas and neighboring areas, and people who do not buy food produced in disaster-affected areas ($ps < .001$). The multiple comparison (Bonferroni) results showed higher negative emotion from Iwate and Fukushima than Kyoto, Hyogo, Hiroshima, Tokyo, and Akita-Yamagata, and from Miyagi than Kyoto, Hyogo, Hiroshima in terms of dissenters to accepting the tsunami debris. For dissenters to buying food produced in disaster-affected areas, negative emotions from participants in Iwate and Fukushima were higher than participants from Hyogo, Kyoto, Akita-Yamagata, Hiroshima, and Tokyo, while negative emotions from participants in Miyagi were higher than in Hyogo, Kyoto, Akita and Yamagata, and Hiroshima. For the dissenters of accepting pine trees from disaster-affected areas, higher negative emotions were found in Iwate and Fukushima than in Hiroshima, Kyoto, Hyogo, Akita-Yamagata, and Tokyo. In Miyagi, negative emotions were higher than in Hiroshima, Kyoto, Hyogo, and Akita and Yamagata. For the dissenters of accepting snow

from disaster-affected neighboring areas, Iwate and Fukushima had higher negative emotions than Hiroshima, Kyoto, Hyogo, and Tokyo. Also, the Miyagi and Akita-Yamagata areas were higher than in Hiroshima, Kyoto, and Hyogo, and Tokyo was higher than in Hiroshima ($ps < .05$; See Table 15).

Table 15. Regional differences of emotional evaluations in Study 8

(A) Regional differences of positive emotions about supporters and dissenters of the reconstruction activities

Residential area	Worker of nuclear power plant	Volunteer tacking nuclear debris	** Dissenter-tsunami debris	Dissenter-products	*** Dissenter-pine trees	*** Dissenter-snow
Iwate	81 ± 25	85 ± 23	7 ± 14	12 ± 21	5 ± 15	4 ± 14
Miyagi	78 ± 24	83 ± 21	15 ± 21	11 ± 19	5 ± 13	5 ± 13
Fukushima	80 ± 25	80 ± 26	12 ± 23	12 ± 22	6 ± 15	4 ± 13
Akita-Yamagata	79 ± 27	79 ± 26	16 ± 25	16 ± 24	9 ± 22	8 ± 20
Tokyo	79 ± 22	81 ± 26	18 ± 24	16 ± 22	10 ± 17	9 ± 16
Kyoto	77 ± 24	78 ± 26	20 ± 24	16 ± 24	17 ± 25	18 ± 26
Hyogo	75 ± 26	78 ± 27	17 ± 22	17 ± 21	9 ± 17	12 ± 19
Hiroshima	78 ± 26	83 ± 23	17 ± 20	16 ± 25	9 ± 18	9 ± 19
Average	78 ± 25	81 ± 25	15 ± 22	15 ± 22	9 ± 18	9 ± 18

(B) Regional differences of negative emotions about supporters and dissenters of the reconstruction activities

Residential area	Worker of nuclear power plant	Volunteer tacking nuclear debris	*** Dissenter-tsunami debris	** Dissenter-products	*** Dissenter-pine trees	*** Dissenter-snow
Iwate	9 ± 17	6 ± 12	71 ± 26	54 ± 31	77 ± 30	75 ± 31
Miyagi	13 ± 19	8 ± 15	67 ± 28	52 ± 31	76 ± 26	74 ± 30
Fukushima	10 ± 18	8 ± 16	71 ± 28	55 ± 33	77 ± 30	76 ± 30
Akita-Yamagata	11 ± 20	9 ± 18	60 ± 31	42 ± 29	65 ± 33	67 ± 33
Tokyo	14 ± 19	10 ± 17	59 ± 29	45 ± 29	67 ± 30	66 ± 32
Kyoto	11 ± 18	13 ± 22	52 ± 31	41 ± 30	61 ± 34	57 ± 34
Hyogo	13 ± 20	8 ± 15	53 ± 27	40 ± 28	63 ± 31	58 ± 34
Hiroshima	11 ± 19	9 ± 17	55 ± 30	42 ± 31	59 ± 32	56 ± 32
Average	12 ± 19	9 ± 17	61 ± 30	46 ± 31	68 ± 32	66 ± 33

Notes. a. The target emotions written in bold letters had significant differences among areas in the test of simple effects (** $p < .01$, *** $p < .001$). b. From the multiple comparison results, cells whose areas tended to have higher scores are marked in dark grey. Cells for which the area tended to have lower scores are marked in light grey.

3-3 DISCUSSION

The structure of emotions was grouped into two opposite factors: positive and negative emotions. Positive emotion to someone can be assumed as admiration, gratefulness, and respect while negative emotion can be assumed as anger, discomfort, disappointment, etc. From the results, we found very high positive emotions and very low negative emotions for every supporter, and low positive emotion together with high negative emotion for every dissenter. These represented the framework of altruism among Japanese citizens whereby it is praiseworthy to support the disaster victims, not only with

physical support such as help managing tsunami debris from the tsunami-affected area, but also economic support (e.g. helping by buying food from disaster-affected areas), and mental support (e.g., using the pine trees from areas severely affected by the tsunami for the Bonfire Festival). Interestingly, the mental support was expected the most with the highest negative emotion among 4 types of dissenters and dissent about economic support was felt least negatively. This result supported the notion that feeling connected with others is a key factor for the resiliency of disaster victims. Also, the results can assume the shared responsibility among the free-riders, because agricultural products from disaster-affected areas were bought countrywide but the pine trees were sent only to Kyoto. The shared responsibility mentioned that the more people at the scene, the less they feel guilty for not taking action.

According to the analysis of variance results and the test afterwards, none of the main effects or interaction effects of gender were found. Also, no regional difference on both positive and negative emotions for the supporters were found, but significant differences were found for emotions toward dissenters. Respondents from severely affected areas tended to be more negative and less positive toward dissenters than respondents from the other areas. Kyoto, Hyogo, and Hiroshima prefectures which are located far away tended to feel slightly more positive and less negative with the dissenters. Yet, participants from Tokyo, and Akita-Yamagata had medium scores ranking between those of disaster affected areas and distant areas. The results can be assumed to show the effects of distance from the disaster center and of the level of damage

upon emotional responses. More important, even though Tokyo is far from the disaster-affected area, the evaluation scores from Tokyo were closer those of Akita and Yamagata prefectures, which are neighboring areas, than those of other more distant areas. This might be because Tokyo was damaged most by the electricity blackout as a result of the disaster. Therefore, even though its distance is far from the disaster epicenter, by being directly affected by the disaster, people living in Tokyo also held high expectations of the reconstruction just as people closer to the disaster-affected area did. However, we can move between Sendai and Tokyo within one and a half hours now by the bullet train. People from Tokyo might feel that they were close to Sendai because of the short transportation time.

The important points to consider are the history of disaster in this study, such as the atomic bomb in Hiroshima and the Hanshin-Awaji earthquake in Kobe city, Hyogo prefecture. We could not deny the possibility that the negative evaluations about the dissenters in Hiroshima and Hyogo is stronger than in Kyoto even though their distance from the disaster is greater, simply because they have a shared experience of suffering with the people in the disaster-affected area. Kyoto was also faced with a typhoon (Murato Typhoon in 1934) and earthquake (Kita Tango Earthquake in 1927) in the past. However, while there is a memorial park to the earthquake in Kobe city, and the Peace memorial for the atomic bomb in Hiroshima which remind people of their loss from these disasters, and some of the survivors are still alive and staying in the area, Kyoto city was categorized as an area without disaster experience in our study because it was safe from

large-scale disaster for almost a century. Not only did we find higher positive evaluations from Kyoto respondents on the dissenters of accepting pine trees from disaster-affected areas to use in the Bonfire Festival in Kyoto, but we also found slightly higher positive evaluations for dissenters of other types. As Yoshiaki Nihei mentioned in his study about rumors after the 2011 disaster, harmful rumors were caused by the generalized fears of the nuclear contamination spreading from one place to another nearby place, from one time to another point of time, and from one thing to another thing in the same area (Nihei, 2014). That is why people in Kyoto were afraid of some pine trees from Iwate even though those trees were approximately 180 km away from the leaking nuclear power plant in Fukushima. They felt there might be a connection. This might not just be an over-exaggerated reaction because eventually it was found that there were higher than normal levels of cesium in those pine trees so they were sent back from Kyoto. Many people still felt sorry for the disaster victims and that is reflected in our results.

