

Disaster Risk Sense in Japan and Gaming Approach to Risk Communication

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The aim of the present paper was to identify and describe the three different modes of risk sense that occurred before Japanese society digested and finally accepted the unfamiliar and imported concept of “risk” (or its Japanese translation “risuku”) in the context of natural disaster reduction. These modes were: mode zero, in which the concept of risk was almost absent before the mid-1990s; the first mode, which occurred after the 1990s when the concept of risk became rapidly and widely accepted by linking it with the preexisting concept of “danger,” or “kiken” in Japanese; the second mode, in which, some people highlighted active and participatory risk management processes based on the significant distinction between risk and danger proposed by Luhmann (1991a). Today, another mode of risk sense is needed, to move beyond the limitations of the first and second modes, and to deal with the recurrence of natural disasters we are bound to face in Japan. To deal with such disasters, a novel and promising gaming approach is proposed that entails a new, third mode conceptualization of risk.

Keywords: disaster management, risk communication, gaming

Overview of Risk Sense in Japan

Recent Risk Trend in Japan

The term “risk,” or “risuku” in Japanese, has rapidly gained popularity in Japan in the last decade. Nowadays, more people—

sometimes even school children—refer to the word risk in everyday conversations on topics about anything hazardous including financial investment, medical treatment, children's safety, and natural disasters. Indeed, many bestselling books include the term risk in the title in phrases such as "risk assessment", "business risk," or "risk management." The Japanese Diet Library Book Database (Japanese Diet Library 2006) indicates only 58 books with the word risk in the title were published in Japan before 1979. This was 0.011% of the total number of books registered in the database during this period. However, this number and the percentage (in parentheses) increased drastically to 63 books (0.049%) between 1980 and 1984; 123 books (0.096%) between 1985 and 1989; 183 books (0.121%) between 1990 and 1994; 439 books (0.246%) between 1995 and 1999, and 1147 books (0.569%) between 2000 and 2004.

As the book publication data suggest, the word "risk" was not common until recently. Before the 1990s, the word was largely restricted to technical use by experts in limited areas such as finance, insurance, and marketing. Maekawa (2002) noted that the concept of risk was first introduced in Japan in the early 1960s with the idea of "risk management." However, most organizations in Japan did not acknowledge risk management until the mid-1990s when the Japanese Central Government deregulated some types of insurance policies to make people more sensitive to business risks. Maekawa (2002) also suggested that an unprecedented and disturbing crime in the mid-1980s played an important role in urging more Japanese companies to introduce a complete risk management system against man-made and natural disasters. This crime was the abduction of a well known food manufacturing company's CEO and a threat to contaminate the company's food products with potassium cyanide,

The rapid spread of the term risk in Japanese society after the mid-1990s is shown in Figures 1 and 2. These figures were prepared based on the work of Kamisato (2002) to illustrate longitudinal changes in media usage of the word risk. Figure 1 shows the number of times the word risk appeared in Asahi-Shimbun Newspaper articles (the most common daily in Japan) each year from 1984 to 2006. Figure 2 shows the ratio of the occurrences of risk relative to those of danger ("kiken", in Japanese) in the same newspaper during the same time period.

Figure 1. The number of occurrences of “risk” (“risuku”) in articles from The Asahi-Shimbun Newspaper from 1984-2005.

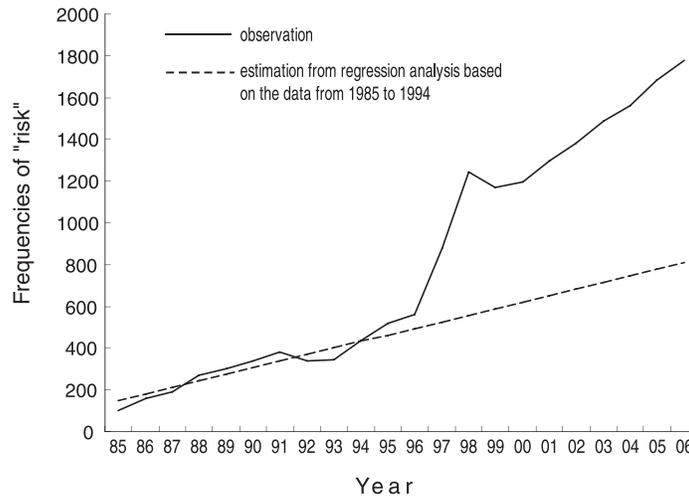
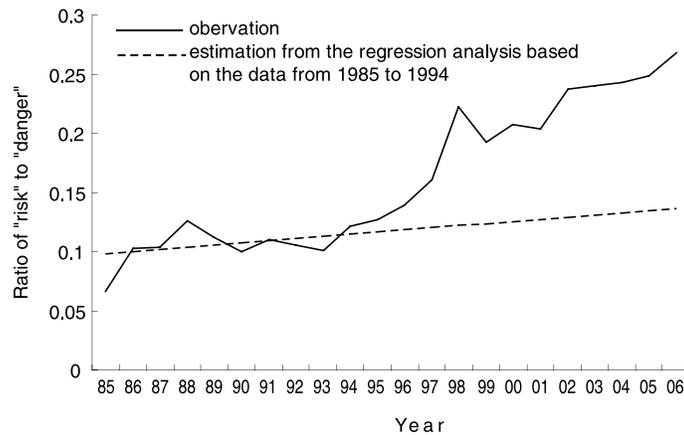


Figure 2. The ratio of the occurrence of “risk” relative to the occurrence of “danger” (“kiken”) in The Asahi-Shimbun Newspaper from 1984-2005.



