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DEVELOPMENT OF COLLABORATIVE JAPAN-UNITED STATES SOCIO-BEHAVIORAL DISASTER RESEARCH

E. L. Quarantelli
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Professor Kitao Abe
Dr. Chikio Hayashi
Professor Hirotada Hirose
Professor Keizo Okabe

Mr. Ryoichi Kazama, Professor Abe's assistant, has to be particularly thanked for his work in helping to arrange the conference in Japan and in later locating, obtaining, and sending to DRC many important Japanese reports and publications.

In the United States I wish to thank the following for their contributions both to the conference and to the project:

Professor Richard Olson
Professor Thomas Saarinen

Dr. William Anderson of the National Science Foundation was, as usual, helpful and cooperative in administrative and substantive matters.

My greatest debt, however, is to Yasumasa Yamamoto, my Graduate Research Associate at the Disaster Research Center (DRC). As a native of Japan and a student of sociology at The Ohio State University he was able to provide necessary translations and substantive knowledge necessary to carry out the project. It is not an overstatement to say that without him the project would not have been undertaken. He performed his duties in a superior fashion, and worked extremely long hours, far beyond his job requirements. In a real sense, he is a full co-author of this report and would be listed as such if it were not for the fact that I was the formally designated Principle Investigator on the project.

Others at the Center also helped put this report into its final form. Jennifer Welch, the DRC Administrative Director, labored long and hard to edit the final report and especially the Inventory of Japanese language sources. Its readability is a tribute to her skills. Connie Smith did her usually competent job in typing the final manuscript. Finally, various undergraduate and graduate students during the years worked on different parts of the English language inventory; special note of their contributions to this segment of the work must be given to Lou Ann Galloway, Carol Smith Jankowski, Beth Rinard, Catherine Smith, and Martha Woodruff.

E. L. Quarantelli
Director, Disaster Research
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INTRODUCTION

Systematic work on sociobehavioral aspects of disasters was first undertaken in the United States in the early 1950s and in Japan in the early 1960s. A substantial body of literature has since been produced by the critical mass of researchers who have developed in both countries. At present also, the most intensive and extensive studies on the topic anywhere in the world are being pursued in America and Japan.

For about fifteen years, there has been informal contact between some researchers in the two countries, especially between the Disaster Research Center (DRC) and the oldest of the Japanese groups involved in disaster research, that headed by Professor Kitao Abe. These professional ties were strengthened in 1972 as a result of a week-long formal conference held at DRC where information was exchanged between ten Americans and eight Japanese disaster researchers. Contacts and visits between individual researchers in the two countries as well as meetings in the context of international conferences, such as at the World Congress of Sociology in Uppsala, Sweden in 1978, have continued to further bring together disaster researchers in the United States and Japan.

Much discussed in recent years has been the desirability of moving toward some joint or collaborative research efforts. In an attempt to start implementing such a goal, DRC in 1979 proposed that the Center:

(1) examine all relevant sociobehavioral disaster studies and produce a systematic inventory of the empirical work in both countries;

(2) organize a conference in Japan between the leading Japanese disaster researchers and representatives of the American disaster research community for the purpose of seeing what consensus there is regarding the possibilities and problems of joint and common studies which might be undertaken; and,

(3) on the basis of the inventory and conference, recommend a program of research priorities as well as alternative structural strategies and possible institutional arrangements for collaborative work in the sociobehavioral area.

This report summarizes what DRC accomplished in pursuing the goals just enumerated.

The Inventories

Two inventories have been produced. The first is an Inventory of Disaster Field Studies in the Social and Behavioral Sciences covering English language sources and references up to 1979. The second is an Inventory of the Japanese Disaster Research Literature in the Social and the Behavioral Sciences. A copy of the latter inventory is attached as Appendix A. The English language Inventory, because of its length will be issued as a separate DRC publication and is not a part of this report. The inventories are self contained documents and are useable for research purposes in the form in which they exist.

For background purposes, however, we note some of the questions that had to be addressed, some of the problems that had to be faced, and some of the limitations that were involved in producing both inventories. Future attempts to build and expand the inventories might benefit from our efforts and difficulties. While there were many common elements in developing both inventories, there were enough differences to warrant discussing each separately.

The English Language Inventory

The English language inventory, An Inventory of Disaster Field Studies in the Social and Behavioral Sciences, was developed and formated in a somewhat different way, than the inventory of Japanese disaster research. The English language inventory was initiated by DRC several years before the present project was started. The original intent was to build upon and extend the 1961 publication, Field Studies of Disaster Behavior: An Inventory issued by the Disaster Research Group of the National Academy of Sciences. Thus, our goal in the past was to develop as complete a listing as possible of all known disaster field studies conducted anywhere by social and behavioral scientists. Listing was by disaster groups according to major natural or technological agents involved. Over the years, dozens of disaster events were added to a draft inventory although the work was never put into any form for public distribution.

When we decided to issue an inventory in connection with this project, several decisions had to be made. First, for a variety of reasons, but mostly because they have rarely been systematically studied by social and behavioral scientists, very diffuse and slowly developing types of disasters such as famines, droughts, and epidemics were excluded from consideration for listing. While this decision excluded some recent studies and publications, it did not exclude in absolute terms very much of a social scientific nature.

Second, we leave out in this first edition of the inventory, all non-English sources. Apart from the Japanese material presented elsewhere in the inventory, as discussed later, DRC has in its possession a considerable body of non-English sources such as Italian, French, and Swedish (it probably has an almost complete set of empirical writings on disasters in these three languages) but translation problems as well as

incomplete collections in other languages led us to decide to postpone attempting to list any non-English references in this first edition of the field study inventory.

Third, we include in the inventory only studies undertaken by social and behavioral scientists or done within an explicit social and behavioral science research framework. As such, we have left out of the inventory purely historical studies (e.g., Hilda Grieve, The Great Tide, 1959), as well as personal anecdotal accounts (e.g., as typically written by disaster victims), journalistic descriptions (e.g., Polk Laffoon, Tornado: The Killer Tornado That Blasted Xenia, 1975), and agency after action reports (e.g., Mattie Treadwell, Hurricane Carla, 1961). While some of these kinds of publications may be more research useful than some standard social science works, we were primarily interested in including in the inventory only relatively explicit social scientific contributions to the literature.

Social and behavioral sciences were interpreted as including the fields of anthropology, economics, geography, political science, psychology, sociology, and urban planning. Studies from medicine, psychiatry, social work, and marginal areas relevant to the social sciences were only included in the inventory if what they reported was primarily of a social science nature. Thus, most medical studies of disasters which focus mostly on health and medical aspects of disasters rather than human and social aspects, are excluded from the inventory.

A fourth arbitrary decision was to systematically include within the field inventory only studies done up to the year 1979. In actuality, a few field studies done in 1980 are included but no complete coverage of that year was possible within the time frame of our project. If the study by Samuel Prince of the Halifax, Nova Scotia, Canada ship harbor explosion published in 1920, is taken as the first systematic social science study in the disaster area, as it usually is, our inventory included the first sixty years of work in the area.

In the field inventory, the listing is by the major disaster agent involved in the event. This was done to allow any user of the inventory to establish the full range of research which has been done on any given disaster. The specific agent categories used are:

Blizzards and massive snowstorms
Earthquakes
Explosions and fires
Floods
Hurricanes, typhoons, and severe storms
Power system malfunctions
Tornadoes
Toxicological incidents
Transportation accidents
Tsunami
Volcanic eruptions
Miscellaneous and mixed

Again, our listing was to a degree arbitrary, but the major dimension of the disaster was used for assigning any given event. Thus, a train derailment which led to a dangerous toxic cloud, for example, is listed under toxicological incidents rather than transportation crashes. Explosions and fires, incidentally, are further subdivided into whether they involve building, forest-brush-grass, mine, ship, other transportation, or other kinds of incidents. Similarly, floods are subdivided as to whether they are dam, river, or other kinds. Toxicological substances are subdivided as air, water, or other.

Studies of wartime and military situations, concentration camp behavior, civil disturbances and riots, terrorist activities and similar conflicts are excluded from the inventory. In this we follow the distinction made in the disaster literature between consensus and dissensus crises and stress situations. In our inventory we include only consensus kinds of events as disasters, as has become traditional in the disaster literature (for a discussion of the difference between consensus and dissensus types of events see E. L. Quarantelli, "Emergent Accommodation Groups: Beyond Current Collective Behavior Typologies" Tomatsu Shibutani (ed.), Human Nature and Collective Behavior, 1970). Following a similar logic, field studies of civil defense tests are excluded from the inventory, in contrast to their inclusion along with some wartime studies in the National Academy of Sciences original inventory of Field Studies of Disaster Behavior in 1961.

Specific threats, however, resulting from standard disaster agents are included in the inventory as well as actual disaster events. They are included because researchers have found little differences in the two kinds of situations, primarily reflecting a sociological axiom that "if people define a situation as real, it is real insofar as consequences are concerned," On the other hand, none of the numerous studies dealing with disaster preparedness planning are in the inventory since they almost always are not event specific but simply involve discussions of general preparations for a possible disaster. Our interest was only in events with specific time/place parameters.

In the inventory, we otherwise provide a chronological listing of all events within each of the major disaster agents enumerated above. If an event involved two or more agents, the listing is by the major agent involved which usually but not always is how the event is traditionally identified (e.g., the 1906 San Francisco earthquake rather than fire). No cross-classification of disaster agents is provided in this first edition of the inventory.