Our data was taken just one year after the disaster and therefore the emotions induced by the events were expectedly strong. We also found ceiling effects and floor effects from the data; for example, more than half of our respondents gave 0 points of negative emotion to the workers in the nuclear power plant and volunteers dealing with the nuclear crisis (exactly 57% and 69% respectively), and more than 50% of responses gave 0 points of positive emotion to all dissenters. Also, we used only 100 sample respondents from each area, which is too few to generalize the findings to the whole area. Finally, this study was conducted through a survey company via the internet. In open

web-based questionnaires, selection bias occurs due to the non-representative nature of the Internet population, and self-selection of participants, i.e. the non-representative nature of respondents, also called the 'volunteer effect' (Eysenbach & Wyatt, 2002). There might be a shared common characteristic among internet users that differed from the overall population. Some studies claim that reactions are more extreme when people express themselves through the internet because of their perceived anonymity (Hise & McGinnis, 1976).

CHAPTER 6

PERCEPTIONS OF THE 2011 DISASTER FROM THE VIEWPOINTS OF NEIGHBORING COUNTRIES

Until chapter 5 we found the strengthen of social norm in both normal and disaster scenes in the 2011 East Japan disaster-stricken area that were slightly higher than 2011 disaster non-affected area that have no severe experience about earthquake, tsunami, and nuclear disaster. This chapter, we report the result of two interview studies conducted in in countries that have a long relationship with Japan; Taiwan and South Korea. We aimed to seek for as much information of how 2011 East Japan disaster affected change in social norm and attitude of people in those countries within one year after the events had occurred.

1. STUDY 9: THE INTERVIEW SURVEY OF PERCEPTION ABOUT THE 2011 EAST JAPAN DISASTER AND ITS IMPACTS IN TAIWAN

The present study selected Taiwanese citizens as respondents for the following reasons. Taiwan is 2,163 km far from Japan, closer than China and Russia. Taiwanese people have also experienced frequent (and strong) earthquakes liked Japan, and are reliant on nuclear power for electricity. Taiwanese people were also influenced by the Japanese life style, TV games, literature, and other factors. As a result of a good historical

relationship, the Taiwanese respect Japan and look to Japan as a role-model and gave higher relief fund to Japan after the 2011 disaster higher than South Korea or even the U.S. (Shu-ling, 2011, May 11). Therefore, we conducted semi-structured interviews in Taiwan 7 months after the 2011 disaster occurred.

1-1 METHOD

(1) *PARTICIPANTS*

In order to obtain a variety of opinions, we contacted representatives of companies, schools, and universities in Taipei and Chiayi. Taipei is the capital of Taiwan located in the northern part of Taiwan. Chiayi city is located in Chiayi County, an administrative area in southwest Taiwan. The representatives who were willing to participate in the study were also asked to invite others to take part in group interviews. Thus, in each group, members felt familiar with one another. The number of participants within each group varied from 2 to 5 depending on the participants' schedules. A total of 65 Taiwanese people (22 Taipei residents and 43 Chiayi residents) participated in this study. Sixteen of the Taiwanese participants were men and 49 were women. The average age of the participants was 28.54 ± 10.3 , and ranged from 19 to 60 years. All participants in Taipei were company workers (mostly related to media and cosmetic companies). More than half of the participants in Chiayi were college students, and the rest were professionals (company employees).

(2) PROCEDURES

We conducted interviews in Taipei and Chaiyi from October 17th to 20th, 2011 (7 months after the 2011 Tohoku earthquake). The interview questions were semi-structured, and the topics included (1) the perception and actions in response to the earthquake/tsunami and Fukushima nuclear accident, (2) the perception of the recovery of Japan after the disaster, (3) the attitude toward nuclear power in Taiwan, (4) the anxiety of visiting Japan, and (5) how well participants could remember the exact locations of the incidents in Japan. The interview duration was approximately 15 minutes for each person. After the interview, the participants received 200 Taiwan Dollars or other souvenirs as compensation for their participation. The participants' responses were classified using keywords, categorized, and calculated as a percentage based on all participant responses. This study was approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University.

2-1 RESULTS

(1) SOURCES OF THE INFORMATION ABOUT THE 2011 DISASTER AND EMOTIONAL RESPONSES

Most participants obtained information about the earthquake from the following sources: internet websites such as Facebook (29%), television (28%), acquaintances (8%), and newspapers (2%). The remaining responses were coded as unidentified/cannot remember. Among the participants, fear was the most reported

emotional reaction toward the news (66%). Additional responses included shock (34%), sadness (22%), and worry (15%), respectively ($\chi^2 (3) = 29.16, p < .001$). Some reports of the fear experienced by the participants included, “*News broadcasts showed the raging fires and scenes from the devastating tsunami, it was very scary*” (from a 27-year old woman). Another example of such a report was “*I always watch the ‘Discovery’ Channel, and all it reported on during the day was the earthquake and subsequent tsunami. People were terrified. I am fearful of the earthquake, and tsunamis, as well*” (from a 29-year-old woman). To additionally summarize the impact of the disasters, 22% of the participants acknowledged reports of fear regarding the nuclear accident stating responses such as “*The radiation was long lasting*” (from a 30-year-old woman) and “*I am afraid of the air-flow of radiation to Taiwan, and illness from the radiation*” (from a 19-year-old woman). Regarding fear over the tsunami, 12% of the participants acknowledged feeling fearful and stated the following responses “*I really fear the earthquake, but more so I am scared of the tsunami*” (from a 23-year-old man), and 6% of the participants reported feeling fearful of the earthquake. Reports of fear among these three disasters were not significantly different ($\chi^2 (2) = 5.85, ns$). Additionally, participants also reported the feeling of shock when describing the disasters. For example, a participant said, “*At first, I was very shocked, it is hard to believe that this hardship would happen to Japan*” (from a 27-year-old woman) or “*I was shocked. When I heard the news, I better understood the fragility and importance of life*” (from a 20-year-old man). Additional feelings of worry were also reported by participants. A 29-year-old woman said, “*I was very afraid when I heard about the news, because my friend was living in Japan at the time. Is she safe? I*

was worried about her. When I heard that she was fine, I was a bit relieved'. Furthermore, 12% of the participants reported that this event reminded them of a past earthquake in Taiwan, the Jiji earthquake (921 earthquake), *"I never experienced such horrible events like this before; however, this reminds me of the 921 earthquake in Taiwan"* said a 20-year old woman. As a result of these disasters, the behavioral responses of the participants showed that 35% of the Taiwanese people attempted to gather more information about the disasters while 31% of those tried to support Japan by contributing donations or volunteering for support activities. An additional 18% of the participants reported that they tried to contact family, friends and relatives living in Japan. No significant differences were observed among these 3 types of responses ($\chi^2 (2) = 3.53, ns$).