Two important observations are gained from these data. First, based on the steep surge in the use of the word risk, it would appear that the term rapidly gained popularity in contemporary Japanese society since the mid-1990s. The discontinuity of this trend around the mid-

1990s is clearly shown by the dotted line in Figure 1 which shows the estimated number of appearances of the term for each year after 1995 based on a regression analysis of the data before 1994. Indeed, the data comprising the ten year period from 1985 to 1994 fits very well with linear regression ($r = .93$; $p < 0.001$). However, this trend showing a linear increase breaks down completely at the mid-1990s, when media coverage that included the term increased drastically.

Second, since the mid-1990s, the Japanese news media have begun to use the term risk more often than the term danger when referring to hazardous objects and events, including natural disasters. Before the mid-1990s the ratio of the occurrence of “risk” relative to the occurrence of “danger” was approximately 0.10, and showed a slight almost linear increase ($r = .49$; $p < .15$). After the mid-1990s, the ratio suddenly doubled to around 0.25, and deviated from estimated linear trend indicated by the dotted line. A similar trend can be detected in the Asahi-Shimbun Newspaper Headline Database (Asahi Shimbun sha 2007). The ratio of “risk” relative to “danger” was 0.0012 between 1945 and 1954; 0.0031 between 1955 and 1964; 0.0068 between 1965 and 1974; 0.0517 between 1975 and 1984; 0.0882 between 1985 and 1994; 0.1362 between 1995 and 2004, respectively. This noteworthy shift corresponds to the distinction between risk and danger proposed by Luhmann (1991a). Specifically, risks are potential losses that are viewed as the consequences of decisions, while dangers are losses attributable to the environment.

Well-known empirical media studies (Woodward 1934; Krippendorff 1980) have demonstrated an approximate correlation between news media coverage and reader attitudes. However, a recent study specifically addressing hazards and disasters has claimed that media coverage affects readers in the same way as other issues (Lombardi 1997). That is, according to McCombs (2005), the media affect people’s agendas (what issues they think about), but not their attitudes (how they feel about those issues). Lombardi (1997) also reported a correlation, albeit slight, between communication emphasis and the social prominence of a subject. In our field, this is seen as valid for general matters and for secondary news.

On the basis of these findings, it is likely that the phenomena outlined above are not limited to the media, but are representative of

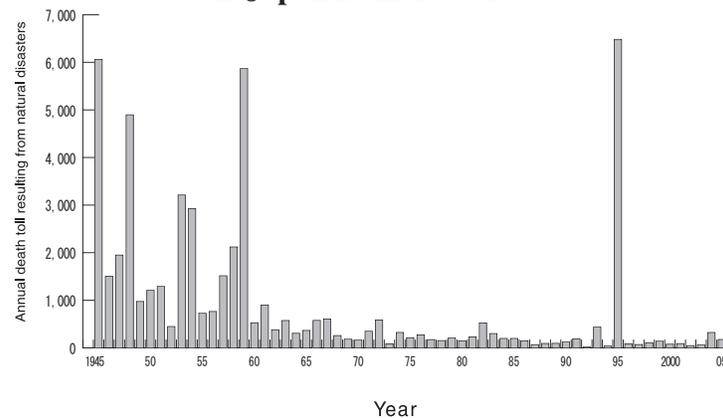
a widespread trend observable in the general public. Although it is somewhat premature to estimate readers' concrete attitudes toward specific risks based on media coverage data, it would be safe to conclude that, after the mid-1990s, Japanese people began facing and even using the term "risk" more often than the term "danger". In other words, Japanese people began considering hazards within the framework, or the agenda, of risk rather than danger.

What changes have occurred in Japanese society since the mid-1990s? And, what is the meaning of this change?

The Great Hanshin (Kobe) Earthquake of 1995

It is obvious from Figure 3 that the Great Hanshin (Kobe) earthquake (GHQ) played a key role in the evolving use of the term "risk". On January 17, 1995, one year after the Northridge earthquake in California, an earthquake measuring 7.2 on the Richter scale struck Kobe City, which is located in the Hanshin region of Japan. The GHQ was one of the most devastating natural disasters in Japan, killing over 6400 people, as well as injuring more than 40,000 and leaving over 300,000 people homeless. Due to its scale, the GHQ had an enormous impact on the work of disaster experts as well as on the general public nationwide. This was partly because the GHQ was the first natural disaster in Japanese history to hit a highly urbanized area (Kobe City) since the Tokyo earthquake of 1923, and

Figure 3. The annual death toll resulting from natural disasters in Japan from 1945-2005.



partly because the death toll from a natural disaster exceeded 5000 for the first time in over 35 years.

After the end of World War II in 1945, disaster management in Japan was placed mainly under the control of central and local governments. This was because the central government made a political decision to promote disaster prevention works as one of the major nationwide issues of the time. This administrative policy has produced significant concrete achievements. Over time, damage resulting from disasters decreased dramatically due to a number of system-, methodology-, facility-, material- and equipment-related improvements in government-centered disaster management. For example, as shown in Figure 3, approximately 40,000 people lost their lives in natural disasters in Japan during the 15-year period from 1945-1959. In contrast, during the 35-year period from 1960-1994, only 5200 were killed by natural disasters until the GHQ killed more than 6400 people at one time in 1995. It cannot be emphasized enough that the governmental efforts in disaster-damage reduction after World War II were extremely successful.

However, the system had one hidden drawback. Ironically, the successful reduction of disaster casualties resulted in ordinary people becoming less alert, less-prepared, and more optimistic about natural hazards. People depended heavily, sometimes too heavily, on the public sector for their safety in the face of natural disasters. Indeed, Britton (2006) noted—in reference to Palm's (1998) report—that the Japanese are more inclined than US citizens to let the government take control of disaster-related issues even if this results in higher taxes. Similarly, Palm (1998) also reported that the Japanese have a shared general belief that individuals cannot do much to prevent an earthquake from harming them, but that cities and communities can take action to lessen the effects of earthquakes.