In our field inventory, the following information is provided for each event listed:

Major agent involved
Event name
Date of occurrance
Location of event

A brief narrative on casualties and damages
including if there was a federal declaration
of disaster for events in the U.S.
All known reports and publications from study

An event is listed as long as we had information that field work of some kind was undertaken even though no specific report or publication was issued on the event. The undertaking of a field study means that some data were collected even if they still remain at present specifically unanalyzed.

The information we provide in the inventory is as complete and as accurate as we could establish. Some of the material presented, however, has to be approached with a certain amount of caution. For example, as experienced disaster researchers know, casualty figures are estimates at best. The number of injured and the amount of property damage can differ by orders of magnitude of two or three depending on which source of information is used. We used those figures which in our estimate are probably the most reliable.

We originally thought of listing the number of interviews obtained in each study, but eventually rejected the idea because the results could be misleading especially for comparative puroses. For example, almost all interviews by DRC personnel were done face-to-face, involved in-depth probing and often lasted two to three hours. In contrast, there are studies where the interviews conducted were done over the phone, followed or used a checklist format and lasted no more than five minutes. For certain research purposes, the latter kind of data might be quite valid, but obviously not all interviews obtained in the different studies can be thought of as substantively equivalent.

The list of reports and publications, however, is probably quite accurate and close to being complete. No item was listed in the inventory unless a copy existed in the DRC library or was thought to be available in regular professional journals or books likely to be found in any major university library in the U.S. Fugitive publications or papers presented at professional meetings are not listed unless DRC personnel had or saw a copy of the item. The collection in the DRC library is so extensive and the search was so thorough that only a handful of possible reports or papers were never located and thus not listed.

The Japanese Language Inventory

The Japanese language inventory was compiled in a somewhat different way than was the English language one. The inventory of the Japanese material was developed by compiling a master list of all relevant items and collecting at DRC actual copies of the publications (or unpublished papers). The master list was obtained through the direct soliciting of information of possible sources not only from all known Japanese disaster researchers, but from Japanese organizations and agencies, especially governmental ones, which might have supported relatively recent research on the human and group aspects of disasters. Our survey concluded with

around 300 possible relevant references. We believe that the survey of sources is as complete as could reasonably be expected, and that if any published item was missed, it must have originally been in a rather fugitive and obscure Japanese source and probably now unobtainable and unknown.

Actually collecting the items at DRC was a very time consuming but otherwise not problematical matter. The delay in getting material was occasioned by one factor in particular. Many of the early studies done in the disaster area in Japan, especially by Professor Abe and members of his group, were undertaken as a form of contract research for national agencies, particularly the police forces. The results from such studies were usually produced as final reports for the sponsoring agency, and were not otherwise published or distributed. Original copies of some of the reports are therefore not abundant and currently are all but unobtainable. In fact, in a number of cases DRC had to have a special reproduction made from a rare original copy of a final report. Nonetheless, through the cooperation of the Japanese researchers, Professor Abe in particular, copies of all such final reports were eventually collected at DRC. In fact, DRC still appears at present to have the only complete set of all the Japanese language disaster literature in the social and behavioral sciences, which is available in one location anywhere, including any one place in Japan.

The volume of the material and the availability of only one Japanese graduate student (Yasumasa Yamamoto) on the DRC staff precluded any attempt to completely translate the publications. However, all items were scanned by Yamamoto and content oulines made for each case. Two problems immediately became apparent. First, what constituted a "social and behavioral science" study. A number of the Japanese publications reported, for example, extensive but simple surveys of populations regarding particular disaster related phenomena, such as how the respondents thought they might act if they were caught in a projected earthquake while they were in the Tokyo subway system. In most such cases, the statistical data was reported as such unadorned by any interpretation or set within any social science framework. In fact, in a few cases there were just statistical tables and almost no narrative text. Regardless, our decision was to include such reports as part of the Japanese disaster research literature on the grounds that while the reports in the forms they existed do not constitute social science literature, the data within the reports could lend themselves to a social science analysis.

Second, there was the problem of how to treat popularized or semi-popularized accounts of scientific studies. A number of the publications we had from Japan fell in such a category. In these cases, many of the publications are treated as part of the social science literature if it appeared that the more popular account was based on empirical data obtained by Japanese social scientists. As in the case of the survey reports, an element of judgment obviously entered into what we in the end included and excluded of the more popularized accounts. If anything, we tended to lean in the direction of inclusiveness rather than exclusiveness.

Also, because of what we included and also because of a desire to maximize the usefulness of the inventory for an English reading audience, we usually avoided simple summaries of the publications; instead, in the inventory we listed in narrative form a number of the substantive findings. Put another way, in the inventory itself we usually do not present a simple, short abstract of the material but instead describe in concrete terms the major findings in the work (e.g., instead of simply saying that the work deals with projected behavior in earthquakes, we noted, as a hypothetical example, that the publication reports that 40% of the men compared with 60% of the women surveyed said they thought they would attempt to extinguish the fire in their kitchens if an earthquake happened).

In general, statements translated from Japanese into English were kept as literal as possible even if it made for a quaint although correct English text. Technical terms are generally avoided, but when discussing the methodology of most empirical studies, standard American terminology with reference to survey sampling is used, i.e., whether the study used a random, rather than a stratified sample. Generalizations are part of the translations made only if they were in the original Japanese text. In the case of more general discussions of disaster phenomena, as is true of some of the books listed in the inventory, a translation of the full table of content is generally presented.

We eventually listed 62 Japanese language items in the inventory. For ease of locating by researchers in Japan, all titles are given in both Japanese and English script characters as well as in an English translation. We also included in the inventory 39 titles of publications in English by Japanese researchers. Almost without exception, these publications report on work discussed in greater detail in the Japanese language works. Since the research findings of the latter are presented in the inventory, we just list the English language titles of these other works by the Japanses, and do not otherwise expand on them in the inventory. Finally, to give English language readers a small flavor of what other possibly relevant disaster literature exists in Japanese, we provide an English title listing of 16 items of non-social science but disaster-relevant sources which would be of value for anyone intending to do field work on Japanese disasters.

The Conference

During the week of December 1-5, 1980, Professors Olson, Saarinen, and Quarantelli along with Dr. Anderson of the National Science Foundation (NSF), met in Japan with the major representatives of the Japanese disaster research community currently involved in social and behavioral studies. The meeting was held through the courtesy of Dr. Chikio Hayashi, one of Japan's leading scientists, at the Institute of Statistical Mathematics in Tokyo. The other Japanese participants included Professor Abe of the Tokyo University of Foreign Studies and his colleagues in the disaster area, Professor Misumi of the University of Osaka and his colleagues, and Professor Okabe of the University of Tokyo and his colleagues.

In all, there were 15 Japanese participants representing a dozen different institutions (the list of participants is attached at the end of this section of the report). The communication at the meeting was facilitated considerably by the presence of a professional translator provided through the courtesy of Professor Abe. Before the arrival of the American group in Tokyo, the Japanese participants had also received in the mail English language copies and Japanese summaries of the 25 research proposal abstracts sent to Quarantelli by American disaster and hazard researchers (names of researchers and titles of abstracts are given at the end of this section of the report).

The first full day of the meeting was given over to a presentation by the group from America. Discussed were prior contacts between American and Japanese disaster researchers, the objectives of the meeting and the NSF interest in it, current disaster and hazard studies in the United States including funding support and patterns, major substantive foci of the work, and specific illustrations of ongoing research projects.

The Japanese participants spent the second day of the meeting to explain the fudning of disaster research in Japan, to indicate the general objectives of the studies being undertaken and planned, and to outline the major specific research projects currently underway or to be soon initiated.

The third day of the meeting was partly devoted to an intensive exchange of ideas and questions by participants from both countries. Among the topics examined were problems which might exist in any future working together of social and behavioral scientists from Japan and the United States, the question of whether any kind of formal or informal arrangements might be developed to maintain and enlarge the contacts and links created by the meeting in Tokyo, and the concrete steps that might be taken in the upcoming months (especially by the American group and by Quarantelli in particular) to build on the meeting in Japan.

The American group also spent an entire day in Shizuoka Prefecture, the site of a very extensive earthquake prediction program. Through the courtesy of Professor Okabe, the group was briefed on preparedness and research activities related to that program. On another day, an afternoon was also spent visiting the NHK broadcasting facilities in Tokyo, and viewing disaster related films and being briefed on the national network in disaster planning.

List of Participants at Tokyo Meeting

Kitao Abe
Professor
Department of Psychology
Tokyo University of Foreign Studies

Ritsuo Akimoto
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Department of Sociology
Waseda University

William A. Anderson
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National Science Foundation

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Ryoichi Kazama
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Hokkaido Takushoku College

Takao Matsumura
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Department of Communications
Tokai University

Jyuji Misumi
Professor of Psychology
Department of Human Science
Osaka University

Hideaki Ohta
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Institute of Social Sciences
University of Tsukuba

Keizo Okabe
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Richard Olson
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University of the Sacred Heart

Ichiro Souma
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Waseda University

Toshio Sugiman
Assistant
Department of Psychology
Osaka University

Toshihide Takeshita
Institute for Policy Sciences
Tokyo

List of American Researchers and Titles of Proposed Research Presented at the Tokyo Meeting

Bolin, Robert, Department of Sociology, New Mexico State University. A Proposal for Collaborative Research on the Utilization of Recovery Aid by Victim Families at Selected Disaster Sites in Japan and the United States.