(2) ESTIMATION OF JAPAN'S RECOVERY

Regarding the recovery process for Japan, respondents' answers ranged from at least 1-2 years to about 20 years or more (with a mean of 7.4 ± 5.8 years) depending on the severity of the problems. Those who indicated a short recovery process said, *"Considering the recovery progress until now, it has been very fast. I think, after 1-2 years, things will go back to normal as before"* (from a 20-year-old woman). In contrast, those who responded that the recovery would take a couple of decades said that it was predominantly due to subsequent mental health problems (e.g. *"It can be seen that the recovery progress is going better, but the mental health aspect of it is sort of... incurable, right? Such as PTSD, I think it still cannot be treated"* (from a 22-year-old woman)). Radioactive contamination was another concern (e.g. *"Even if the destruction from the*

tsunami or earthquake can be cleaned up quickly, the radioactivity will last forever” (from a 20-year-old woman)). Thus, the reconstruction and revival of the economy were perceived to take little time in comparison to the management of debris and radioactive material, and mental health recovery of the victims and survivors.

With regard to the duration or length of recovery time for Japan, the Taiwanese people made comparisons to their own disastrous earthquake. For instance, a 20-year-old man said, *“I think Japan will recover very fast. In the 921 earthquake in Taiwan, we needed 10 years to recover. The economic problems may take 4-5 years this time”*, or *“For the Taiwan 921 earthquake, it was said that the recovery took 10 years, but I have not forgotten it until now”* (22 year-old woman). Another source of consideration for the recovery process came from a previous Japanese disaster (e.g. *“The previous earthquake in Osaka (Hanshin-Awaji Earthquake) seemed to take about 10 years, so, for the Tohoku area, I think it might take longer”* (from a 23-year-old woman).

(3) *ATTITUDE ABOUT THE NUCLEAR POWER PLANT AND JAPANESE PRODUCTS*

After the nuclear accident in Fukushima, 69% of the Taiwanese people stated that they were worried about the radioactivity, and the explosion at the nuclear power plant. The number of respondents who reported being worried about the nuclear accident was significantly higher than those who did not ($\chi^2 (1) = 9.62, p < .01$). Specifically, 20% of the respondents believed that the Japanese government withheld important details and

information about the disasters, 18% reported being afraid of radioactive material and products such as fish and leafy vegetables, 17% stated they were fearful of future health and agricultural problems as a result of the radiation exposure. No significant differences were found among these categories of responses ($\chi^2(2) = 0.17, ns$).

With regard to purchasing Japanese made products, 42% of the Taiwanese people stated that they would not, 49% stated that they would still continue to purchase products from Japan, and 9% stated that they had not purchased Japanese products even before the events. Among the Japanese products respondents reported no longer purchasing, included agriculture products (26%), fish and other seafood (6%), products from Ibaraki or Fukushima (5%), products which were launched and distributed after March 11 (2%), and all Japanese products (2%). This was due to concern and fear over contamination. In contrast, those who claimed they trusted the international radioactive inspection of traded goods (28%), were among the groups who continued purchasing Japanese products.

(4) *THE PERCEPTION ON NUCLEAR POWER USE*

Fifty-two percent of the participants believed that there was a risk for the occurrence of a nuclear accident, while 15% reported that it was safe. These results suggest that the number of participants who suspected of the danger in having a nuclear power plant was higher than those who believed in its safety ($\chi^2(1) = 13.09, p < .001$).

Respondents believed that Taiwan has a high risk of nuclear power plant accidents because their country is susceptible to frequent earthquakes. During their interview, a 20-year-old female participant stated, *“Taiwan also has nuclear power plants, and earthquakes often occur. I am worried that Taiwan will also experience a nuclear accident”*. Furthermore, participants also mentioned fear over possible chaos that might occur among citizens after an accident. For instance, a 45-year-old woman said *“If an accident actually occurred in Taiwan, there would be chaos among people”*. Additionally, 12% of the participants provided opinions regarding the continuation of nuclear energy and its use. Most of the respondents said that even if dangerous, nuclear energy is important for people (e.g. *“Nuclear power is very convenient for us, I think we cannot get rid of it. But nuclear power is a bit... dangerous, right? I think it should be built and constructed more safely”* (from a 28-year-old woman)), and half of that (6% of the participants) mentioned the essentials of current nuclear power use (e.g. *“When I watched the news of Japan’s nuclear accident, it reminded me of Taiwan’s nuclear plant. Because Taiwan is geography liked Japan, we may experience a similar accident here. But the government said that we have no need to stop using nuclear power. Chiayi, has often been shaken, I think I have to be cautious”* (from a 20-year-old woman)). However, 6% of the participants reported a negative change in attitude towards the use of nuclear power due to this accident. For example, a 31-year-old woman stated *“This makes me reconsider the use of nuclear power in Taiwan. I am rethinking ‘do we really need nuclear power?’ And I think Taiwan may experience a similar accident in the future, too”*. Half

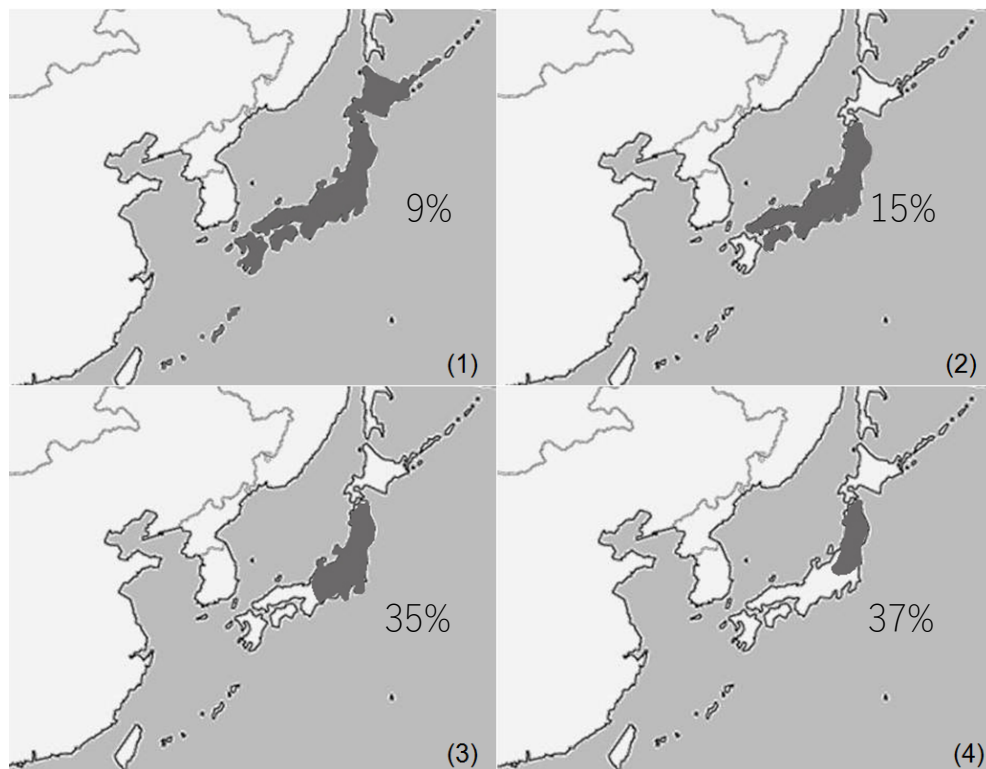
of those participants who had a negative attitude toward nuclear power (3% of the total participants) stated their needs for an alternative form of clean energy.