A number of factors contributed to this preference for governmental involvement over individual efforts in disaster preparedness. First, as noted above, the marked reduction in deaths prior to the GHQ (Figure 3) resulted in people putting their trust in national and local governmental endeavors to reduce damage caused by disasters. It is possible that this degree of trust may have resulted in lower levels of household and business preparedness.

Second, as characterized by Britton (2006, Table 20.2) with terms such as “reactive”, “hazard specific”, and “technical”, disaster management in Japan after the World War II focused mainly on hardware counter measures such as seawalls, flood control dams and riverbanks, and seismically resistant buildings. These measures, which required huge budgets, professional knowledge, and technology, thereby moved disaster management into the exclusive domain of governmental agencies and experts. As a result, local citizens were alienated from disaster management and had no choice but to leave disaster control to the public sector.

In 1995, the GHQ changed things drastically. As seen in Figure 3, the death toll of this single disaster exceeded the total number of dead in all the natural disasters during the quarter century prior to the earthquake. An elevated expressway, which experts assured the public was absolutely safe, collapsed easily. Emergency rescue organizations to which people attached great trust, such as fire stations and emergency hospitals, fell into disorder due to unexpected malfunctions in their facilities, personnel shortages, and various other reasons. Emergency food and water supplies from outside the disaster stricken area which, according to local government officers should have arrived rapidly, were actually slow to arrive due to poor communication and unexpectedly severe traffic congestion. In addition to inefficiencies and the malfunction of individual organizations and agencies, a lack of interagency planning and coordination prevented a quick and effective response (Bosner 2002).

Although the official response was disappointing, local residents were committed to helping each other within the community. For example, more than 70% of those who were rescued from the debris of collapsed houses were saved by family members or neighbors rather than professional rescue workers (Kawata 1997). Local people also helped each other to survive in emergency shelters without electricity, gas, or sufficient food and water. According to Yatsuzuka (1999), more than 1.5 million people living outside Kobe voluntarily rushed to emergency shelters and temporary housing to help disaster victims. As a result of the breakdown in the official response, serious doubts were raised about top-down, expert-driven crisis management system, and people realized how important grass-roots as-

sistance could be during a disaster. From this point on, much more attention was paid to a bottom-up, citizen-driven disaster reduction efforts within local communities.

The involvement of a large number of volunteers in activities aimed at coping with disasters is not exceptional, and is commonly observed in many areas of disaster response. Indeed recent reviews such as Tierney, Lindell, and Perry (2001) and the Committee on Disaster Research in the Social Sciences (2006) have already summarized the important role of such voluntarism in activities related to disaster response. However, in the context of Japanese society, the sudden rise of voluntarism following the GHQ cannot be over-emphasized. As Yatsuzuka (1999) noted, the year of 1995 is often referred to as “The Year of Voluntarism Renaissance” in Japan. Indeed, it was not until the GHQ that a great number of people became engaged in disaster-related voluntary works. And, just after the GHQ, some newly established disaster relief-related NGOs (Non-Governmental Organizations) organized a nationwide network for mutual assistance in the event of disaster (Atsumi 1997; Atsumi and Suzuki 2003).

The Change of Risk Sense in Japan after the GHQ

To summarize, for the first time in Japanese history, the GHQ resulted in a vivid sense of “risk” for natural disasters, replacing the sense of “danger” among Japanese citizens. When we contrast risk with danger, we follow Luhmann’s (1991a) conceptualization of risk. That is, as noted earlier, dangers are losses that are not perceived as resulting from choice, but rather from acts of God or nature. Slovic and Weber’s (2002) discussion of the concept of risk considers similar issues. After categorizing multiple meanings of risk into four different types of definitions, they proposed that risk does not exist “out there,” independent of our minds and cultures, waiting to be measured. Instead, risk is seen as a concept that human beings have invented to help them understand and cope with the dangers and uncertainties of life.

Following such conceptualization of risks and risk management as those proposed by Luhmann (1991a), Tierney, et al. (2001), and Slovic

and Weber (2002), we can conclude that, after the GHQ, Japanese people came increasingly to conceive natural disasters as neither unknown and uncontrollable dangers nor as a hazard to be managed exclusively by government workers and disaster experts. Instead, people regarded natural disasters as a risk that they should be informed about and a situation they could deal with themselves. This way of thinking resulted in a strong trend toward risk-centered disaster management. It is important to note that this trend has been accelerated along with the generation of two different modes of risk sense.

The First Mode of Risk Sense

As a result of the shift in the way of thinking about hazards after the GHQ, a great deal of risk information was publicized in response to strong demands that everything risky, whether natural or man-made, should be public information. One line of evidence of this shift was the steep surge of media coverage of the term “risk” described in Figures 1 and 2. The book publication statistics reported at the beginning of the paper provide additional data to illustrate the rapid spread of “risk” related information. Similarly, annually published dictionaries, such as *The Dictionary of Contemporary Keywords in Japan*, or *Gendai Yougo no Kiso Chishiki* in Japanese (Jiyukokumin-sha 1991-2005), show a similar trend. Because many dictionaries follow an editorial policy to include buzzwords and phrases that are currently notable, we can estimate how widely a particular word is used. Table 1 shows that an increasing number of keywords and phrases that included the term “risk” appeared in *The Dictionary of Contemporary Keywords in Japan* over time.

