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Abstract

In this article we discuss the practical significance of sociology for Crossroad as the disaster prevention tool and the academic significance of Crossroad in sociology, from three perspectives. The first one is comparative analysis of Crossroad questions. We introduce five classification axes, and discuss the importance of especially two axes, dilemma type and theoretical framework, to extract sociological meaning from Crossroad questions as the disaster case data. The second one is comparative analysis by setting theoretical reference point questions. In this case we introduce two reference point questions: one is based on N person prisoner’s dilemma, and the other is based on social capital theory in regard with solving dilemmas. We illustrate comparative analysis of two questions of Crossroad Kumamoto with these reference point questions and show how to extract sociological implications from them. The third one is comparative analysis of reactions of Crossroad players. By taking a question on distribution of insufficient supplies in a shelter, we consider theoretical meaning of the response difference when an additional condition of counting the number of evacuees in advance is introduced.

Key word: Crossroad, Kumamoto earthquake, social dilemma, social capital

1. Academic Integration of Crossroad

Crossroad is a tool of card game style for education for disaster prevention, which was initially developed based on interviews during the Great Hanshin-Awaji Earthquake (Yamori et al. 2005).

In case of the Kumamoto Earthquake in 2016, with colleagues in the Graduate School of Integrated Sciences for Global Society (ISGS), the author has conducted interdisciplinary fieldwork research in Kumamoto city and Mashiki town, and then cultivated collaboration with the Kumamoto Crossroad Society (representative: Shinsuke Tokunaga) to carry out support work centering on Crossroad. In addition, ISGS has been developing interdisciplinary graduate education materials for collaborative problem-solving that incorporate Crossroad into the Problem Based Learning (PBL) (Misumi 2018).

When incorporating Crossroad into teaching materials, it is necessary to systematically categorize Crossroad questions from a certain academic perspective. In addition, there is academic significance to make comparative analysis of Crossroad questions and responses by treating them as the disaster experience data. In this article, we examine the effectiveness of sociological theories, especially those theories of social dilemmas and social capital as a framework for comparative Crossroad analysis.

Table 1 Examples of Comparative Analysis of Crossroad Question

Crossroad Question	Time / Occasion / Agent	Dilemma Type	Theoretical Framework
Crossroad Kumamoto #13 // You are a "shelter operator" // Right after the disaster, you are in a shelter that used to be an elementary school gym. Disaster victims have arranged their bedding, and are sleeping in huddle. Meanwhile, several survivors have requested a partition to be installed to ensure privacy. // Will you install partitions?	During a disaster / Shelter environment / Shelter manager	Public(publicity) vs. private(privacy)	Public goods issue
Crossroad Kumamoto #16 // You are a "college student" // Large aftershocks continue. A friend contacted you via SNS requesting the spread. The content is that sex crimes and kidnapping are rampant on the street. However, shortly after the earthquake, there is no way to confirm the truth of the information. // Will you spread information?	During a disaster / News / Citizens (young)	Helping behavior that brings obstacles (possibility of damaging others)	Collective behavior (panic)

2. Comparative Analysis of Crossroad Questions

Crossroad emphasis on the actual experience of the situation, so there are many questions where the dilemma is not uniquely identified. In the first place, questions are created without a correct answer as to whether YES or NO. This is because, as a disaster prevention tool, it focuses on the process of "constructing solution" by exchanging opinions after the game. But on the other hand, if we play Crossroad from a perspective of earthquake legacy, ambiguity of the aim of each question obscures what should be inherited as a legacy. Also, success of the process of "constructing solution" depends largely on the competence of a facilitator.

Therefore, in this article, we introduce some comparison axes and items to categorize Crossroad questions, and systematically organize them by focusing on the type of dilemma and situational conditions that each Crossroad question points to. In this way, our analysis provides a guide to question selection when playing Crossroad. In addition, it digs up implications of a question as the case data not merely a game. Then it helps us to consider what conditions on the site are related with the dilemma and what policy will be effective to solve it from the sociological viewpoint.

The followings are axes and items for comparative Crossroad analysis set by the author based on "Crossroad Kumamoto" (created by Kumamoto Crossroad Society in 2018) with generalization to some degree. Table 1 picks up two questions to illustrate the analysis.