Brunn, Stanley D., Department of Geography, University of Kentucky. Evacuation Planning for Populations Around Nuclear Power Plants.

Brunn, Stanley D., Department of Geography, University of Kentucky. Perceived Impacts of Technological Hazards.

Bolton, Patricia A., Policy Sciences Associates, Boulder, Colorado. Collaborative Japan-United States Study of Long Term Family Recovery and Recovery Planning.

Carter, Michael T., University of Minnesota, and Patricia A. Bolton, Policy Sciences Associates, Boulder, Colorado. Collaborative Japan-United States Study on Governmental Response to Earthquake Predictions.

Davis, Morris, Department of Political Science, University of Illinois. Recognition of and Response to Technological Threats.

Farberow, Norman L. and Norma Gordon, The Institute for Studies of Destructive Behaviors, Los Angeles, California. Problems of Emotional Adjustment After a Natural Disaster.

Gibson, Geoffrey, American Hospital Association, Chicago, Illinois. A Comparative Assessment of Disaster Resources and Responses in U.S. and Japanese Hospitals.

Kreimer, Alcira, Department of Urban and Regional Planning, George Washington University. A Study of Postdisaster Urban Reconstruction.

Kreps, Gary A., Department of Sociology, College of William and Mary. Comparative Study of National Emergency Response Networks in Japan and the United States.

Leik, Robert K. and Sheila Leik, Family Study Center, University of Minnesota. Family Relocation due to Disasters.

Mayo, L. H. and James M. Brown, The National Law Center, George Washington University. Governmental and Legal Measures for Earthquake Mitigation: A Comparison.

Mileti, Dennis S., Colorado State University. Human Response to Risk.

Olson, Richard Stuart and Douglas C. Nilson, University of Redlands. Earthquake Prediction Capability as an International Technology Transfer.

Olson, Richard Stuart and Douglas C. Nilson, University of Redlands. Public Policy Aspects of Earthquake Hazard Mitigation: Japan and the United States.

Perry, Ronald and Michael Lindell, Battelle Human Affiars Research Centers, Seattle, Washington. Local Community Organization and Citizen Involvement in Volcanic Eruptions.

Quarantelli, E. L., Disaster Research Center, The Ohio State University, and Lee Becker, School of Journalism, The Ohio State University. A Comparative Examination of the Handling of Disaster News in Japan and the United States.

Rainey, Charles T., Center for Planning and Research, Inc., Palo Alto, California. Disaster Contingency Planning Based Upon the Identification of Basic Operating Situations and Corresponding Responses.

Reitherman, Robert, Center for Planning and Research, Inc., Palo Alto, California. Communication Methods of Increasing Disaster Information Comprehensibility.

Reitherman, Robert, Center for Planning and Research, Inc., Palo Alto, California. Public Preparedness Information and Earthquake Safety: The Behavioral Strategy.

Rose, Adam and K. C. Kogiku, University of California, Riverside. Hazards and Facility Siting.

Rose, Adam and K. C. Kogiku, University of California, Riverside. Individual Decision Making in Relation to Hazards.

Turner, Ralph, University of California, Los Angeles. Consequences of the Coexistence of Scientific and Nonscientific Frames of Reference on the Comprehension and Response to Earthquake Warning.

Wenger, Dennis, University of Delaware. A Cross-Cultural Examination of Disaster Subcultures.

Wenger, Dennis, University of Delaware. A Comparison of Disaster Planning for Nuclear Power Facilities.

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Impressions of the Japanese Disaster Research Scene

We will now turn to our impressions of the Japanese disaster research scene as this was garnered through developing the inventory, the conference in Tokyo, and other direct and indirect contacts with Japanese disaster researchers. In connection with the latter kinds of contacts, particularly informative were conversations with Yasumasa Yamamoto, the Japanese native serving as a Graduate Research Associate at DRC, with Shunji Mikami from the University of Tokyo who spent 10 months at DRC on a Fulbright Fellowship, and with Professor Hirotada Hirose with shom there were several personal meetings during the course of the study.

1. In Japan, there is a very active program of research on the social and behavioral aspects of disasters, a critical mass of researchers, and an impressive, significant body of work.

Japanese studies in the areas of the physical sciences and engineering far outnumber, of course, studies within a social and behavioral science framework; but the same is true within the United States. Similarly, while in absolute numbers there are relatively few social and behavioral disaster researchers, Japan appears to be the only country other than the United States where there are more than two separate groups of scientists continuously and actively involved in the area. The Japanese also are using many of the most up-to-date and advanced social science methodological techniques as well as a wide range (e.g., from computer simulations to analyses of historical documents), although model building and the development of theoretical formulations are still at an early stage.

The range, depth, and sophisticaion of Japanese work in the disaster area is somewhat underrepresented by literature produced so far. This is because most of the reserach literautre exists in the form of final reports done for contract research for governmental agencies. The necessarily practical, applied, and concrete nature of such reports obscures for example, that the Japanese scholars have implicitly brought to bear more of a theoretical background from the social sciences than explicitly appears in the written documents. To judge Japanese work in the disaster area solely on the publications noted in our inventory, therefore, is to see a "raw empiricism" that does not fully reflect the social science that is involved in the work generally. Perhaps as a habringer of the future, a few very recent publications in Japan are much more social science in format and substance as this is understood in the United States, than has been typical of most of the Japanese literature so far.

2. The focus of the large majority of the actual and planned Japanese research is on social and behavioral aspects of earthquakes and earthquake predictions. Most of the scientists are concerned with this one disaster agent. In fact, there is particular concentration on studies related to earthquake prediction. This focus probably reflects current Japanese research funding patterns.

While this is the current emphasis, studies in Japan in the past two decades have dealt with other disaster agents. Even now, some research

deals with other kinds of disasterous events, such as mass fires, topic chemical episodes, and volucanic eruptions. Also, Japanese participants at the meeting expressed an interest in future work on environmental and technological types of disasters, but studies of problems associated with nuclear plants and power did not presently appear to have high priority. Overall, Japanese disaster research seems to be more focused on specific disaster agents than it is in the United States although it might be argued that the American funding pattern may be moving in the same direction as presently prevails in Japan.

In recent years the strong concern of the Japanese government about a possible major earthquake soon in Shizuoka Prefecture, can be seen as having been both functional and dysfunctional for the development of disaster research in the country. Without doubt, the concern brought a level of funding and support for social and behavioral science research on earthquake phenomena which otherwise would not have occurred. On the other hand, this thrust did not encourage Japanese researchers to mount studies on the full spectrum of natural and technological disaster agents which exist in the society. In fact, some Japanese researchers have expressed a fear that if the earthquake in Shizuoka occurred or did not happen in the next several years, that the Japanese government might lose interest and withdraw much of its current support for research. This is partly linked to a feeling that there does not exist much governmental interest in post-impact studies or historical studies of past disasters. Put another way, there is a belief that research into disasters is not yet fully institutionalized in Japanese science and fuding support sources, and is vulnerable to the vagaries of public attention to certain immediate problems which may not be sustained over a long term. From an outside perspective this seems a more discouraging assessment of the situation than is warranted, but it is a view currently prevailing among some of the Japanese disaster researchers.

3. In the earthquake area, the Japanese have developed a relatively explicit overall research agenda which so far has concentrated only on selective topics (e.g., predictions and warnings via the mass media and public responses to them, behavior in flight movements and evaucation, etc.). It appears that the range of socio-behavioral problems which ought to be studied have been considered much more systematically and explicitly in Japan than in the United States. The initial work, underway or planned, especially with respect to earthquake prediction, seems to focus primarily on the pre-impact period with major attention on the behavior of indidivuals and specific institutions like the mass media. The longer-run post-impact or recovery period, the role of governmental and private sector institutions, and prevention or mitigation measures, as these matters are defined in the Untied States, appear to be of less research priority in Japan, although some are part of the overall research agenda.

The overall research agenda developed on earthquake problems is impressive and something from which American researchers can learn. It is not clear, however, to what extent there is a deliberate intent to launch studies on all aspects noted. Nor is it clear what determines actual research priorities. Neither is it obvious why certain matters

appear to be relatively neglected. The most obvious example of the latter, from an American perspective, is the relatively little amount of systematic research attention to planning and organization of governmental agencies necessarily involved in the whole process. Their problems in implementing planning and what internal and external factors are affecting their preparedness measures have not been examined. Some Japanese disaster reserachers are not unaware of this gap in their studies and indicated to their American colleagues that some governmental administrators tend to be overly optimistic about disaster preparedness planning and to assume, probably incorrectly, that because plans exist that the plans would be actually followed in an earthquake emergency. In fact, Japanese researchers had done an intensive study of the diffusion of a news story which was incorrectly misinterpreted as an official earthquake prediction, and by this study they showed they were willing and able to take advantage of reserach opportunities not planned in the official research agenda.

4. As in the United States, there are different points of view in the scientific community in Japan as to the value and priority which ought to be given to different kinds of research. Some want to proceed with the development of theoretical models and tight research designs, and otherwise undertake what in the United States would be designated as basic or fundamental research. At the other extreme, there is what in Japan is called administrative research, which would seem to be quite similar to what in American society is called in-house, applied, or inventory type research. As in the United States, funding patterns also influence what is actually done. Given current governmental interest in Japan, studies are not heavily in the basic research direction at present.