Another line of evidence comes from the publication of nationwide active fault maps (e.g., Nakata and Imaizumi 2005) and guide maps to help people return home in an earthquake (e.g., Shobun-sha 2005). Both of these natural disaster related books have shown unexpectedly strong sales, about 39,000 and 800,000 copies, respectively. The former (costing about 16 \$US apiece) provides locations and estimated activity levels for each one of the active faults across Japan. The latter (about 7 \$US apiece) illustrates how commuting workers can return home safely and quickly without being involved in risky incidents when public transportation breaks down due to earthquake

Table 1. The number of words and phrases in The Dictionary of Contemporary Keywords in Japan that included the term “risk”

Year	Frequencies
1991	3
1992	4
1993	9
1994	9
1995	12
1996	13
1997	9
1998	11
1999	10
2000	19
2001	17
2002	17
2003	19
2004	22
2005	27

damage. A flood of this type of risk information served to further drive the risk trend. As well, it is noteworthy that the Japanese Industrial Standards Committee issued a *Guideline for the Development and Implementation of Risk Management*, the JIS Q 2001 (Japanese Standards Association 2001). This guideline has provided a fundamental and practical basis for the growing interest in risk and its management both in public agencies and in private companies.

Moreover, unlike the period prior to the mid-1990s, Japanese people can now readily estimate how vulnerable their private houses are to natural hazards, as many kinds of local hazard maps are available. People can also access a variety of web sites for even more details, ranging from general information such as nationwide data on current and predicted rainfall, to local risk information such as water levels of neighboring rivers (for example, see the websites for the

Japanese Metrological Agency, www.jma.go.jp/jma/indexe.html, and Fire and Disaster Management Agency, www.e-college.fdma.go.jp/foreigners/foreigners.html). Even personally customized risk information is available for private houses, including soil stability during earthquakes and vulnerability to floods (for example, see the website of Rescue Now, www.rescuenow.net, one of the most active disaster relief NGOs in Japan). Using these sites, people can readily monitor what is going on around them and easily share disaster experts' hazard predictions.

However, it should be noted that in Luhmann's (1991a) terminology, when processing risk information, risk is still treated almost the same way as danger. Because the outcomes of the experts' risk assessments are simply reported in such information, the hazards are regarded as existing "out there" (Slovic and Weber 2002), independently of those who receive the data. In other words, when ordinary people talk about the information, they are not in an active position to produce and to change the information; they simply receive the data passively as given and unchangeable facts. Thus, people still rely on risk information generated by experts even after learning from the GHQ that expert risk assessment was not completely reliable. This treatment of risk information, in terms of identifying risk as danger, is referred to as the first mode of risk sense.

The Second Mode of Risk Sense

The second mode of risk sense emerged along with the first one. What we learned from the GHQ was not only that ordinary people were not fully informed of disaster risks by disaster specialists at that time. Most important, however, was the simple but important fact that we could not rely entirely on risk information based on disaster experts' scientific inquiries into natural hazards. In other words, deeper commitment by citizens to risk assessment, evaluation, and management is desperately needed. In this regard, public release of risk information is not sufficient, although it is still highly necessary as a part of the whole risk management process. In this way, along with the first risk sense, we have developed the second risk sense that focuses on active risk management instead of passive risk learning or acceptance. In this type of risk understanding,

collaborative risk assessment and joint risk management requiring participation by many stakeholders (including specialists and local citizens) was emphasized rather than a one-way risk information transfer from experts to the public.

We can now observe a larger number of such participative risk management practices that embody the second risk sense (Atsumi and Suzuki 2003). For example, a disaster management exercise called DIG (Disaster Imagination Game) is well known in Japan. Participants in DIG sessions could be local citizens, local government staff, disaster relief NGO members, or disaster experts. A DIG session might be organized on the premise, for example, that a huge earthquake might hit a region where the participants live. Participants are first encouraged to spot apparent risks in their community and to imagine potential consequences, and then to co-produce a “DIG map” with the other members in the session. Next, they discuss such issues as the kind of responses that would be feasible in an emergency, how different social sectors could cooperate with each other to deal with disasters, and what preventative measures could be taken in the region. Participative risk assessment procedures like DIG mapping are widely used in the US. For example, Lindell, Prater, and Perry (2006, Chapter 6) reviewed the tools, procedures, and maps available on internet websites that local emergency managers can use when they conduct local hazard/vulnerability analyses (HVAs). It is emphasized that the HVAs should involve a wide range of stakeholders in the community’s emergency management system as this will provide critical information for the community’s hazard mitigation, emergency preparedness, and recovery preparedness practices.

Another approach is a participatory disaster lesson for children at schools. For example, Misaki Elementary School in Toyoake City in central Japan selected regional disaster reduction as the main theme in their “Integrated-study program” (Sogo-gakushu, in Japanese) for the fiscal year 2003. In this program, each school is allowed to develop its original curriculum—independent of the national teaching guidelines set up by the Ministry of Education, Culture, Science and Sports that cover regular lessons such as mathematics, science and history. The school focused on disaster reduction education because a big earthquake is predicted to hit this region within the next several years.

During these lessons, school children first walked around their hometown with teachers, parents, and disaster experts. Second, the school children had a discussion session to learn about the estimated damages that would be caused by the earthquake and what could be done beforehand to reduce these damages. Finally, based on the results of the discussion, the schoolchildren learned some practical protective measures including conducting evacuation drills under the instructions of firefighters, learning to cook emergency food with their parents, and setting up emergency portable toilets with the assistance of volunteer staff from construction companies.

It should be noted that a variety of stakeholders who worked in close collaboration were involved in these efforts and participants committed themselves actively to deal with specific local risks. This type of program is greatly needed, particularly when we take the original meaning of risk into consideration. Since the term risk can be traced back to an ancient Italian word “risicare”—which means “dare to do something”—risk is, originally, not accepted passively but what we do actively. We refer to this positive attitude toward risk as the second mode. This sense of risk is now so widely spread that we can even observe nationwide campaigns that promote this movement: “Disaster Education Challenge Plan” (Implementation Committee of Disaster Education Challenge Plan 2006), “Bosai Kousien Campaign” (Mainichi Shinbun Newspaper 2006), and “Exploration for Disaster Prevention Program” (General Insurance Association of Japan 2006), to name just a few. Many collaborative and participatory local risk management programs are implemented in the course of such campaigns.