**(5) *PERCEIVED DANGEROUS AREA IN JAPAN, RECOGNITION OF
THE EARTHQUAKE'S EPICENTER AND THE LOCATION OF
FUKUSHIMA NUCLEAR PLANT***

Participants were asked to draw on a map the areas in Japan that were still too dangerous to visit. We categorized participants' responses into the following four patterns: (1) avoided traveling to all of Japan; (2) avoided traveling to the Honshu and Shikoku islands; (3) avoided traveling to the Chubu region as well as the aforementioned areas; and (4) avoided traveling to the Tohoku region. Interestingly, only a total of 4% of the participants reported that they felt safe enough to go anywhere in Japan. Pattern 4 displayed the highest frequency of responses with (37%) followed by pattern 3 (35%), while pattern 1 displayed the least frequent response with (9%) ($\chi^2(3) = 15.79, p < .01$). These results indicated that the Taiwanese people considered all of the areas in Tohoku and Kanto regions to be too dangerous to visit (see Figure 8).

With regard to the recognition of the earthquake's epicenter and the location of Fukushima nuclear plant (via a Chinese world map displaying the names of the prefectures in Japan excluding the Fukushima prefecture), more than half of the responders (51%), reported that Sendai was the epicenter of the earthquake. Correct responders included only 12% of the participants who marked that the north-east side of

Oshika Peninsula was the epicenter of the earthquake. Additional responses included Fukushima (9%), areas in Tohoku region (8%), Tokyo (5%), Hokkaido (Sapporo 2% and southern Hokkaido 2%), the seaside near southeast Honshu (3%), Fukuoka (3%), and area in central of Honshu island (2%). 3% of responses declined to answer. Sendai was the most frequent response when compared to other responses ($\chi^2(10) = 155.53, p < .001$) (see Figure 9). Thus, these results suggested that nearly half of the Taiwanese people misidentified Sendai as the epicenter of the 2011 Tohoku earthquake.



(1) Avoided traveling to all of Japan (9%), (2) Avoided traveling to the Honshu and Shikoku islands (15%), (3) Avoided traveling to the Chubu and Tohoku regions (35%), (4) Avoided traveling to only Tohoku region (37%).

Figure 8. Four patterns describing areas which were dangerous for visiting.

Additionally, when participants were asked to indicate the correct location of the Fukushima nuclear power plant, 17% of the participants still marked the site at Sendai, while 12% marked areas in Chubu region (Niigata 5%, Shizuoka 3%, and 2% each for Nagano prefecture and Nagoya). Only 11% of the participants correctly identified Fukushima as the correct location, while 11% said Morioka, 8% said Fukuoka, 6% said Tokyo, 5% each said the areas in Hokkaido, and Tohoku region (excluding Sendai and Morioka), 3% each said Osaka, and area in Chugoku region, 2% each said the earthquake epicenter and seaside near Kanto region, and 15% declined to answer ($\chi^2(16) = 41.64, p < .001$) (see Figure 10).

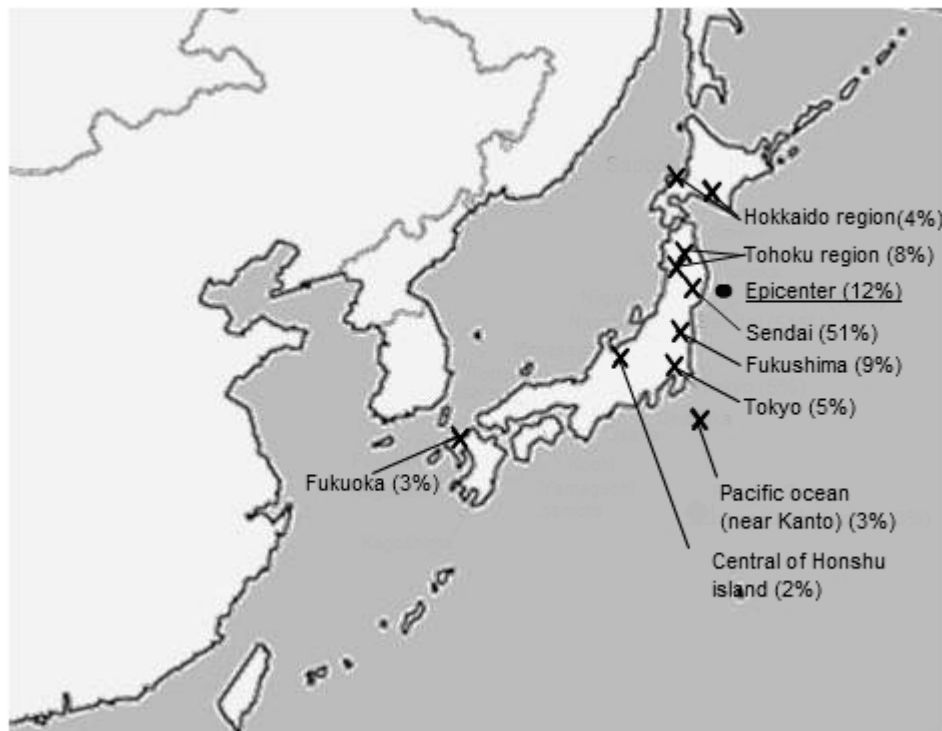


Figure 9. The location of the 2011 Tohoku earthquake epicenter according to participants.

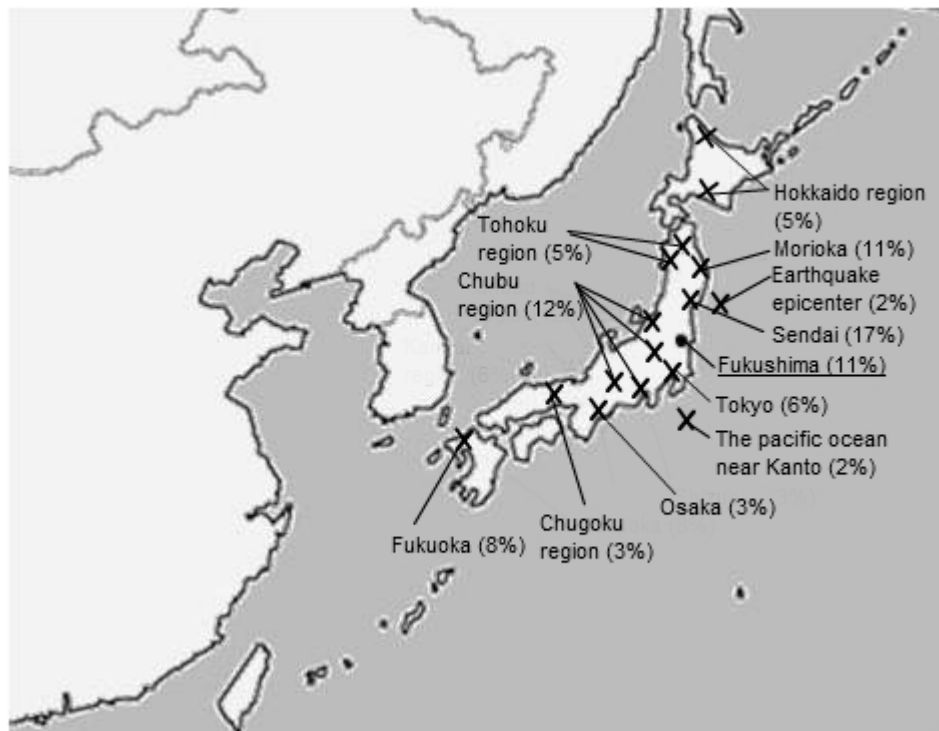


Figure 10. Participants' indication of the location of the Fukushima nuclear power plant.

1-3 DISCUSSION

The present study investigated the perception of the Taiwanese people toward Japan after the 2011 Tohoku earthquake by conducting a semi-structured interview on a sample of Taiwanese residents in Taipei and Chaiyi, Taiwan. Specifically, the present study examined how people in Taiwan perceived Japan after the earthquake and subsequent accident at the nuclear power plant. For example, we studied their perceptions and how they felt about the impact of the disaster. We also inquired about various events

that they would recognize concerning the disasters and their overall thoughts on the use of nuclear power. The role of the media and heuristic thinking were also examined.