Japanese disaster research in the social and behavioral sciences up to the present has been funded by fewer organizations than research in the United States. This has influenced the disaster research undertaken, primarily limiting the range of topics which have been examined. Unlike in America, for example, there has been almost no support in Japan for mental health studies of disasters. On the other hand, Japanese researchers do seem to have somewhat more freedom in doing their scientific work than their American counterparts. For instance, human subject considerations are not a matter of current concern in Japan; in fact, a few simulation and experimental studies done by Japanese researchers could probably not at present be done in the United States. Thus, while there are many elements of a common approach to scientific work in Japan and the United States, there are also cross-cultural differences which effect what is and can be done in scientific disaster research in the two countries.

5. Insofar as researchers are concerned, Japanese disaster research is intrinsically much more interdisciplinary (i.e., both within major areas such as the social sciences and also between areas such as the physical and the social sciences) than that typically found in the United States. The structure of higher education in Japanese society may partly account for this. Disciplinary lines are not as sharp in Japan, and there is not as strong a need to operate within scientific

disciplines as is the case in American colleges and universities. Japanese disaster reserachers are accustomed, therefore, to working with scientists from a wide range of disciplines. The structure of higher education and the pattern of research in Japan also encourages team research with participants from different colleges and universities, a situation very rare in American disaster research. In fact, Japanese team efforts may involve working not only with other social and behavioral scientists but with non-scientists as well.

Comment was made at the Tokyo meeting that while interdisciplinary research facilitated funding it was not always implemented in practice. Other Japanese participants at the meeting however, did not agree with this assessment. But Japanese disaster studies do involve researchers from a variety of disciplines, certainly more so than is typical in the United States. Also, it is rather rare to find solo researchers in Japan, whereas it is probably the mode in American disaster and hazard studies. In fact, the great majority of disaster research in Japan is not only a team effort, but usually under the leadership of one or two key senior researchers.

To the extent that there is a prevailing general disciplinary research orientation (as distinct from the specific disciplinary background of particular researchers), most Japanese studies are of a nature which in the United States would be called social psychological. At the meeting, however, there were explicit remarks by Japanese participants on the need to introduce a more organizational or sociological perspective into the research being done in Japan. But other disciplinary perspectives, such as those from political science or economics (as these are presently practiced in the United States) do not currently loom large on the Japanese disaster scene. On the other hand, journalism and communications are well represented in Japanese disaster research, although they are almost completely absent in American studies (there is, however, an important line of work in journalism and mass communications in Canada). There is also some work being done by geographers in Japan which parallels some of the American studies in hazards research.

6. While the American disaster community is almost totally ignorant of the Japanese work in the area, the converse is not true. The Japanese disaster research community is conversant with much of, and uses some of, the relevant American disaster and hazard research in the social and behavioral sciences. There is knowledge particularly of American studies on earthquakes, and attempts are made to incorporate ideas and findings from work already done in the United States into some Japanese research. But highly relevant and significant findings and ideas from Japanese studies remain unknown to American researchers. This situation is undoubtedly influenced by the fact that the vast majority of Japanese researchers can read the English language, whereas, as far as is known, not a single disaster or hazard researcher in North America knows Japanese.

Japanese efforts to learn of work elsewhere can be documented by the following selective examples. Barton's classic publication, Communities in Disasters has been translated into Japanese, as well as certain articles on panic behavior by Mintz and Quarantelli. Yasumasa Yamamoto in a late

1981 article in the Japanese Sociological Review had an article entitled, "Disaster studies in the United States in the latter half of the 1970s." A 1981 volume edited by Professor Hirotada Hirose with the title Social Scientific Approach to Disasters contains several chapters primarily summarizing American writings and works in the disaster area. Except for Quarantelli's use of two specially commissioned articles by Japanese researchers (namely Abe and Takuma) for his book Disasters: Theory and Research, 1978, and the earlier 1972 Proceedings of the Japan-United States Conference held at DRC, there has been little effort by Americans to find out about the disaster studies in Japan over the last 15 years.

The Future

There is little doubt that it would be highly fruitful to have closer contact between Japanese and American disaster researchers, and that collaborative research is an eventual worthwhile goal. American researchers have indicated their interest in developing something when they provided 25 abstracts of possible research topics for the Tokyo conference. Individual researchers such as Professor Olson, Professor Perry, as well as Professor Nigg of Arizona State have pursued possibilities of working together on some disaster topics with Japanese counterparts. The Japanese, in turn, have actively pursued, through personal meetings and correspondence, closer relations with American researchers resulting in one case to a joint presentation by Professor Nigg and Shunji Mikami at the 1981 Natural Hazards Workshop held at the University of Colorado. The University of Tokyo group under Professor Okabe is very actively involved in trying to obtain funds for 1982 which would allow some small scale collaborative research with American researchers including Professors Ralph Turner and Dennis Wenger as well as E. L. Quarantelli and Lee Becker of The Ohio State University. Also, at least seven Japanese researchers including almost all the leading researchers in Japan will be attending the World Congress of Sociology in Mexico City in 1982 with joint papers scheduled to be presented by Professors Hirose, Perry, and Nigg. A number of the Americans interested in collaborative work will specifically be attending the Congress to establish direct contact with their Japanese counterparts.

Thus, the overall situation is a promising one and there is continuing movement on several fronts. There is the need, however, for some caution least hopes and desires lose sight of practical realities and some difficult structural problems. To continue a movement toward closer relations and collaborative research between the Japanese and American disaster research communities in the social and behavioral sciences we recommend the following steps and activities.

1. A major effort should be made to distribute to American researchers the inventory we have developed on the Japanese work.

   In particular, the availability of the inventory should be made known in as many networks of scientific information as possible. DRC will take a lead role in this endeavor, as well as insuring that the key Japanese researchers will be sent a copy of the English language inventory.

2. American scholars should be encouraged to establish direct communication with relevant Japanese counterparts.

   Similarly, Japanese researchers ought to be encouraged to develop contacts with American students of disaster Phenomena. Perhaps NSF might publish and keep up to date a master list of researchers in Japan and the United States who are interested in cross-cultural and collaborative research; NSF might explicitly encourage collaborative research in its grant program.

3. Additional direct contacts are more important at present than further inventories or translations of works in either language.

   It would not be cost effective to develop other inventories or to do translations unless the parties involved clearly establish what else they want to learn from one another. The existing literature in the form it now exists along with the development of the inventories produced by DRC would seem enough at this time to encourage and to allow direct contact between interested parties (but see the * statement at the end of these recommendations).

4. Closer relations should be initiated slowly and should proceed a step at a time.

   That is, Japanese and American researchers who have had no previous contact, should first attempt to learn about one another's past work in the disaster area rather than proposing immediate joint research. There is no reason to believe that anything can be done quickly or that there can be a sudden jump into full scale collaborative work by parties unfamiliar with one another.

5. Initial collaborative work should first be undertaken by individual researchers (or a particular small group of researchers on both sides).

   Complex and close arrangements between groups of researchers or the two scientific communities are not presently possible. Whatever the arrangements made, American researchers should understand that the Japanese are accustomed to initiating their work program through senior researchers, although junior members of the group have considerable freedom once funding has been obtained. In fact, only some senior Japanese researchers get as intimately involved in the research effort as is typical of their American counterparts.

6. Initial collaborative research probably will have to take the form of common work where some Japanese and American researchers may be able to agree, for example, to use parts of the same research design.

   Thus, the work would be of a parallel nature. Truly joint or fully integrated research appears some time off.

7. In the near future at least, much of any common or collaborative work will have to be related in part to aspects that have some relevance to earthquakes, earthquake prediction, or related phenomena such as volcanic eruptions.

   Other substantive foci are not completely precluded, especially if the focus is on similar institutional aspects in both societies, such as the mass media and their functioning in providing warnings.

However, the realities of current research funding in both societies indicate where substantive research projects will have to initiated.

8. Any common or collaborative study that is launched, should include, if possible, some kind of pre-study as well as post-study direct contact between the collaborating Americans and Japanese.

   Development of understanding on what the work will focus must be an integral part of the joint or common research design. Direct personal meetings between some of the Japanese and American researchers should if at all possible be an integral part of the study design.

9. Further attention needs to be given to the consequences for collaborative research given the cross-cultural differences in the structure and institution of science in the two societies.

   For example, Japanese disaster research is more interdisciplinary, more team based, more principle investigator, initially focused, and less rule-regulated than is American disaster research. Perhaps some lessons could be learned from the experiences of Japanese-American collaborative research which is and has taken place outside of the disaster area, and a matter with which NSF has had considerable experience.

10. To maintain, facilitate, and augment existing contacts between Japanese and American disaster researchers, other linking mechanisms and more flexible funding sources need to be found.

    Possible linking mechanisms such as exchanges of raw data, the establishment of common data banks, the use of visiting scholars, and the holding of common workshops, ought to be explored. Funding possibilities should also be sought which would allow long term contact, the addressing of non-substantive issues in collaborative work, and the exploration of less immediately practical topics; a private foundation might be more supportive of such a thrust than a government agency.

Despite the just enumerated difficulties, the future seems bright. This very project being reported has itself initiated a number of steps and activities which have moved collaborative research between Japanese and Americans much further along than it was before the project started. If the momentum can be maintained future reports to NSF should be accounts of collaborative work rather than statements of how collaborative research can be developed.