Interactions of the Two Modes of Risks

Finally in this section, we stress that the first and second modes of risk sense are not independent of each other when it comes to their practical impact on Japanese society. Although, theoretically, the two senses contrast sharply, both have reinforced one another to make the concept of risk even more common and more widespread in contemporary Japanese society.

The interaction between the two modes shows itself in the following ways. First, as more risks are identified by disaster experts

and more risk information is disseminated to the public, people become more strongly motivated to face local disaster risks and it becomes easier for them to engage in participatory risk management. Second, as people become more actively committed to dealing with local risks, they seek larger amounts of and more specific types of risk information to encourage their involvement in active risk management processes.

An Analysis of Risk-Centered Disaster Management

The Positive Impact of Risk-Centered Disaster Management

The latest risk trend, driven by the mutually reinforcing interaction between the first and the second risk sense is, in a manner of speaking, a double-edged sword. On one hand, this trend is quite positive because it has the potential to dispel the mistaken idea, shared by many people in Japan for the last number of decades, that disaster prevention and reduction should be left solely to public government and/or disaster experts. It is true that risk-centered disaster management in Japan, which has developed mainly based on the lessons learned from the GHQ, was highly successful. The relatively low annual death toll during the decade from the GHQ in 1995 to the year of 2005 (Figure 3) provides conclusive evidence for its positive impact. Although Japan experienced a large number of powerful natural disasters after the GHQ, such as Chuetsu Earthquake in 2004 (67 dead), a series of floods in 2004 (236 dead), and the Tokachi-Oki Earthquake and Tsunami in 2003 (1 dead and 1 missing), deaths and casualties were low. In my view, this is at partly due to the quick dissemination of risk information provided through computerized monitoring systems that detect earthquake tremors and advanced early warning systems for heavy rain and floods. It is also partly due to citizens' increased awareness of the risk of natural disasters that has developed from the large body of risk information now available. Bosner (2002) also included these two points in a list of disaster management improvements that have taken place since the GHQ. In fact, the percentage of Japanese communities having self-help disaster management groups ("Jishu Bosai Soshiki" in Japanese) has steadily increased from 43.8% in 1995,

to 56.1% in 2000, and further still to 64.5% in 2005. This increase, which reflects the positive impact of effective risk communication, is one of the remarkable advances resulting from risk-centered disaster management aimed at involving citizens.

The positive impact of risk-centered and participative disaster management is also emphasized in the US context. For example, Tierney, et al. (2001) and the Committee on Disaster Research in the Social Sciences (2006) provide a number of examples, as well as empirical data and a theoretical background, to demonstrate the degree to which risk perception, and thus risk information, is significant in the preparedness and response phases of disaster management. Particularly, in the “protective action decision model,” which Tierney et al. (2001) presented as a conceptual integration of emergent norm theory and general system theory, the concept of risk is placed at the core of the decision model. This model consists of four questions that people must address when deciding whether or not to comply with a warning message. “Risk identification”, “risk assessment”, and “risk reduction” are defined as the critical decision components used to determine the final output of the model, and thereby the protective response. Lindell, et al. (2006) also stressed the importance of a wider range of stakeholder involvement in risk management and described specific techniques for encouraging community involvement, such as “talking up” such work to friends, relatives and neighbors, and providing “hazard hotline” telephone numbers.

Although I fully acknowledge that there are many positive aspects to risk-centered disaster management, and that it has had a great impact on disaster management practices both in the US and in Japan, I venture to consider its negative side, as well. Indeed, there are growing criticisms and concerns regarding the negative impact of the upward risk trend, as well as the effect of risk-centered disaster management which assumes public prevalence of the concept “risk.” With these arguments in mind, I would challenge the status quo to assess the weaknesses in the present approach to disaster management in Japan, as characterized by the first and the second mode of risk sense, and work to improve its future prospects. To face these issues, it is highly important to distinguish between two different critical views on the current version of risk-centered disaster management.

The First, Basically Friendly Criticism

The first criticism shares a basic direction proposed by the current risk-centered disaster management. It warns that the goal has not been achieved yet and, thus, insists that the present movement should be accelerated even further. In fact, some experts say that active disaster risk management by local citizens is often neither complete nor satisfactory. We can find one of the major reasons for this in the opposition by citizens to the implementation of regulatory policy, which is stronger than their opposition to distributive policy (Lindell, et al. 2006). Mitigation practices such as land use controls and building codes are examples of regulatory policies that impose restrictions and limits on behavior as well as commonly imposing costs for noncompliance. Such policies frequently generate conflict because there are obvious losers. Thus, it is more difficult to form a consensus on the policy among stakeholders, even though sufficient risk information is provided. In contrast, when disaster managers deal with distributive policies, such as disaster-relief related policy, consensus building is easier because the policy normally benefits a deserving population and has no identifiable losers.

Another major reason underlying a critical view of risk centered disaster management lies in poor quality of risk information that is normally given to local people by disaster experts and/or by local government officers. The risk information is unlikely to have the desired effects if, for example, it is too difficult to understand. This is analogous to the problematic situation in which naïve patients cannot do anything but accept a doctor's diagnosis as fact, even though they are formally open to an informed consent procedure. Local people need to be carefully educated and sufficiently trained to be qualified for a full commitment as stakeholders before risk-centered disaster management is officially institutionalized.

The dilemma caused by "organized-irresponsibility," a term proposed by Beck (1986), is similar to the basically friendly criticism. Beck expressed a deep concern that an ideal condition of fully responsible and perfectly collaborative participation in risk management processes might deteriorate due to a negative collective effect, which he termed organized-irresponsibility. This is especially the case as the number of people involved in the risk management increases.