■ Time: During a disaster / After a disaster / Restoration / Normal

■ Occasion: Evacuation / Shelter / Night in car / Goods distribution / News / Work and school / Residence / Volunteer / Free riding behavior / Medical care / Waste / Disaster proof / Disaster prevention / Local community and cultural property

■ Agent: Citizen / Evacuee / Child (mother) / Teacher / Local government staff / Medical worker / Professional / Shelter manager / Volunteer / Foreigner

■ Dilemma Type: Behaviors that bring obstacles / Elimination of management targets (fairness vs. priority) / Public vs. private / Public vs. public / Rule compliance vs. safety first / Evacuation (status check) vs. standby / Self-help vs. reliance / Migrate vs. stay / Farmland abandonment vs. continue to farming / Remember vs. oblivion

■ Theoretical Framework: Incomplete information game / Public goods issue / Prisoner's dilemma / Collective behavior / Value conflict

3. Comparative Analysis by Theoretical Reference Point Question

Apart from the method of comparative analysis of Crossroad questions with each other as described above, we can also consider the method of setting a theoretical reference point question and examining the implications of the Crossroad question by comparing with it. The reference point question is not limited to the actual earthquake disaster experience, but is based on the theoretical dilemma problems. By considering its appearance in actual settings, we transform the problem into a Crossroad format that asks whether YES or NO. As a result, since it is systematically related to academic knowledge, with its well correspondence to texts and lectures, it is easy to use as teaching materials.

Strictly it is no longer "Crossroad" because it departs from the actual experience. However, by comparing the Crossroad questions with it, we can do theoretically examination on solution and prevention measures of the dilemma indicated in the Crossroad question from sociological viewpoint, and then explore the problems and conditions that are overlooked there.

3.1. Example of Theoretical Reference Point Question (1)

The following example is a reference point question on the subject of "cooperation." When focusing on the residents' association, this question related to the problem of N person prisoner's dilemma (union game), which serves as a reference point for a problem in which a set of people creates something new together based on the homogeneity of the members. In addition, if we see the residential convenience brought by residents' autonomy as public goods (or commons), it is related to the free rider issue. In this case it serves as a reference point for a problem of free rider when there exists a certain number of cooperators because of the heterogeneity of members' standpoints. Of course, it can also be linked to other theoretical contexts in sociology and politics, such as urbanism and resident autonomy.

Theoretical Reference Point Question (1)

// You are a citizen.

// You bought a detached house and have moved to a new land for living. The resident's association immediately invites you to join. You think that it is important to get close to the neighborhood, but there are things you want to do in your new life, and it is troublesome to be involved in various roles of the resident's association.

// Will you join the resident's association?

In light of the above theoretical reference point question, let us discuss the theoretical implications of a Crossroad question in the following column, the No.4 question of Crossroad Kumamoto. At first, we notice that comfortable and sanitary environment in an evacuation can be seen as the public goods. However, it is not a simple free rider problem because multiple dilemmas exist there. First, the women might have an expectation of the evacuees' non-cooperation with the relocation. The situation is like N person prisoner's dilemma in s sense, then the above-mentioned expectation shall reduce the incentive for her making proposals. Moreover, her expectation includes that her proposal

may trigger strong opposition by local people as the dark side of bonding social capital they have cultivated. It increases the cost of the proposal, too.

Thus, there is a theoretical "correct answer" that relies on rational choice: "do not propose" (non-cooperation), that is, freeride on existing shelter operations. If everyone thinks this way, the potential human resources in the shelter will end up in wasting. But in actual Crossroad games (even on the spot at shelters), there are always some people who decide to "make the proposal." It is meaningful to feed back the reasons to academic discussions and examine the perspectives that theory of social dilemmas might have overlooked.

Crossroad Kumamoto #4

// You are a "female former medical worker"

// An earthquake over magnitude 6 occurred and you evacuated to an shelter. There, the local people unite and operate to guide evacuees. Since areas have been divided by region, there is no space for people to pass through, and there are health concerns.

// Will you propose to change layout?

Let us look at another question of Crossroad Kumamoto, the No.25 question in the following column. If we look at this situation from the citizen's side, their cooperation with trash separation shall reduce disposal cost (and financial pressure and low administrative services as a result of it), then there we find N person prisoner's dilemma behind the question. On this context, the government's refusal to "accept" non-disaster trash should work as a penalty for non-cooperating on separation. In other words, the choice of this question is whether to take measures against the prisoner's dilemma or not. We need to consider problems related to each choice of YES or NO from this viewpoint. For example, as a countermeasure for prisoner's dilemmas, some theories suggest the effectiveness of trust. However, penalty enforcement may undermine the foundation of trust in the community. Moreover, in order that the local government strictly enforces the penalty, strict check for garbage is not avoidable, then we need pay attention to the secondary dilemma over the cost burden, and so on.

Crossroad Kumamoto #25

// You are a "disaster trash disposal manager"

// The day just after the major earthquake, the government designated 20 items as disaster trash and started accepting segregated items. However, some residents bring non-disaster trash. Cars are coming one after another.