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*However, if certain Japanese language writings were to be translated the highest priority ought to be given to the following sources:

1. Shimbun Kenkyusho (Institute of Journalism and Communication) THE EARTHQUAKE PREDICTION WARNING AND SOCIAL RESPONSES, PART II. The University of Tokyo Press, 1981.

This volume presents a number of the more important earthquake prediction studies in Japan and makes some comparisons with earlier Japanese studies on the topic. Chapter 1 is about the response to people to earthquake prediction. Chapter 2 is a second study of a semi-longitudinal nature and also on the responses to people to earthquake predictions.

2. Shimbun Kenkyusho (Institute of Journalism and Communication) THE EARTHQUAKE PRECITION WARNING AND SOCIAL RESPONSES. The University of Tokyo Press, 1979.

   This volume discusses the flow of information in connection with earthquake prediction.

3. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society) REPORT ON THE PSYCHOLOGICAL RESEARCH FOR COUNTERMEASURES AGAINST EARTHQUAKE DISASTER: EARTHQUAKE AND HUMAN BEHAVIOR. Keishi-Cho (Tokyo Metropolitan Police Board), 1971.

   This volume summarizes eleven other studies.

APPENDIX A

AN INVENTORY OF THE JAPANESE DISASTER RESEARCH LITERATURE IN THE SOCIAL AND BEHAVIORAL SCIENCES

This inventory has two sections. The first section provides three lists: (1) A list of the 62 Japanese social and behavioral science publications on the topic of disasters written through 1981. The items listed constitute the bulk of the empirically based literature produced in Japan; (2) A list of 39 English language writings by Japanese researchers. Some of these sources reproduce in whole or in part some of the material from the first list, but there is also original material; (3) A list of 16 non-social science but disaster relevant sources which would be of value for anyone planning to do field work on Japanese disasters. English language translations are provided for the Japanese titles which are only a fraction of this kind of literature available.

The second section of the inventory provides information and an abstract of the 62 Japanese publications in the first list. For each empirical report the following is presented: title, author(s), publisher and year, type of disaster agent, date of occurrence, location of event, casualties and damage in the situation, date of study and methodology used, and detailed hypotheses and findings.

For more general reports the following is presented: title, author, publisher and year, type of disaster agent, the full table of contents, and an abstract of the major ideas and suggestions in the text.

List A. The Japanese social and behavioral science publications on the topic of disasters written through 1981.

List B. The English language writings by Japanese researchers

List C. Miscellaneous non-social science but disaster relevant works in Japanese

LIST A.

1. Abe, Kitao
How To Survive a Disaster: The Behavioral Science of Disaster.
(Iza to iutoki Dou Nigeruka.)
Japanese Association of Property Insurance. (Nihon Songai Hoken Kyokai.) 1973

2. Abe, Kitao
Psychology of Panic.
(Panic no Shinri.)
Kodansha, Tokyo 1974

3. Abe, Kitao
At That Moment! You Are the Leader ---For Appropriate Actions in a Disaster.
(Sono Toki Anataga Leader Da.)
Japanese Association of Property Insurance. (Nihon Songai Hoken Kyokai.) 1976

4. Abe, Kitao
Experiments on Evacuation Behavior.
(Saigaiji no Hinan Kodo ni kansuru Model Jikken.)
in Tokyo Gaikokugo Daigaku Ronshu, Vol.30, 1980

5. Abe, Kitao
Psychology of Disaster I - XII.
(Saigai Shinrigaku)
Serial Articles in Psychology, July, 1980 - October, 1981

6. Abe, Kitao
Social Disorder in a Disaster --- On Some Determinants of Panic.
(Saigaiji no Shakaiteki Konran --- Panic o Kiteisuru Yoin ni tsuite.)
No Data about publication.

7. Abe, Kitao et al
Experiments on the Flow of Crowd.
(Gunshu no Ryudo ni kansuru Jikkenteki Kenkyu.)
Society for the Behavioral Science of Disaster. (Saigai Kodo Kagaku Kenkyukai.) 1976

1. 安倍北夫
『イザというとき どう逃げるか
防災の行動科学』
日本損害保険協会. 1973

2. 安倍北夫
『パニックの心理』
講談社. 1974

3. 安倍北夫
『そのとき! あなたがリーダーだ.
災害時の適応行動のために。』
日本損害保険協会. 1976

4. 安倍北夫
「災害時の避難行動に関する
モデル実験」
『東京外国語大学論集』30. 1980.

5. 安倍北夫
「災害心理 (I) ～(XII)」
『サイコロジー』7月号 1980～
10月号 1981.

6. 安倍北夫
『災害時の社会的混乱
パニックを規定する要因について』

7. 安倍北夫
『群集の流動に関する実験的
研究』
災害行動科学研究会. 1976.

8. Abe, Kitao et al
Panic.
in The Estimation of Damages in Tokyo Area by an Earthquake. (Tokyo Kubu ni okeru Jishin Higai no Sotei ni kansuru Kenkyu.)
Committee of Disaster Prevention, Tokyo Metropolitan Government. (Tokyo-To Bosai Kaigi.) 1978

8. 安倍北夫 他
「パニック」
『東京区部における地震被害の想定に関する報告書』
東京都防災会議. 1978.

9. Abe, Kitao and Ryoichi Kazama
Social Psychological Research on the Influence of the Prediction of the So-Called Kawasaki Earthquake.
(Iwayuru Kawasaki Chokkagata Jishin Yochi Joho no Shakai-Shinrigakuteki Teii.)
in Tokyo Gaikokugo Daigaku Ronshu, Vol.28, 1978

9. 安倍北夫・風間亮一
「いわゆる川崎直下型地震予知情報の社会心理学的定位」
『東京外国語大学論集』 28. 1978.

10. Abe, Kitao and Ryoichi Kazama
Human Responses to Crises.
(Kikibamen ni okeru Ningen no Hanno.)
in Tokyo Gaikokugo Daigaku Ronshu, Vol.29, 1979

10. 安倍北夫・風間亮一
「危機場面における人間の反応」
『東京外国語大学論集』 29. 1979.

11. Abe, Kitao and Ryoichi Kazama
On Panic Caused by Fire.
(Kasai Panic Ko.)
in Kenchiku Chishiki, February, 1981

11. 安倍北夫・風間亮一
「火災パニック考」
『建築知識』 2月号. 1981

12. Akimoto, Ritsuo and Hideaki Ohta
City in Disasters.
(Toshi to Saigai.)
Gakubunsha, Tokyo. 1980

12. 秋元律郎・太田英昭.
『都市と災害』
学文社 1980.

13. Bosai Toshi Keikaku Kenkyusho (Laboratory of Urban Safety Planning) and MANU Toshi Kenchiku Kenkyusho (MANU Institute of Urban Architecture.)
Report of Research on the Sennichi Department Store Fire.
(Sennichi Depaato Kasai Kenkyu Chosa Hokokusho.) 1972

13. 防災都市計画研究所・MANU 都市建築研究所.
『千日デパート火災研究調査報告書』
1972.

14. Fujiyama, Yoshio et al
The Behaviors of Injured Persons in Earthquake Emergency: A Research on the Behaviors of Injured Persons in the 1978 Miyagiken Oki Earthquake Emergency.
(Jishinji ni okeru Fushosha no Kodo.)
in The Study of Sociology (Shakaigaku Kenkyu.), Tohoku University 1979

14. 藤山嘉夫 他
「地震時における負傷者の行動」
『社会学研究』 38.
東北社会学研究会. 1979.

15. Hirose, Hirotada et al
Panic---The Day of Rebirth of the Aesop's Fables.
(Panic---Aesop no Guwa ga Yomigaeru Hi.)
in Ushio, September, 1978

15. 広瀬弘忠 他
「パニック イソップの寓話が甦る日」
『潮』 9月号. 1978.

16. Hirose, Hirotada
A Study of Evacuation Behavior in the Case of the Volcanic Eruption of Mt.Usu.
(Saigai to Jumin no Hinan Kodo.)
in The Earthquake Prediction Warning and Social Responses. (Jishin Yochi to Shakaiteki Hanno.) edited by Institute of Journalism and Communication (Shimbun Kenkyusho), University of Tokyo Press, 1979

16. 広瀬弘忠
「災害と住民の避難行動」
『地震予知と社会的反応』
東京大学・新聞研究所(編)
東京大学出版会. 1979.

17. Hirose, Hirotada (ed.)
Social Scientific Approach to Disasters.
(Saigai eno Shakaikagakuteki Approach.)
Shinyosha, Tokyo 1981

17. 広瀬弘忠(編)
『災害への社会科学的アプローチ』
新曜社. 1981.

18. Horige, Kazuya and Hiroshi Oura
The Cognition of the Damages, Caused by the 1978 Miyagiken Oki Earthquake, and the Corresponding Behaviors with It.
(Jishin Higai no Ninchi to Taio Kodo.)
in The Study of Sociology (Shakaigaku Kenkyu.), Tohoku University 1979

18. 堀毛一也・大浦宏.
「地震被害の認知と対応行動」
『社会学研究』 38.
東北社会学研究会. 1979.