Beck's (1986) central idea is that a decision made by many stakeholders is essentially equivalent to no decision being made, because the responsibility for the decision cannot be fixed on any particular persons or associations when many people are involved in the decision. This is the social mechanism through which organized-irresponsibility is likely to emerge, particularly in a complex modern society where everybody is inevitably closely networked to influence or to be influenced by one another. In this way, organized-irresponsibility might cause a paradoxical outcome in disaster management as well. An attempt to get more local inhabitants involved in the process of building a consensus about disaster risk might instead result in a diffusion of responsibility.

Consequently, disaster experts and government officials face a dilemma; on one hand, in order to realize more complete participation, they need to abandon the role of God Almighty who alone recognizes everything about risks. Risk communication will be unsuccessful as long as it remains a one-way communication because risk information, in this case, is just like a sacred oracle given to the naïve general public from God. Instead, experts must form a horizontal relationship with citizens to create a broader consensus about risk management. However, on the other hand, if we follow Beck's suggestions, disaster experts are advised simultaneously not to delegate all of the risk management power to many people, since over-delegation without deliberate consideration might result in organized-irresponsibility.

A similar commentary also applies to local inhabitants. They should not be satisfied with unconditionally accepting experts' risk assessments without any substantial commitment. Deeper knowledge and more active commitment to share risks with the experts are both required. However, including too many participants may result in organized-irresponsibility and spoil the whole participation process. In the end, the deliberately-coordinated active commitment of many stakeholders such as local residents, disaster experts, government workers, and NGO staff seems to be the only way to ensure satisfactory risk-centered disaster management. It remains an open question how we can realize this perfect coordination and ideal consensus among risk partners.

The Second, More Fundamental Criticism

It is true that there is a growing expectation that consensus-based risk management with significant public involvement brings about more benefits, despite some of the critical views outlined above. For example, questionnaire data (see Table 2 and 3) obtained in the *Survey of the relationship between science, technology, and society* conducted by the Cabinet Office of the Government of Japan (2006), clearly showed that people today are more eager to know about science and technology than they were in the past, and that people consider public involvement to be necessary for the proper development of science and technology. These findings suggest that public consensus as well as scientific risk data is expected to provide important guidelines in driving risk management in the right direction.

Table 2. Change in the percentages of poll respondents who evaluated the necessity to know more about science and technology

	1990 (n=2239)	1995 (n=2045)	2004 (n=2084)
YES	53.9	65.6	65.3
NO	26.5	18.2	17.6
DK or NA	19.6	16.2	17.1

Note: The question is “Do you think you need to know more about science and technology?” The original data presented by Cabinet Office of the Government of Japan (2006) was reexamined by the author for the present purpose.

As I stressed above, I fully acknowledge that consensus building, referring not only to narrowly based “technocratic” consensus but also to a more broadly based “participatory” consensus, has brought about and will continue to bring about better results in disaster management. However, it remains useful to identify any negative aspects so as to move beyond the limitations of consensus-oriented risk management. To this end, a second line of criticism, which is

Table 3. Percentages of poll respondents who evaluated the necessity of public involvement in science and technology development

Answer	Percentage
YES	42.1
Relatively YES	29.6
Relatively NO	6.9
NO	3.1
DK or NA	18.3

Source: Cabinet Office of the Government of Japan (2006).

Note: The question is “Do you agree the idea that development of science and technology is realized by not only leadership of scientists and government administrators but also by public involvement?” The data was obtained in 2004 (n=2084).

more fundamental than the first, is worth considering. This line of criticism does not question the practical feasibility of a participatory approach in active risk management; instead it casts a grave doubt on the potential value of the participative process and consensus building in risk communication. Such queries are directed at the negative function of the very consensus which is so eagerly sought in risk-centered disaster management approaches.

This second criticism provides a warning against an overly optimistic view of consensus building because consensus always has a negative side. First, it is critical to note that the scope of a consensus is unavoidably confined to a limited number of people, a limited area of space, and a limited period of time. It is impossible to come to a truly universal and purely global consensus due to practical limitations. Even when we are sure that a consensus is complete, it is always formed by a limited number of people, at a specific location and time. Thus, there always remains room for a different possibility other than the current choice resulting from the present consensus. Consensus is always accompanied by residual factors which have not been taken into account, but might emerge in the future.

As Luhmann (1991a) suggested, to make a consensus about risks would be, by itself, another risk. Indeed, this is because risk is nothing but future's uncertainty, yet the future heavily depends on the decision made in the present. In other words, to make a decision or to build a consensus at this moment of time, to deal with future's uncertainty, inevitably creates a brand new future that is, either slightly or largely, different from what is estimated before the decision has been made. Thus, consensus building efforts to specify and reduce a future risk might function destructively, by producing another risk, rather than constructively, by controlling the risk.

This argument holds true especially when we deal with major catastrophes such as earthquakes, tsunamis, and volcanic eruptions. The expected recurrence time for such major natural disasters is typically longer than an individual life time span, sometimes exceeding 100 or even 1000 years. Such disasters also affect an extremely wide area. Thus, temporary and local consensus could be ineffective to cope with such catastrophes, due to the changeable conditions under which people would actually face the disaster in the distant future. In addition, risk reduction actions at the present moment themselves might also change natural and social conditions over time before a disaster actually occurs. In sum, it is impossible at present, both in practical and theoretical senses, to take all of the uncertainties into consideration within a consensus building effort.

One of the possible solutions for this dilemma regarding consensus-building in risk management is to establish the state of *Verstaendigung* (mutual understanding), as Luhmann (1991b) suggested. Although this concept is often mistakenly equated with mutual agreement or mutual consensus, this is absolutely incorrect. Luhmann defined *Verstaedigung* as a state in which a reference point for subsequent communications is secured in terms of the current communication. Ongoing communication is viable and significant, not because it realizes a static consensus at the moment, but because it secures a subsequent and continuous effort toward a better solution. In other words, the state of *Verstaedigung* is not concerned with whether or not a consensus is formed at the present time. Instead, the important factor is to maintain a continuous drive from the present moment toward constructing a future consensus. An endless and

dynamic movement toward consensus is emphasized here instead of a static state of consensus.