// Will you accept non-disaster trash?

Thus, by comparing and analyzing as many crossroad problems as possible in the light of the same reference point questions, the theoretical commonalities and differences between the Crossroad questions can be sorted out.

3.2. Example of Theoretical Reference Point Question (2)

Another example of the theoretical reference point question is shown below. This is a Crossroad question based on the author's similar real experience (the rescued side). At the same time however, it is designed to view the "cooperation" issue as a reference point by reconsidering rational choice framework that discussions of social dilemmas ordinarily stand on. While it is possible to look at this situation in the framework of rational decision-making with risk, the focus here is on generalized reciprocity, a key element of social capital. This involves social exchange theory, folklore and social anthropology of gifts, experimental psychology of indirect exchange, and political

theory of democracy on “the doctrine of self-interest properly understood” (Putnam, 2000). It is a reference point in the theoretical context that is very different from social dilemmas research. In general, it is a context directly related to the explanation of altruistic behaviors (emergence of a disaster community) during a disaster (Solnit, 2009). In this way, by preparing multiple theoretical reference point questions that are positioned in different theoretical contexts with connections to each other, a comparative analysis of a Crossroad question with a wider range can be performed.

Theoretical Reference Point Question (2)

// You are a citizen.

// During a heavy rain, while driving on the highway with a 4WD car, you saw a person whose car is stuck on the shoulder of a flooded road. The surrounding fields are like ponds, and you can see the rising river. There is an interchange just a few kilometers away.

// Will you get off the highway at the interchange and go to help?

Returning to the “female former medical worker” question (Crossroad Kumamoto #4) as an example of analysis, the generalized reciprocity is positioned as a normative structure that promotes “proposal” (cooperation) over irrationalities. Regarding the disaster waste disposal problem in Crossroad Kumamoto #25, generalized reciprocity as well as trust can be seen as the mechanism that encourages citizens to cooperate with separation. However, in the case of separation cooperation at a disaster waste disposal site, since the benefit of such cooperation is less visible for others, it is difficult that a chain of cooperation that helps themselves becomes salient. In that sense, the effectiveness of generalized reciprocity as a mechanism to promote irrational cooperation differs between these two Crossroad cases.

4. Comparative Analysis of Crossroad Reactions

Crossroaders have accumulated amount of experiences about difference of people’s reactions for a slight difference of situational conditions between similar Crossroad questions. A theoretical explanation for this difference in people’s reaction in Crossroad games is also an interesting research topic.

Let us take an example of conflict over the additional supply of relief goods. For Crossroad questions on a shortage of supplies in an evacuation shelter, many participants on the viewpoint of shelter operator make decision to distribute even if there is not enough supplies. But if the question includes an additional condition that the operator has counted the number of evacuees in advance and requested the necessary number of supplies to the supply center, the negative response will increase.

From the perspective of social dilemma, the key is that relief supplies that are normally consumed as private goods (food, clothes, medicines, cold protection, etc.) are provided as public goods during emergency period. When you do not know the number of evacuees in advance, it is easy for you to accept the public goods principle that they shall be distributed equally to every evacuee. On the other hand, grasping the number of evacuees beforehand, in contradiction with its initial purpose of ensuring fair distribution to all evacuees, in effect means to permit ownership (in other words, priority to consume) to the limited evacuees. This conflict tends to be salient in urban shelters where the rescue targets are in flux. This is because many participants in a Crossroad game hesitate to response to additional demand for which the ownership in this meaning has not been previously recognized.

The problem of how to grasp the number of people is often pointed out, too. In the first place, it is impossible to ascertain the number of evacuees in flux, such as night in a car evacuees, which account for a large portion of the additional demand. Therefore, it is better to follow the principle of distribution as public goods. Or on the other hand, if the number is counted beforehand, it is necessary to ensure thorough use of a ticket system such as a numbered

coupon. Namely, we need to clearly indicate the ownership or the priority in distribution. The public vs. private perspective provides a consistent framework for these arguments.

5. Conclusion

This paper has discussed the practical significance of sociology for Crossroad as the disaster prevention tool and the academic significance of Crossroad in sociology, from three perspectives. The discussion stands on a unique methodological viewpoint that we regard the Crossroad question as the case data of disaster experiences, and regard the reactions of Crossroad players as the data of simulated disaster experiences, thus treat them meaningful enough to conduct theoretical comparative analysis. These valuable data have been accumulating abundantly in Crossroad meetings and workshops for creating new questions that are actively developing nationwide (and worldwide recently). The comparative method presented in this article is useful for examining the earthquake disaster legacy from an academic perspective, and also for training sociological theory through analysis of those data.

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