19. Ikeda, Kenichi et al
The Study of the Responses to Earthquake Prediction: Part II.
(Zoku Jishin Yochi Joho eno Taio.)
Institute of Journalism and Communication (Shimbun Kenkyu-sho.), University of Tokyo.
1980

20. Keibi Shinrigaku Kenkyukai
(Guard Police Psychology Research Society)
Report on the Psychological Study for Countermeasures Against Earthquake Disaster: How Do Tokyo Residents Think About and Prepare Against an Earthquake Disaster? Vol.1
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Tomin wa Dou Kangae Dou Sonaeteiruka? Dai 1-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1965

21 Keibi Shinrigaku Kenkyukai
(Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Against Earthquake Disaster: How Do Companies, Schools, and Neighborhoods Respond to an Earthquake Disaster? Vol.2
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Kigyo, Gakko, Chiiki wa Ikani Taisho Sureba Yoika? Dai 2-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1966

22. Keibi Shinrigaku Kenkyukai
(Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Against Earthquake Disaster: How Should Tokyo Residents Respond to an Earthquake Disaster in Underground Shopping Malls or on Bustling Streets? Vol.3.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu:

19. 池田謙一 他
『続・地震予知情報への対応』
東京大学・新聞研究所.
1980.

20. 警備心理学研究会.
『大震災対策のための心理学的調査研究・都民はどう考え、どう備えているか. 其1報』
警視庁. 1965.

21. 警備心理学研究会.
『大震災対策のための心理学的調査研究・企業、学校、地域は如何に対処すればよいか、其2報』
警視庁. 1966.

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『大震災対策のための心理学的調査研究・外出時の都民はどう対処すべきか. 其3報』
警視庁. 1967.

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Tokyo Metropolitan Police Board (Keishi-Cho), 1967

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Report on the Psychological Research for Countermeasures Against Earthquake Disaster: Drivers' Consciousness and Responses to an Earthquake Disaster. Vol 4.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Daishinsai ni taisuru Jidosha Untensha no Ishiki to Kodo. Dai 4-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1969

24. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Agaist Earthquake Disaster: On Evacuation Behaviors. Vol.5.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Hinan Kodo ni Tsuite. Dai 5-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1970

25. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Against Earthquake Disaster: Earthquake and Human Behaviors.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Jishin to Ningen Kodo.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1971

26. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Against Earthquake Disaster: Evacuation Behavior to the Designated Evacuation Places Vol.6.
(Daishinsai Taisaku no tameno

23. 警備心理学研究会
『大震災対策のための心理学的調査研究・大震災に対する自動車運転者の意識と行動. 才4報.』
警視庁. 1969.

24. 警備心理学研究会.
『大震災対策のための心理学的調査研究・避難行動について. 才5報』
警視庁. 1970.

25. 警備心理学研究会.
『大震災対策のための心理学的調査研究・地震と人間行動』
警視庁. 1971

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『大震災対策のための心理学的調査研究・指定避難場所

Shinrigakuteki Chosa Kenkyu: Shitei Hinanbasho eno Hinan Kodo. Dai 6-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1971

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警視庁．　1971.

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Report on the Psychological Research for Countermeasures Against Earthquake Disaster: The Community Organization for the Prevention of Disaster, Vol.7.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Chiiki Bosai Soshiki ni kansuru Chosa, Dai 7-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1972

27. 警備心理学研究会．
『大震災対策のための心理学的調査研究・地域防災組織に関する調査．第7報』
警視庁．　1972.

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Report on the Psychological Research for Countermeasures Against Earthquake Disaster: Tokyo Citizens' Expectations for Police. Vol.8.
(Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Keisatsu Katsudo ni taisuru Tomin no Kitai. Dai 8-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1973

28. 警備心理学研究会．
『大震災対策のための心理学的調査研究・警察活動に対する都民の期待．第8報』
警視庁．　1973.

29. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)
On the Fire of Kumamoto Taiyo Department Store.
(Kumamoto Taiyo Depaato Kasai ni kansuru Keibi Shinrigakuteki Chosa.)
Mimeographed by Tokyo Metropolitan Police Board (Keishi-Cho), 1973

29. 警備心理学研究会．
「熊本大洋デパート火災に関する警備心理学的調査研究」
警視庁．　1973.

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Report on the Psychological Research for Countermeasures

30. 警備心理学研究会
『大震災対策のための心理学的調査研究・交通に関する調

Against Earthquake Disaster: The Traffic Conditions. Vol.9. (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Kohtsu ni kansuru Chosa. Dai 9-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1974

31. Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)
Report on the Psychological Research for Countermeasures Against Earthquake Disaster: The Drivers from the Outside of Tokyo. Vol.10. (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Jidosha Untensha no Ishiki Chosa. Dai 10-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1975

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Report on the Psychological Research for Countermeasures Against Earthquake Disaster: People in High Rise Buildings. Vol.11. (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Saigaiji ni okeru Koso Biru Riyosha no Ishiki Chosa. Dai 11-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1976

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Report on the Psychological Research for Countermeasures Against Earthquake Disaster: Residents of the Areas More Vulnerable to Earthquake. Vol.12. (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu: Daijishin ni Mottomo Kiken to Sareta Chiiki deno Ishiki Chosa. Dai 12-ho.)
Tokyo Metropolitan Police Board (Keishi-Cho), 1977

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警視庁. 1974.

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『大震災対策のための心理学的調査研究・自動車運転者の意識調査. 才10報』
警視庁. 1976.

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『大震災対策のための心理学的調査研究・災害時における高層ビル利用者の意識調査. 才11報』
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Author: Abe, Kitao

Publisher and Year: Nihon Songai Hoken Kyokai (Japanese Association of Property Insurance), 1973

II. Agent and/or Event.

Type of Disaster Discussed: Not specified

III. Table of Content.

IV. Abstract (Major ideas and suggestions.).

Emphasizing tragic consequences of panic, the author offered some ideas to control panic in emergency situations. Among them are "Fool-Proof" and "Fail-Proof." Fool-Proof means that facilities or equipment should be devised so that everybody can make use of them even if those people are mentally and physically handicapped. Fail-Proof means that alternative applications, methods, or equipment has been provided.

Most of contents overlap with Panic no Shinri (Psychology of Panic) by the same author.

Chapter 1 - Panic: Cases of the Ebino Earthquake, the Niigata Earthquake, the Tokachioki Earthquake, the Los Angeles Earthquake, and the Osaka, Sennichi Department Store Fire

Chapter 2 - Astonishment and Fear

1. Temporary Loss of One's Mind
2. Fear. Eruption of Violent Actions
3. Being Calm; Is It Possible?
4. Not Being Calm, but Recovering from Fright
5. Assume a Certain Emergency Role

Chapter 3 - Emergency Responses

1. Latent Anxiety about Disasters
2. Effectiveness of Customary Responses to Earthquake

Chapter 4 - Responses to Fire

1. Fright of Fire
2. "Fool-Proof" and "Fail-Proof"

Chapter 5 - Panicky Responses to Emergencies

1. The Crowd Involves People
2. Panic in Underground Shopping Mall
3. Stories Regarding the Osaka, Sennichi Department Store Fire
4. Decisions to Escape

Chapter 6 - Evacuation: Its Dynamics

1. Emergency Responses and Evacuation
2. Determinants of Evacuation
3. Facilitative Factors of Evacuation
4. Obstrctive Factors of Evacuation
5. Information and Crowds: Extrinsic Factors of Evacuation
6. Mass Evacuation in the Los Angeles Earthquake
7. Time Prior to Evacuation
8. Distance to an Evacuation Place
9. Removal of Valuables
10. Life in Shelters: Family Functions
11. Life in Shelters: Problems and Helping Behavior

Chapter 7 - Information and Rumor: Double Edged Sword

1. Functions of Rumor
2. Information as a Determinant of Panic
3. The Theory of Marginal Utility of a Transistor Radio

4. Uses and Effects of Information
5. Rumor
6. Emergence and Growth of Rumor
7. Credence of Rumor

Chapter 8 - Traffic Jam

1. What Happens to Cars?
2. Traffic Paralysis and the Secondary Disaster
3. Among Drivers the Lack of "Customary Responses" to Disaster
4. How to Prepare Against Traffic Panic

Chapter 9 - Organizational Breakdown of Business Firms

1. Leaving Workplaces
2. Anxiety about Family Members
3. Countermeasures Against Organizational Breakdown

Chapter 10 - To Avoid Panic

1. Disasters Created by Human Beings
2. What Creates Anxiety and Fright?
3. Panic
4. Behavior in Panic
5. To Avoid Panic
6. Everyday Preparation Against Sudden Disaster

I. Material.

Title: Panic no Shinri (Psychology of Panic)

Author: Abe, Kitao

Publisher and Year: Kodansha, Tokyo, 1974

II. Agent and/or Event.

Type of Disaster Discussed: Not specified

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

On the basis of empirical findings, the author emphasized that human factors determined the degree of disaster. Among others, panic in emergency situations is regarded as the most dreadful factor.

In the last chapter, the author provides twelve measures for avoiding panic. Some of those are:

1. Decrease the degree of shared fear by providing people with accurate disaster information.
2. Separate people into controllable groups.
3. Create social solidarity among people thereby decreasing competition.
4. Assign a specific emergency role to each person.
5. Educate a good emergency leader.
6. Be just to evacuees.
7. Avoid the spread of rumors by providing accurate, directive, and concrete information.