Thus, in an extreme example from this point of view, if we feel that a consensus has been completely formed, we know we remain at risk because the lack of diversity under unanimous consensus is likely to deter further argument toward being on alert for an unexpected risk. What we need is a sustainable and perpetual consensus building process with continued monitoring of both expected and unexpected risk. In this sense, if we fully grasp the idea of the second critical view on risk-centered disaster management, we can conclude that what is important is not to build a quick consensus, but, ironically, to delay the consensus making process without losing the drive to achieve it.

A New Disaster Risk Communication Tool

A Shift in Risk Communication Tools

The tools and styles by which disaster risk is communicated and shared in a society could change over time as people's risk sense shifts. This is because a communication tool is not just a neutral vehicle of risk information; it also reflects very clearly how a disaster risk is conceptualized and accepted in a society. Risk sense and communication tools interact with each other. Thus, it could be possible to alter and reorganize disaster risk sense in a society by introducing a new communication tool.

From this perspective, we can see a dramatic change in the risk communication tools used in Japanese society and this change clearly corresponded to the shift of risk senses. As described above, in the mode zero period that took place before the mid-1990s, any hazardous objects were considered as "danger" rather than as "risk". During this period, the concept of risk did not really exist in Japanese society and, as a result, there were virtually no risk communication tools. Any tools that did exist during this period were hardware facilities, like flood levees and seismically resistant construction. Such hardware implied that disasters are "out there", and that disaster management consisted of "games against nature" (Slovic and Weber 2002).

Subsequently, during the first mode period from the mid-1990s to the mid-2000s, when risk was first identified with danger, major

communication media informed the public of scientifically identified risk levels. This information was mostly in the form of hazard maps and statistical data about various types of risks. During the same period, different types of communication tools also emerged, corresponding to the second mode of risk sense. A collaborative risk assessment practice that incorporates the participation of local citizens along with disaster experts and employs consensus making practices in the form of workshop sessions, for example, represents the typical risk communication style for the second mode.

Gaming Approach: A New Style of Risk Communication

The question here is what type of risk communication tool can be the best fit for the “third” mode of risk sense. A new tool must overcome the first and the second criticisms levied against the preceding two modes of risk sense and, at the same time, it must also realize the *Verstaendigung* in risk communication. This tool should neither simply inform us of the results of scientifically valid risk assessments (the first mode) nor help us reach an immediate consensus within a limited number of people (the second mode). Instead, a new tool is required that has the capability of securing continued discussion, while sometimes bearing some amount of contradiction and conflict. In addition, this tool should be open to a wider range of people, be robust in the face of heterogeneity, and be flexible in regard to further need for adjustment to local and temporal specifications.

Based on this new perspective, what we need now is a communication tool that is open to “others”. The meaning of “others” could vary according to the person; for example, “others” could be ordinary people for a disaster expert; “others” could be victims of different types of disasters for a victim of a particular disaster event; and “others” could be those who live in different cultural and/or geographical settings. Strictly speaking, only “others” can continue to activate creative communication in an effort to realize *Verstaendigung*. “Others” could introduce something unfamiliar and unexpected to a group of people; if not, they are likely to stay in a stable but unimaginative, inner, and closed communication style. A new tool must be what keeps us facing toward the “others” in this sense because here “others” are functionally equivalent to the unpredicted

risk of natural disasters. “Others” keep us alert to disaster risks without actually facing real hazards at this moment.

Crossroad: Kobe

To close this paper, I propose one, not perfect but workable, solution for the task we are facing. That is a gaming-style group learning procedure, called *Crossroad: Kobe*. For further details, see Kikkawa, et al. (2004) and Yamori (in press). *Crossroad: Kobe* is based on the idea that a gaming approach could make a positive impact on disaster risk communication, especially when the third mode of risk sense is taken into account.

Crossroad: Kobe has been used in Japan in various settings nationwide, ranging from disaster training for central or local government officers to voluntary disaster drills planned by local people, and even for disaster education for children in schools. More than 15,000 copies have already been published since its release in 2004, and we have monitored more than 300 gaming sessions involving more than 15,000 participants. Because such widespread distribution is quite exceptional for a disaster education tool, this in itself provides simple and unequivocal evidence that *Crossroad: Kobe* is widely used and highly valued.

The game proceeds as follows. During a game session, a group of five players read 10-20 episodes that are presented on cards one at a time (see Figure 4 for a sample item card). Each episode was derived from extensive focus group interviews of disaster veterans of the GHQ and describes a severe dilemma that the veterans of Kobe actually faced. Individual players are required to make an either/or decision (i.e., Yes or No) between two conflicting alternatives in order to deal with the dilemma. Players discuss each episode after each player gets one game point (a normal point) if he/she shares in the majority opinion.

The discussion is enhanced by examining support materials, including basic background information and related statistics, expert opinions, and video clips. The video clips are recordings of the focus-group interviews, in which Kobe disaster veterans speak frankly about what really happened during that time. Thus, game participants face the realities of Kobe, both in terms of its summarized form (i.e., a short text on

You Are... City employee
<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small; margin-right: 5px;">[Kobe1030]</div> <div style="flex-grow: 1;"> <p>The city hall has almost totally collapsed. However, maps and documents which are necessary for disaster response are in the collapsed office.</p> <p>Do you dare to enter the office in the area off-limits ?</p> </div> </div>
Yes (To enter) OR No (Not to enter)

Figure 4. A sample item card of “Crossroad: Kobe”

an episode card) and in a more direct form (i.e., narrative accounts).