In general, the media tended to focus on the negative and most emotional and shocking aspects of the disasters and repeatedly depicted the emotional scenes of the disaster. In fact, participants reported experiencing an overload of portraits and videos from the disaster and said that they were still haunted by the imagery. Additionally, more than half of the Taiwanese people reported fear when they obtained information regarding Japan's disasters. Furthermore, those who had acquaintances living in Japan reported feeling additional concern and fear over the safety of their loved ones. Citizens from around the world can easily exaggerate the effects of a disaster that they did not experience themselves. Thus, the facts may be completely different from their perceptions. In contrast, people living directly in Japan can experience both the reality as well as the information provided by the media concerning the affected and unaffected areas. We can see that people's trust in Japan was compromised and wavered. As a result, 40% of the participants reported feelings of fear associated with visiting Japan or purchasing Japanese products.

Heuristics persuade people to believe even when there is only little possibility in the worst case when there is high involvement in the matter (Chaiken, 1980). Thus, some of the Taiwanese people still believed that, 7 months after disaster, Japan was too dangerous to visit and that Japan's agricultural products were unsafe. The results obtained from the map task indicated that the Taiwanese people considered not only all of the

Tohoku area as dangerous, but also the Kanto and Chubu areas. Furthermore, when there is low involvement in matters, people cannot manage details well; such as the correct designation of the earthquake's epicenter and the Fukushima nuclear power plant's location. Some people were lured by irrelevant cues and misunderstood the actual events. Most of the participants believed that the earthquake's epicenter and the nuclear power plant were in the same area. Furthermore, the terms and locations 'Miyagi' 'Sendai' and 'Tohoku' were terms that the participants heard from the news, and when the researchers introduced themselves; thus, participants may imprint the word Sendai, and associate it with the epicenter of the earthquake. Also, people may become confused because Tokyo metropolitan is the most well-known city among the ones affected by the radiation leak, and because Fukuoka has a similar pronunciation and accent as 'Fuku' like Fukushima. These cues are easier for people to remember than unfamiliar ones. These common mistakes showed that people are easily affected by peripheral information. These results suggested that heuristic thinking was a culprit in the growing anxiety over the safety of Japan.

Regarding thoughts on the duration of the recovery process for Japan, participants' perceptions were influenced by Taiwan's past disasters and earthquakes. For example, Taiwan experienced strong earthquakes including the Jiji earthquake (referred to as the 921 earthquake) on September 21, 1999. Some participants said that Taiwan took nearly 10 years to recover from the damage. Thus, their knowledge and experience may have influenced and reflected their prospect for Japan's recovery process.

Furthermore, in comparison to Taiwan, Japan's ability to recover was thought to be more efficient. Japan's image of calmness and carefulness (Donaldson, Goldman, and Goldman, 2011, Lah, 2011), influenced people's perception of a full and efficient recovery. However, exceptions for an efficient recovery included mental health problems, and future health problems due to exposure to radioactive materials.

Regarding the consideration of the use of nuclear power after the incidents, people reported that their opinions about the perceived importance of nuclear power changed after the disasters. Similar to an Inoculation effect of attitude formation and commitment (Renn, 1990), people who hold neutral attitudes toward nuclear work tended to become more negative with by the minor information. However, similar research conducted by Renn (1990) revealed that this change in attitude may return to normal (or nearly normal) with the passing of time (approximately 1 month later). Consistent with participant reports, respondents reported that they would likely forget about the catastrophic events with the passing of time.

In summary, study 9 investigated the perception of the Taiwanese people toward Japan and the use of nuclear power after the incidents of the 2011 Tohoku earthquake and tsunami. Results revealed that more than half of the Taiwanese people felt fear when they obtained information about Japan's disasters. They also reported great concern over radioactive contamination and a hesitation to visit certain areas of Japan. They also reported being fearful of purchasing Japanese agriculture products. However, our results also demonstrated that our participants could not easily identify the correct

locations of the disasters and affected areas from the earthquake or the nuclear power plant accident at Fukushima. Based on our findings, we also discussed the role of the media and heuristic cues, which may have further influenced the perceptions of the Taiwanese people toward the disaster. Since the present study is a qualitative study, it is limited in its ability to claim sample size and representativeness and generalizability of the findings. However, the present study is consistent with previous research conducted on the perceptions of nations and communities recovering from terrible disasters. Our findings help the further understanding of how Taiwanese people perceive Japan and the use of nuclear power 7 months after of the disaster and events.

2. STUDY 10: THE INTERVIEW SURVEY OF PERCEPTION ABOUT THE 2011 EAST JAPAN DISASTER AND ITS IMPACTS IN SOUTH KOREA

South Korea has the highest density of nuclear power plants of any country with more than ten reactors in operation (Lee, 2014). This country is located very close to Japan (942 km far) and has plans to develop a nuclear power industry. It is therefore essential to examine how South Korean people felt after the GEJE disasters in regard to the perception of risks and benefits of nuclear power, and also the influence of the evidence on their personal lives. Due to the proximity of the two countries, the people of South Korea and Japan have interacted for thousands of years. Even now, South Korea is an important economic partner with Japan, with large numbers of visitors and goods imported from Japan (Japan Tourism Agency, 2011).

As a continuation of our previous study in Taiwan (study 9), we conducted another interview study in South Korea, one year after the 2011 East Japan events.

2-1 METHOD

(1) PARTICIPANTS

A total of 20 South Korean women who were living in Seoul participated in the study. The age range was from 21 to 38 years old (mean: 24.8 years, SD: 5.0 years). Fourteen participants were students (three were graduate students) and the others had various occupations, such as writer, programmer and religious studies teacher.

(2) INTERVIEW AGENDA

The interview agenda was developed from study 9, which was conducted in Taiwan. Participants were asked the following questions:

1) Impressions about the 2011 East Japan disaster: “Have you ever heard about the disaster in East Japan, 2011?” and “How do you feel about these events?”

2) Anxiety about radiation exposure: “When you first heard about the nuclear accident, did you worry that radiation would spread to South Korea?” and “What are your recent thoughts about the spread of radiation?”

3) Perception of necessity and safety of nuclear power: “What do you think of nuclear power since the nuclear accident in Japan?”; “How do you think about the safety

of nuclear power?"; "Is nuclear power necessary for South Korea?" and "Have your perceptions changed since the nuclear disaster in Japan?"

4) Intention to purchase Japanese products: "Do you often purchase industrial products or fresh food produced in Japan?" and "If yes, did you change your shopping behavior concerning Japanese products since the nuclear accident?"

5) Perception of behavior of Japanese refugees and prediction of South Korean citizen disaster response: "Regarding the 2011 disaster, what do you think about the evacuation of Japanese people?" and "If an emergency occurred in South Korea, how do you think people would respond to it?"

6) Preparedness strategies applied and needed: "After the 2011 disaster, have you made any alternative preparations for a potential disaster?" and "If yes, please specify what you would do"; "What kinds of preparation for disaster do you think are necessary?" and "Please give specific examples."

(3) PROCEDURES

Participants were contacted through a network of personal acquaintances (one researcher recruited people she knew and from whom she could subsequently request further contacts). The interviews were conducted in March 2012. Participants were asked for consent to participate in the 1- to 2-hour interview. Then, they were interviewed in groups of five participants. One of our author was the interview leader. She was a native speaker of Korean and was trained in the interview process beforehand. At the time of

the interview, other researchers gave support and provided additional questions to clarify answers. Sessions took around 1.5 hours. Each participant received 20,000 won for volunteering her time. The study was approved by the local ethics committee of the Graduate School of Arts and Letters at Tohoku University. We obtained permission for recording the conversations and informed consent from each participant.