Contents

I. Material.

Title: Sono Toki! Anata ga Leader Da (At That Moment! You Are the Leader: For Appropriate Actions in a Disaster)

Author: Abe, Kitao

Publisher and Year: Nihon Songai Hoken Kyokai (Japanese Association of Property Insurance), 1976

II. Agent and/or Event.

Type of Disaster Discussed: Earthquake and Fire

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

Contents

7. Ill Responses by Drivers Are Fatal to Urban Areas
8. Open Your Houses for the Drivers
9. Do Not Defend, but Offend Against Disasters

Chapter 6 - Ascertain the Good Timing for Evacuation

1. Be Timely When Evacuating
2. Evacuate Earlier Rather Than Too Late
3. Eliminate Obstacles for Successful Evacuation
4. Factors Which Affect the Timing of Evacuation
5. Geographical Knowledge: Have an Evacuation Map in Your Head

Chapter 7 - Controlling Panic

1. Partition and Order of Crowd
2. One and One Do Not Make Two
3. Why Is Panic Threatening?: Physical Collision
4. Why Is Panic Threatening?: Circular Reaction
5. Density of Crowd
6. Conflictive Directions and Disorderly Crowd Flow
7. Disorderly Crowd Flow Caused by Different Speeds of Components
8. Acceleration and Amplification of Anxiety and Fear
9. Successful Control by Partition
10. To Create Crowd Order

Chapter 8 - You Are the Leader

1. Divisions of Labor and Activation of Organizations
2. A Determinant Factor of Crowd Behavior: Leader
3. Division of Labor as Crowd Partition
4. Trained Leaders Rather Than Spontaneous Leaders
5. Active Organizations Rather Than Blueprinted Organizations
6. Pay More Attention to Ensuring Safety
7. Efforts to Set Up Neighborhood Organizations
8. Miracle Survival from the Great Kanto Earthquake
9. Learning Lessons from Records or Archives of Disasters
10. Keep Things Necessary for Shelter Life in Your Storage Outside Your Houses

I. Material:

Title: Saigai Ji no Hinan Kodo ni Kansuru Model Jikken (Experiments on Evcauation Behavior)

Author: Abe, Kitao

Publisher and Year: in Tokyo Gaikokugo Daigaku Roushu, Vol. 30, pp. 233-250, 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Experiment

Date of Occurrence:

Location:

Casualties and Damage:

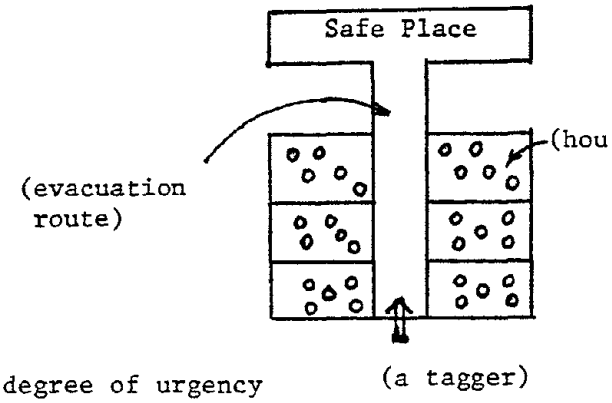
(2) Method

Method in detail: See the attached

Date of Study: Not mentioned

III. Hypothesis and Findings.

I. Experiment
   A. Subjects
      1. Fourth grade students in four elementary schools in Tokyo
   B. Design
      1. Let the subjects play a tag game.
         a) The conditions controlled
            (1) the degree of urgency
            (2) the necessity of cooperation
            (3) the avilability of disaster information



II. Findings
   A. Experiment I
      1. Evacuation without a tagger (the low degree of urgency
         a) evacuation was smoothly accomplished
         b) density per square meters was negatively associated with speed of human flow
   B. Experiment II
      1. Evaucation with cooperative work requirement
         a) evacuation accomplished at a slower pace
   C. Experiment III
      1. Evacuation with a tagger (the high degree of urgency
         a) the subjects pushed one another in passing an evaucation route and some of them fell down
         b) falling-down happened at the point after the highest density point in an evacuation route, rather than at the highest density place
         c) it did not necessarily take longer to evacuate in comparision with Experiment I.
   D. Experiment IV
      1. Evacuation with a tagger and a work requirement
         a) movements of the group closer to a tagger stimulated other groups; movements
   E. Experiment V
      1. Evacuation with a tagger, without any information about the time a tagger begins to chase (the high degree of urgency and no information about a crisis)
         a) when certain groups began to evacuate, all other groups rushed into an evacuation route.
         b) time and evacuation ratio showed the following curve

I.Material.

Title: Saigai Shinri (Psychology of Disaster), I-XII

Author: Abe, Kitao ...

Publisher and Year: in Psychology, July 1980 - October 1981, Vol. 4-8, 10-12, 14-15, 18-19

II. Agent and/or Event.

Type of Disaster Discussed: Not Specified

III. Table of Content.

See the attached

IV. Abstract (Major ideas and suggestions.).

See the attached

Twelve related articles have appeared serially in a professional journal, Psychology.

1. Three Human Factors Which Determine the Disaster
   (Psychology No. 4, July, 1980, pp. 72-76)

   Human factors which determine disasters are (1) human responses to emergencies, (2) life styles, and (3) the idea that "I" am exceptionally free from a disaster.

2. Astonishment and Fear
   (Psychology No. 5, August, 1980, pp. 74-78)

   The necessity for "Fool-proof" and "Fail-safe" measures is emphasized.

3. To Form New Customs for Disasters
   (Psychology No. 6, September, 1980, pp. 74-79)

   Traditional knowledge or customs for protecting ourselves from disasters have already been outdated. New customs based on facts should be formed among people.

4. On Carelessness I
   (Psychology No. 7, October, 1980, pp. 70-75)

   Disasters strike our weakpoints. We should realistically recognize our weakpoints and take steps to strengthen them.

5. On Carelessness II
   (Psychology No. 8, November, 1980, pp. 76-81)

   We should keep the fear of disasters and the necessity of countermeasures in mind in our everyday lives.

6. On Evacuation I
   (Psychology No. 10, January 1981, pp. 74-80)

   The Izu Oshima Kinkai Earthquake and the Osaka Sennichi Department Store Fire are used to illustrate physical and psychological obstacles to evacuation.

7. On Evacuation II
   (Psychology No. 11, February, 1981, pp. 72-77)

   The author uses the examples of three tragic fires to indicate that four important points are necessary for safe evacuation (1) smoke rather than fire is more dangerous, (2) that people need to be guided when evacuating, (3) that windows of high-rise buildings are not necessarily the best ways to evacuate, and (4) that information is very important.

8. On Evacuation III
   (Psychology No. 12, March, 1981, pp. 72-77)

   Two topics relating to evacuation are discussed; (1) when people will evacuate, and (2) people's tendencies in evacuating. In the discussion on the latter topic, the author indicates seven tendencies; (1) people choose the way out they know best, (2) people run away from smoke, (3) people who are not familiar with the setting tend to blindly follow

a leader, (4) people evacuate toward brighter places such as windows or the like, (5) people who recognize the sign of an "emergency exit" will safely evacuate, (6) people tend to follow other peoples' behavior, and (7) some people will shut themselves up in a room after they have been successful in escaping.

9. Urban Disaster I
(Psychology No. 14, May, 1981, pp. 78-82)

As to the factors which make urban disasters unique in comparison with disasters in non-urban areas, the author indicates these are (1) high-rise buildings, (2) automobiles, and (3) subways.

10. Urban Disaster II
(Psychology No. 15, June, 1981, pp. 79-85)

The author, focusing on an earthquake disaster, discusses the breaking down of lifeline functions as well as the way of life after disasters in urban areas.

11. Urban Disaster III
(Psychology No. 18, September, 1981, pp. 74-79)

The possible great fires after an earthquake and the large scale evacuation which would be necessary are discussed in relation to the significance of the designated evacuation areas.

12. The Flow of Crowd I
(Psychology No. 19, October, 1981, pp. 76-81)

The author discusses the mass movements which may occur in crowds and notes the relationships between the density of a crowd and its speed of movement and the tendency of many people to fall down in such situations.

I. Material:

Title: Saigaiji-no Shakaiteki Knoran (Social Disorder in a Disaster)

Author: Abe, Kitao

Publisher and Year: No Information

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake A. Izu Oshima Kinkai Earthquake B. Miyagi Ken Oki Earthquake

Date of Occurrence: A. January 14, 1978 B. June 12, 1978

Location: A. Izu Peninsula, Shizuoka Pref., Japan B. Miyagi Pref., Japan

Casualties and Damage: No Information

(2) Method

Method in detail:

(The Izu-Oshima Kinkai Earthquake)
1) Questionnaire method: Response Rate 71.3% Stratified Random Sampling (Izu area; 2,000 respondents, and Shizuoka Pref. except Izu area; 2,000 respondents)
2) Structured Interview with 1,076 people in 20 subdivided areas in Izu area.

(The Miyagi Ken Oki Earthquake)
Questionnaire method; 1,486 respondents

Date of Study: February 30-March 10, 1978 - Izu-Oshima Kinkai Earthquake
No Date for Miyagi-Ken Oki Earthquake

III. Hypothesis and Findings.

1) Panic is subdivided into four types of behavior; 1) evacuation behavior, 2) rush-for-shopping behavior, 3) go-home behavior, and 4) rumor.
2) By the factor analysis with 89 items, five dimensions which determine the people's consciousness and behaviors responding to earthquake and the earthquake warning are identified. Those are 1) the degree of damage or casualties, 2) source of information (from a relative, or from anonymous people), 3) other-oriented or self-dependent, 4) community-oriented or isolated, and 5) location (at home or distant from home).