This procedure aims to encourage game players to create and express their personal views on disaster reduction actively rather than just listening passively to the descriptions of the Kobe survivors. The game also encourages participants to inject their own views in persuading others, negotiating with each other, and even co-creating a new solution, in order to secure game points that are given to the majorities. An additional game rule allows the only person in a group whose choice differs from the others (single minority) to gain a special point, thus leading participants to respect a minority view, and encouraging them to seek unique and undiscovered ideas.

Obviously, in *Crossroad: Kobe*, winning the game is not particularly important. The real point is to deeply involve participants in situations that the people of Kobe actually faced. The goal of winning simply helps motivate the players to genuinely consider what they should do: how to rationalize their own choices, how they might persuade others to change their minds, and how to find new solutions.

The style of group gaming, in which minority opinions as well as majority ones are appreciated, also guarantees opportunities for par-

ticipants to face the “others” continuously. There is empirical evidence to support the above contention. Kikkawa, et al. (2004) have provided questionnaire data suggesting that players’ opinions become varied rather than polarized into either Yes or No answers after playing the game. This suggests that playing *Crossroad: Kobe* could have led the players to become aware of different viewpoints by facing different opinions of other members. Second, Yamori (in press) has reported on the positive feedback of a user in response to an open-ended question, which indicates that the user considered it useful to play *Crossroad: Kobe* repeatedly. This is because participants can discover a new perspective every time the game is played with different “others.”

Multi-logue Capacity and Dissemination Power

A notable aspect of *Crossroad: Kobe* is its ability to encompass multiple voices. As stressed above, the game not only elicits personal and unique views from each of the participants, it also serves as a medium in which these sometimes competing and conflicting personal views exist together. The personal voices evoked by this game result from differences in sense-making (Weick 1995) involving difficult circumstances. It is true that a group consensus sometimes emerges with a single interpretation of a situation and agreement on a particular solution, which accompanies a new and unified group solution. Such consensus might be preferable if game users’ primary concerns are focused on quick practical problem-solving in a particular setting within a specific locality.

However, this is not required in *Crossroad: Kobe* because a core feature of gaming lies in the capacity to realize a “multi-logue” (Duke 1974). When viewed as a communication medium, gaming shows more potential to admit different perspectives addressing the problem at hand than do other types of media, such as mathematical language or computer simulation models. In this regard, *Crossroad: Kobe* never forces players to conform to a uniform solution; rather, it encourages them to face and respect diverse opinions, in other words, to meet the “others” as described above.

Another notable feature of *Crossroad: Kobe* is its ability to transform initially passive users into more active collaborators. For example, some disaster management workers at Kochi Prefecture in

southern Japan have become so familiar with *Crossroad: Kobe* that they can now facilitate the game, even though they began as ordinary users. Now, they are even teaching facilitation skills to lower level officials in municipal government as well as disaster response leaders in local communities. Moreover, some of the Kobe City staff, who were originally interviewed to create *Crossroad: Kobe*, are now actively engaged in disaster education for local residents by playing *Crossroad: Kobe*. Through this process, the game is proliferating rapidly to the grassroots level, and in doing so increasing the number of “others” involved in this lasting risk management process.

Moreover, *Crossroad: Kobe* became so popular that many requests have been made to apply the same method to other region-specific problems and also to different social issues. As a response to these requests, the game authors have already created different versions, based on the *Crossroad: Kobe* prototype, for such topics as: typhoon and tsunami disaster reduction in Kochi Prefecture; oil pollution disaster reduction for the Japanese Coast Guard; school security measures; and infectious disease control (Yamori, in press). All of these new versions of *Crossroad* were created through joint efforts between the author and those who first played *Crossroad: Kobe* and noticed its broad applicability.

The appearance of active successors and the development of different versions demonstrate the strong disseminating power of the game. This is partly because *Crossroad: Kobe* is quite simple, both in its gaming procedure and the format of its narrative content, and partly because it is open to personal, positional, and regional modifications. Thus, those who once used it as players can easily assume the role of game creator or facilitator next time. Those who were once learners can promptly become coaches.

This characteristic of *Crossroad: Kobe* is all the more important in prospective planning for long term disaster events, that is, those with recurrence periods exceeding 100 years, such as major earthquakes and volcanic eruptions. Because the next such disaster might not occur during our lifetimes, building a community-based learning system is more significant than simply developing the knowledge and skills of individuals. Conducting temporary, short-term, and unidirectional learning is insufficient, while creating a partici-

pative and lasting “community of practice” (Lave and Wenger 1991) is absolutely vital.

In sum, the multi-logue capacity and dissemination power of *Crossroad: Kobe* clearly demonstrate that the game can be an effective risk communication tool which assumes the third mode of risk sense. This is because these two components guarantee the capability of continuing the consensus building process while accommodating contradiction and conflict. *Crossroad: Kobe* is open to a wider range of “others,” as well as being robust in terms of heterogeneity and flexible in terms of further options. The gaming, both in terms of its procedure and contents, can be adjusted easily to fit local and temporal specificities.

Finally, I should stress that the present argument does not necessarily mean *Crossroad: Kobe* ignores the first and second mode of risk senses while highlighting the third one. *Crossroad: Kobe* can act as a multi-purpose tool that covers not only the third mode of risk sense but also the first and second modes. As I mentioned above, it is possible to inform game participants about the primary lessons and basic information on the GHQ if facilitators emphasize the briefing period after playing the game. This use of *Crossroad: Kobe* focuses on the first mode of risk sense in which the aim is a one-way transfer of risk information. It is also possible to highlight consensus building among the participants by using *Crossroad: Kobe* to solve specific problems in a group of participants within a particular locale. This use focuses on the second mode of risk sense. In conclusion, to extend our metaphor, *Crossroad: Kobe* is a multi-purpose disaster risk communication tool that was created at the crossroads of the first, second and third modes of risk sense.

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