(4) ANALYSIS

The recorded interview files were transcribed. Then, the keywords that related to the question were extracted and similar keywords were grouped. The number of participants who responded for each keyword was counted and the statements were reported as examples of that category. Also, the participant's code is noted after each statement (e.g., P1, P2).

2-2 RESULTS

(1) IMPRESSIONS OF THE 2011 EAST JAPAN DISASTER

Initially, 19 participants had heard about the disaster from a secondary source, such as television or the Internet. One participant was in Japan at the time of the disaster. Their emotional responses toward the events included worry ($n = 7$): *“I heard about it from the news. At first, I was shocked. I was worried about all the people in the affected areas”* (P2). *“When I saw the news, I was worried about my friends and relatives who were in Japan. I thought that Japan was going to face a major turning point”* (P4). Five

people mentioned shock: *“I couldn’t believe it. It didn’t seem real. It looked like the world was coming to an end”* (P14). *“At first, I thought, it wasn’t unusual because Japan has a lot of earthquakes. But this was extraordinary. I didn’t believe that it had happened”* (P6). Three people expressed sadness: *“Since there was an earthquake in China, and now in Japan. I was very sad”* (P18). *“At first, I felt nothing, but when I read about the news [of the disaster], I cried. It was a sad story”* (P17). Another response was guilt: *“It was a frightening event. I cancelled my travel plans afterward because I felt guilty about the disaster victims”* (P10).

(2) ANXIETY ABOUT RADIATION EXPOSURE

Fifteen responses revealed the participants’ anxiety about the radiation plume that came from Fukushima, whereas other participants ($n = 5$) said they did not worry about it. Of those 15 who worried about the radiation plume, only two changed their attitude to a more positive one after one year had passed. The reasons for anxiety that were mentioned included the long half-life of the radioisotopes ($n = 2$): *“Because radiation is long lasting, I still believe it is dangerous”* (P7). Another reason is related to the proximity between Japan and South Korea: *“South Korea is close to Japan. So I am still afraid”* (P16). Or they stated their fear of the effects of radiation: *“I am so afraid of the radiation. It was very dangerous. So I am afraid of nuclear power, too”* (P14).

**(3) *PERCEPTION OF NECESSITY AND SAFETY OF NUCLEAR
POWER***

Thirteen responses expressed the belief that nuclear power plants were dangerous. The main reason mentioned was serious health effects: *“We need to investigate it [radiation effects on health] more thoroughly. In fact, I was afraid. Time passes and we don’t understand what will happen to our body”* (P1). Despite that, three participants felt anxiety but did not object to nuclear power. The reasons were because of governmental decisions: *“Here, people always solve the problem after it has already happened. I don’t know what to do. So I have no choice but to believe [our government]”* (P4); cost: *“I do not believe that it is safe in our country. But it may cost a huge amount of money to close all the plants. I think we have no choice but to continue it”* (P7) and the lack of alternative energy: *“I think because our country has no alternative energy we may have no choice”* (P9). One response expressed confidence in the safety of nuclear plants because South Korea has a low risk of earthquake: *“Since we can believe that South Korea is safe from earthquakes, I think there is no need to worry about a nuclear accident here”* (P12).

(4) *INTENTION TO PURCHASE JAPANESE PRODUCTS*

Eleven participants answered that they would continue to buy electronic goods and stationery; no one disagreed. However, for products that come in contact with the body, such as cosmetics, food and clothing, responses were divided. There were four

responses that indicated an intention to continue buying cosmetics, four responses to continue buying food and one response to continue buying clothing. In contrast, there were five responses indicating an intention to stop purchasing cosmetics, six responses regarding the intention to stop buying food and one response about the intention to stop buying clothing.

**(5) PERCEPTIONS OF THE BEHAVIOR OF JAPANESE REFUGEES
AND PREDICTIONS OF CITIZENS' RESPONSES TO THE DISASTER**

All participants mentioned that refugee activities in Japan were calm and systematic. However, 16 responses predicted that the South Korean people would not stay calm during a disastrous event. In support, they mentioned the lack of experience with large-scale earthquakes ($n = 5$): *“Because buildings in South Korea weren’t designed to endure earthquakes, it could be difficult to get out of a building easily”* (P20); *“I think earthquakes might not occur in the near future. Even so, we lack experience with earthquakes, so I think it could be difficult”* (P4); national characteristics, i.e., impatient and always in rush ($n = 4$): *“I think Korean people would not be systematic. They have no sense of queuing. Not only that, they don’t know evacuation routes so there is likely to be confusion”* (P1); *“The South Korean people are always rushing. So, I think it is impossible that people will stay calm”* (P5); and lack of education in disaster management ($n = 2$): *“We don’t know how to prepare for an earthquake. It might be because we have not experienced a strong earthquake for a long time. No one has taught us what to do. Thus, I think it would be difficult”* (P16). Other responses expressed suspicions and lack

of confidence in the government information on risk and the apparent lack of a person directing the emergency response (one response each).

(6) *PREPAREDNESS STRATEGIES APPLIED AND NEEDED*

Of the preparedness activities that people used after the 2011 events, there were five who confirmed the location of emergency kits in public places, four located emergency exits, two watched news reports and searched for more information about the disaster on the Internet and one each moved heavy luggage down to a lower position, increased attention to emergency preparedness, prepared nonperishable foods and always carried a passport. Furthermore, three participants mentioned the need for more effective earthquake prevention standards in construction. Only one participant said that she made no changes as a result of the events.

2-3 DISCUSSION

This study examined the impact of the 2011 East Japan earthquake and subsequent nuclear accident on a sample of women living in Seoul, South Korea, using a semi-structured interview. Our results showed that more than half the participants reported anxiety about the radiation plume and mistrust about the safety of nuclear power in their own country. The results matched surveys after the Chernobyl nuclear accident (Eiser, Spears & Webley, 1989; McDaniels, 1988; Midden & Verplanken, 1990; Peters, Albrecht, Hennen & Stegelman, 1990; Rankin, Melber, Overcast & Nealey, 1981; Renn,

1990; Sjöberg & Drottz, 1987; Sjöberg & Sjöberg, 1990; Tsunoda, 2011) and the study of the Fukushima accident's effects in European countries (Kessides, 2012; Visschers et al., 2013). People discussed how fearful they were of radiation but did not talk much about the possibility of the occurrence of a nuclear accident in their own country. Our study highlights the finding that reminding people of the danger of radiation creates more fear than mentioning the possibility of accidents at nuclear power plants. However, some people considered the accident to be unique and not likely to happen again (Midden & Verplanken, 1990).

Our study did not find a “rebound effect” in attitude (Rosa, & Dunlap, 1994) or “pseudo-opinions” (Lindell & Perry, 1990; Prati & Zani, 2013) about risk perception or attitudes about nuclear power. In spite of the fact that South Korea still found food imported from Japan to be contaminated with radiation (Kim, 2012, June 19), the rebound effect of attitude is reflected in the shopping behavior of women living in Seoul. The only products that were affected were those that were applied to the body or ingested. It is possible to explain that the Fukushima nuclear accident was considered as a series of disasters after the strong earthquake and tsunami rather than a single event. As a result, the vivid images of people suffering from the disasters were implanted in people's minds and created a stronger impression than did images from Chernobyl.

The altruism exhibited by Japanese people in refugee centers was compared with that of South Koreans in the present study. Participants had negative opinions about the orderly evacuation of people in their country. Japanese evacuation behavior was

praised by people from many countries (Takeda, 2011). However, according to the “panic myth” (Clarke, 2002; Perry & Lindell, 2003; McEntire, 2006) people naturally focus on hazards when there is an emergency situation due to the influence of the media. Also, many studies argued that disaster experience (Norris & Murrell, 1988), disaster education (Tanaka, 2005) and cultural factors (Palm, 1998) are key determinants in creating effective disaster preparedness strategies. Additionally, the Japan disaster improved the awareness of how to deal with emergency situations. This example should help educate others about how to respond in an emergency to garner the confidence of the people.

Several limitations should be considered regarding the present findings. We did not have information about pre-disaster attitudes of the participants. Furthermore, our results were obtained from a limited sample and area in South Korea. Therefore, the influence of gender (Palm & Carroll, 1998), age (Cohen & Poulshock, 1977; Bolin & Klenow, 1982-3) and other social factors could not be clarified. Even so, using interviews helped us gather open-ended responses, which cannot be statistically evaluated. Ideally, a larger sample containing a demographically representative mix of gender and age groups with participants from both rural and urban areas and high and low socioeconomic groups would be a valuable contribution to the literature, making it possible to make worthwhile generalizations about South Koreans’ affective, cognitive and behavioral responses to the 2011 Japanese disaster.

In conclusion, this study indicates that South Korean people’s attitudes and behaviors were affected by the 2011 Japan disaster, especially in the perception of the

radiation plume, the acceptance of nuclear power and shopping behavior. Importantly, one year after the event the purchase of goods made in Japan returned to normal despite continued fear of the radiation plume and the acceptance of nuclear power. One suggestion to lessen the negative impact from disasters is to replace images that can cause trauma with positive images. For instance, Japanese and other national governments should portray images of recovery in Japan together with efforts by the Japanese government to improve safety in Japan and the safety of Japanese exports

CHAPTER 7

GENERAL DISCUSSION

1. SUMMARY OF THE FINDINGS

Ten separate studies were conducted with five objectives to 1) explore and analyze post-disaster panic-cooperative behaviors among citizens in disaster-affected areas, 2) clarify post-disaster culture and determine how social norms changed after the 2011 Japan earthquake disaster, 3) explore public nuclear attitude after the 2011 disaster and the relationship between this and the reconstruction activities, 4) examine regional differences concerning attitudes and emotions toward reconstruction activities along with the effects of distance, level of damage, and historical disasters, and 5) study the perceptions of the 2011 disaster and Japanese behavior from the viewpoints of neighboring countries.

For the first objective, to explore and analyze post-disaster panic-cooperative behaviors among citizens in disaster-affected areas, Studies 1 and 2 indicated that during the post-disaster period, the situation in the Tohoku region following the 2011 East Japan earthquake was very calm and ordered. This result was concordant with the data reported from the police, in that the most severely damaged areas of the Tohoku region (i.e., Iwate,

Miyagi, and Fukushima prefecture) showed 30% fewer serious offenses and larceny offenses compared with the previous year. Slightly damaged areas in the Tohoku region (i.e., Aomori, Akita, and Yamagata prefectures) showed 27% fewer offenses compared to the previous year (Miyagi Prefecture Police, 2011). However, there was some evidence, such as photos of closed-down convenience stores, with doors apparently barricaded by trash bins, which could be used to imply that people were panicking due to the threat of crime in the disaster-affected area. Therefore, we can conclude that crimes were still found in disaster-affected areas but to a low degree, and concern about the risk of crime was still found among citizens. Furthermore, Studies 1 and 2 mentioned that mutual help and caring for others was an unusual experience. As mentioned in the disaster phase (Myers, Zunin & Zunin, 1990), after overcoming the initial shock of the disaster, survivors become energetic and aroused by an adrenalin boost which helps them to survive in hazardous situations. This effect can help people get through the difficult disaster aftermath. Furthermore, the norm of forming lines is also mentioned in those resources; even though the Japanese always form queues, this still seems to be impressive among the survivors in the aftermath of a disaster.

For the perception of which behaviors are justified as deviant in a disaster or not, the second purpose of this study was to clarify post-disaster culture and determine how social norms worked after the 2011 Japan earthquake disaster happened. Based on the emergent norm theory of collective behavior (Turner & Killian, 1972), people in crisis tend to shift from institutional norms to emergent norms that are consentaneously applied

by all members at the scene. Study 3 statistically proved that ‘Buying things up’ and ‘Sales on favoritism’ were more difficult to forgive in disaster situations and ‘Cutting the line’ was found to have no significant difference between situations. Study 4 showed that residents in affected areas found it more difficult to forgive deviant behaviors compared with residents in non-affected areas in both normal and disaster situations, specifically ‘illegal dumping’ and ‘vending machine theft’. Furthermore, ‘buying things up’ and ‘Denying cooperation in local activities’ were more difficult to forgive in disaster situations. ‘Cutting in line’ gained the highest score in unforgiveness, anger, and shame in both situations. From these results, we could imply that the slightly higher degree of resistance on the breaking of social norms in the disaster-affected areas compared to other areas is related to a trend of etiquette cultures among survivors, especially ‘queuing culture’ which is valued worldwide.

The third objective was to explore public attitude towards nuclear energy after the 2011 disaster and the relationship between this and reconstruction activities. The nuclear accident in Fukushima occurred approximately thirty years after the great accident in Chernobyl in 1986. We assumed that the structures of attitude would be changed due to the time and culture (East Asian and western). Study 5 created a new scale of attitudes toward nuclear power plants among Japanese college students, which consisted of three factors, namely nuclear power plant efficiency, trust in institutions, and fear of radioactive contamination which contained both cognition and emotional dimensions. Also, we found gender differences; men gave a higher assessment of nuclear

power plant efficiency and a lower assessment of fear of radioactive contamination when compared with women. A higher level of trust in institutions in Miyagi was also higher than in Tokyo. The results of gender are consistent with those of previous studies (e.g., Brody, 1984; Drottz-Sjöberg & Sjöberg, 1991; Keller et al., 2012; Newcomb, 1986). Finally, only when looking at fear of radioactive contamination could people's attitudes towards reconstruction policies in Japan after the 2011 disaster be predicted. Our results emphasized the emotional facet of attitudes towards nuclear power that rules feedback from citizens on the cooperation about the reconstruction activities but provided no evidence that the cognitive components of attitudes predict the acceptance of radioactive debris and support for products manufactured in disaster-affected prefectures. The findings on the cognitive component did not match with some of the previous studies (Tanaka, 2004; Visschers & Siegrist, 2013).

The fourth objective was to examine regional differences regarding the attitudes and emotions towards reconstruction activities. Three studies (Studies 6, 7, and 8) focused on a comparative emotional evaluation of events and the public related to post-disaster reconstruction. Study 6, which was conducted among college students in Miyagi, Tokyo, and Kobe as a representation of areas severely affected by disaster, areas slightly affected by disaster, and areas not affected by disaster. First, we found that attitudes towards reconstruction activities showed positive feedback in terms of economic help, emotional help, and help related to tackling the nuclear problem but not the help that harms others who provide help themselves. Next, emotions towards the supporters and

dissenters of reconstruction activities were classified into two groups for the dissenters (positive and negative), and three for the supporters (positive, negative, and empathetic). Sadness and compassion played different roles when evaluating supporters and dissenters of the activities. For regional difference, participants from Kobe had a slightly more positive stance towards the dissenters against reconstruction activities compared with respondents from Miyagi, which might be related to the distance from Kobe to the severely affected areas of the earthquake and tsunami. This point should be focused on further in the study.

To confirm some of the results found in Study 6, Studies 7 and 8 increased the number of participants and the size of the resident area while balancing their gender and age ranges. In Study 7, the results corresponded with those of Study 6, in that positive attitudes towards reconstruction activities are shown through economic and emotional help, and help related to tackling the nuclear problem, not the help that harms the ones who take actions. Moreover, we found regional differences which indicated that residents in disaster-affected areas had more positive attitudes regarding reconstruction activities than compared with residents in others area. Importantly, we could not omit the tendency that respondents from Hiroshima had to have slightly more positive attitudes about reconstruction activities than those in other areas not affected by disaster. We suggest the reason for this greater sympathy from residents in Hiroshima is due to the fact that this city that was once subject to catastrophic nuclear damage during World War II.

Study 8 focused on the structure of emotional evaluation towards people associated with reconstruction policies and its regional differences. The structure of emotions found in this study differed from that of Study 6. Sadness and compassion were extracted to the empathy for the supporters of the reconstruction, but this factor had low commonality. Therefore, we have omitted sadness and compassion in further analysis. Lastly, we had two factors: positive and negative emotions for both dissenters and supporters of the activities.

The overall evaluations were high positive emotion and low negative emotion which were rated for the supporters and low positive and high negative emotions were found for the dissenters. Similar to the results found by Study 6, among the dissenters, those who refused the acceptance of the pine trees gained the most negative emotions, and those who do not buy agriculture products in disaster areas gained the least negative emotions. The results in these three studies supported our assumption that emotional help seems to be very important for survivors. However, helpful actions that have a negative effect on the ones actually taking such action are not preferable choices. Importantly, the distance from the disaster-affected area and the area providing help directly affects attitudes towards cooperation probably because they feel less beneficial and more at risk to participate in reconstruction support activities. Also, we found tendencies that could imply that the level of damage and historical disasters affect the feeling of sympathy with the disaster survivors compared to those areas which did not suffer damage and experience community upset.

The fifth purpose, to complete the overall pictures of social norms and cooperativeness among Japanese, the studies of perceptions of the 2011 disaster from the viewpoints of neighboring countries were conducted in Studies 9 and 10. In Study 9, we found the influence of media in communicating risk and understanding about the disaster, most of our participants feared radiation levels in Japan and also in products imported from Japan while fewer of them were able to specify the location of the earthquake and subsequent nuclear accident that occurred on a map. Also, this accident made them feel unsafe of having nuclear power plants in their country. Study 10 showed similar results to Study 9 in terms of the feeling of insecurity of having nuclear power plants in their country. However, anxiety of visiting Japan and purchasing Japanese products seemed to gradually disappear. Because the interviews in Study 10 were conducted half year after study 9 which was done only 7 months after the disaster, the level of anxiety seems to fade away when as time passes. In addition, the results from two studies agree with our previous results, in that that attitudes towards people who have experienced disasters in Japan were very warm and hospitable; this might be reflected in the opposite way if this has happened in their countries.

From the result of these ten studies, we can conclude in this thesis that people in disaster-affected areas tend to stick with the social norms more so than people in other areas; this is as a result of the change of norms in the aftermath of a disaster. We also suggest that regional differences in attitudes regarding cooperation come not only from

distance but also from the level of damage caused by the current disaster and past disasters.

2. LIMITATIONS

We took all practical measures to control the possibility of contamination by other variables; however, our findings and conclusions are presented with the following limitations.

2-1 TIME CONSTRAINT

The time constraint problem is the most important remark in our studies. Attitudes can greatly change after a critical event, such as a natural disaster. However, attitudes are not permanent and they tend to swing back to the normal state as time passes after a disaster first happens.

Most of studies included as part of this thesis were conducted within one year after the great 2011 disaster, and we collected much of the data from residents in disaster-affected areas that could be assumed to be directly affected more or less by such disaster. Therefore, it becomes difficult to repeat these studies at different times or even with different types of disaster.

Also, we did not have data before the disaster occurred. Therefore, we were unable to clarify the base-level of certain social norms in Japan before the disaster and how much of the change came as a result of the disaster situation.

Despite the limitation of time, we consider this thesis as a valuable resource to record the overall picture of what people found and think about the 2011 disaster which can be used for the further study of disaster resiliency.

2-2 REPRESENTATIVENESS OF THE SAMPLES

In this thesis, many methods of collecting data were applied. For instance, collecting secondary data (Study 1), open-ended questionnaires (Study 2), questionnaire surveys (Studies 3, 5 and 6), internet surveys (Studies 4, 7, and 8), and semi-structured interviews (Study 9 and 10). The data was often collected in accordance with the availability of the resources. Therefore, some unmeasured characteristics among participants may have an effect on the results.

For the comparative study, the data from paper questionnaires was mostly collected from college students with a slightly higher number of female than male participants providing responses. Our internet studies balanced age, gender, and occupational background well but respondents must have a good internet accessibility (which may be difficult for those who were severely affected by the disaster) and these may be the respondents who have a potential personal conflict of interest in this matter.

Also, to consider the effects of region on attitudes, data was collected from only 100 respondents as a representation of people in the prefecture. The most we had was 360 responses per prefecture in Study 4. One hundred responses could not be used to firmly assume representativeness of citizens in a whole prefecture.

Next, there were also many ceiling and floor effects on the data concerning attitudes and emotions. We understand that in a disaster aftermath these facets tend to be more extreme so we should have amplified our rating scale or adapted our scale to be more concrete.

2-3 CULTURAL BARRIERS

The study of attitude and social norms is very cultural-sensitive and is easily misunderstood by those from different cultural backgrounds. Japanese culture has particular characteristics. Despite the fact that Japan is located in Asia, its culture is not as collectivistic as most of its Asian neighbors. Japanese are seen as collectivistic by Western standards and as the individualistic by Asian standards. They are more private and reserved compared to most other Asians (Hofstede, 1980). These character traits make it hard to apply our findings in other cultures which have different cultural backgrounds.

3. APPLICATION OF THE FINDINGS

Japan is highly prone to natural disasters and, as a result, the population is greatly concerned. The findings from our results could provide suggestions for disaster mitigation and building cooperation among communities.

From Studies 1 and 2, deviant behaviors found at disaster scenes reflect the need for a polished preparation strategy; for example, there is a need to prepare for

emergency supplies of drinking water, food, and electricity, and the communication of necessary information to the survivors during disaster aftermaths. Studies 3 and 4 (and also Studies 6-8) showed the difference of expectations regarding cooperation in reconstruction activities that seems to be higher among the survivors than people living in areas further away.

The communication of health risks showed a lack of adequate understanding regarding radioactive contamination, especially among residents in distant areas. Fear of health risks from radiation was shown to be a strong predictor of attitudes towards cooperation in the post-disaster period. The distance from the disaster scene, level of damage caused by the disaster, and disaster history all affected attitudes concerning cooperation in disaster reconstruction. Even though it is difficult to change someone's attitude about health risks connected with radionuclide problems in the disaster-affected areas, it would be better if we have more opportunities to hold a constructive conversation between disaster survivors and people in faraway areas about the need for cooperation and the safety of food produced in the Tohoku region. Clear communication of risk and risk protection would reduce the gap created by extraordinary fear from harmful rumors.

Finally, this thesis is a record of events that happened after the 2011 East Japan earthquake. We presented data from photos, blogs, diaries, questionnaires and interviews using a bird's eye view. The data was collected from one-and-a-half months after the disaster (at the earliest), most of the data was recorded within one year, and the latest data was taken within three years after the disaster occurred. We have presented our results

based on a theoretical focus of attitudes and social norms during the post-disaster period from both sociological and psychological viewpoints.

For understanding the social phenomenon, we hope that our results will provide a better understanding of the strict social norms in Japan during a disaster's aftermath, and give a clearer picture of problems regarding social conflict related to cooperation in post-disaster time periods. In the academic facet, we also hope that this thesis will benefit the study of Japanese and Asian cultures, sociology studies in the forming of the emergent social norms in Japanese culture, and psychological studies on the influence of groups, and attitudes towards nuclear power plants, and conflicts within Japanese society.

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