I. Findings for the Izu Oshima Kinkai Earthquake
   A. The greater the damage
      1. The more information from the outside came into the community
      2. The more face-to-face communications tend to be
      3. The more other-oriented people tend to be
   B. The characteristic of the area, the degree of the damage, had the greatest effect on the occurrence of panic.
   C. With the degree of the damage controlled, the major factors which affect the occurrence of panic were as follows
      1. Source of information
         a) the greater the number of sources, the more likely panic is to occur
      2. Confirming behavior
         a) the failure to confirm information led to panic
      3. Anxiety
         a) the larger-the anxiety, the greater the possibility of panic
      4. Sources of information
         a) those who obtained information from their neighbors, passers-by, or relatives are more likely to panic than those who obtained information from co-workers or friends
      5. Experiences
         a) those who had experienced no earthquake were more likely to panic than those who had not

II. Findings for the Miyagi Ken Oki Earthquake
   A. The initial shock of the earthquake had a positive relationship with the degree of perceived social disorder.
   B. The major dysfunctions which the respondents indicated as social disorder were

1. Breakdown of electric current	173 respondents
2. Suspension of water supply	92 respondents
3. Suspension of gas supply, including propane gas	74 respondents
4. Traffic jam	72 respondents
5. Debris in disorder	48 respondents
6. Lack or shortage of food or other necessary goods	47 respondents
7. Suspension of telephone communication	44 respondents

Total number of respondents = 460

   C. The major items which people tried to buy after the earthquake were:
      1. In the area with the high perceived disorder
         a) canned food
         b) milk
         c) juice
         d) cookies
         e) fruit
      2. In the area with the low perceived disorder
         a) instant food such as Cup-Noodles
         b) candles

D. Those who were out of the home were more likely to perceive the disorder around them than those who were at home. The specific locations tend to affect their perception. Those who perceived the greater disorder are people who were

1. On trains or in cars	23.5%
2. In a building	
a) supermarket or department store	24.9%
b) company	15.2%
c) restaurants	15.1%
d) friend's house	6.6%
e) own shop	4.3%
f) school	2.6%
3. On a road distant from home	11.8%
4. Driving a car	10.1%

I. Material:

Title: Gunshu no Ryudo ni kansuru Jikkenteki Kenkyu. (Experiments on the Flow of Crowd)

Author: Abe, Kitao et al

Publisher and Year: Saigai Kodo Kagaku Kenkyukai (Society for the Behavioral Science of Disaster), 1976

II. Study:

(1) Agent and/or Event

Type of Disaster: Experiments

Date of Occurrence:

Location:

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

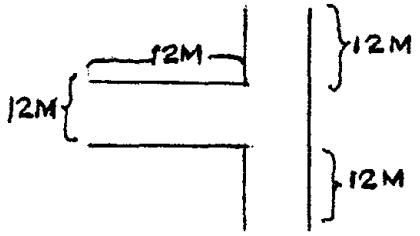
I. Experiment

A. Subjects: 150 fifth grade students of an elementary school

B. Design: subjects engage in a walking race in the following setting.

Three conditions:

1. a right-angled turn
2. a confluence toward the same direction
3. a convectional flow



Five experiments were done with various human densities per square meters (2 persons/m^2, 4 persons/m^2, 6 persons/m^2, and 8 persons/m^2). In every case, the density per square meters at a confluence point was held constant at 8 persons/m^2.

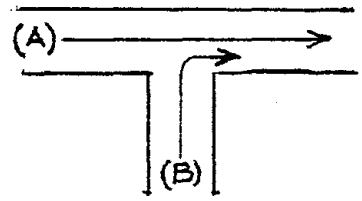
II. Findings

A. In the case of a right-angled turn with high density, they could not move in a proper manner. At the turning point, they turned the corner drawing a semicircular locus, with high density inside and low density outside.

B. In the case of a convectional flow, undulant curves were observed in both flows. The undulant curves were accompanied by different speeds at different points in the curve. This made for a flattening of the curve.

C. In the case of a convectional flow, movements at the middle created pressures to the edges of the group. These pressures caused many subjects to be crowded out.

D. In the case of a confluence toward the same direction, the movement of (A) did not draw a semicircular locus so that (B) could not smoothly join to (A) and began to weave to and fro. This failure of (B) to smoothly join and the resulting weaving caused many subjects to fall down.



I. Material:

Title: "Panic" in The Estimation of Damages in Tokyo Area by the Prospective Earthquake, pp. 426-461

Author: Abe, Kitao et al

Publisher and Year: Committee of Disaster Prevention, Tokyo Metropolitan Government, (Tokyo-To Bosai Kaigi), 1978

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

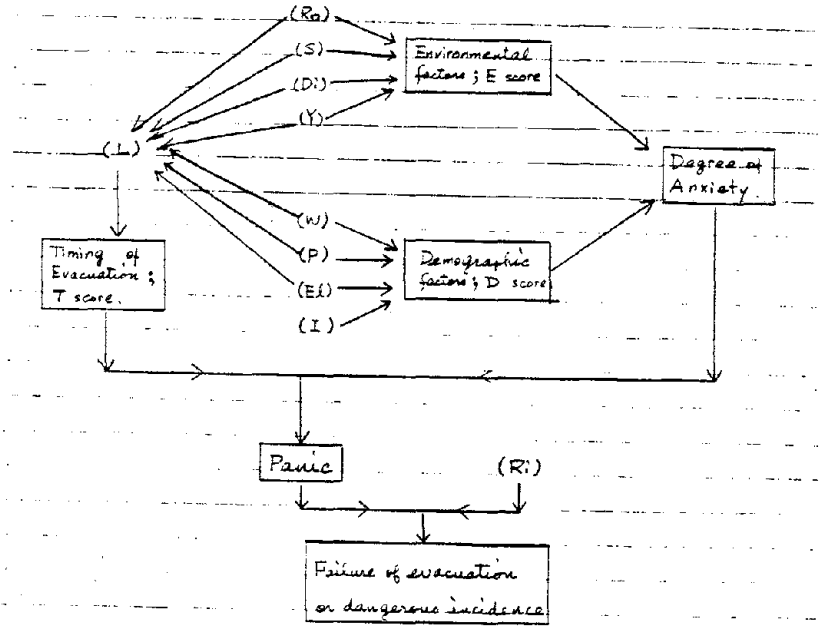
Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method
   A. No description of the method of collecting data
   B. For developing a model of panic analysis, a questionnaire survey was conducted.
      1. Questionnaires were delivered to and collected from students by teachers after questions were answered by students' parents.
      2. Sample: 2,174 residents of Ohta Ward, Tokyo, chosen by two-stage sampling
      3. Date of study: Feburary, 1975

II. A model of panic
   A. Variables taken into account (abbreviations in parentheses)
      1. Ratio of roads to the area (Ro)
      2. Ratio of open spaces to the area (S)
      3. Distance to evacuation place (Di)
      4. Years of living at the present residence (Y)
      5. Ratio of wooden houses (W)
      6. Population density (P)
      7. Ratio of the elderly or infants (El)
      8. Information availability (I)
      9. Evacuation lag (L)
      10. Potential risks in the area (Ri)
   B. A model



C. A weighing system

	(weighing point for E & D score)	(weighing point for T score)
(Ro)	1.5	2.0
(S)	1.0	1.5
(W)	3.0	1.5
(P)	2.0	1.0
(I)	1.0	-
(Di)	1.5	-
(Y)	1.0	2.0
(El)	1.0	1.0
(L)	-	2.0

D. Calculating a possibility of panic occurrence

1. E score = 1.5(Ro) + 1(S) + 1.5(Di) + 1(Y)
2. D score = 3(W) +2(P) + 1(El) + 1(I)
3. T score = 2(Ro) + 1.5(S) + 2(Y) + 1.5(W) + 1(P) + 1(El) + 2(L)
4. (E score + D score) = panic-potential
5. The greater the value of (E score + D score), the greater the panic potential.
6. The possibility that a dangerous panic situation (P) will be developed can be defined as follows

   a) (P) = (E + D) x (Ri) x (T)

7. By calculating P scores for all areas of Tokyo, the authors indicated 337 areas highly susceptible to panic incidences.

I. Material:

Title: Social Psychological Research on the Influence of the Prediction of the So-Called Kawasaki Earthquake. (Iwayuru Kawasaki Chokka-Gata Jishin Yochi Joho no Shakai-Shinrigakuteki Teii.)

Author: Abe, Kitao and Ryoichi Kazama

Publisher and Year: in Tokyo Gaikokugo Daigaku Ronshu, Vol. 28, pp. 168-197, 197

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake Prediction

Date of Occurrence: December, 1974

Location: Kawasaki, Kanagawa Prefecture, Japan

Casualties and Damage: Not mentioned

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method
   A. Structured interviews with 1,066 persons
   B. Samples: 1,066 persons chosen from three areas in Kawasaki city by two-stage sampling
   C. Date of Study: April, 1976

II. Results
   A. The research focused on five aspects of prediction information and its transmittance
      1. Recognition of information
      2. Attitudes toward information
      3. Contacts with information
      4. Responses to information
      5. Evaluation of information

In December, 1974, the committee for earthquake prediction released information about unusual phenomena observed around Kawasaki city. The information was reported in newspapers, and was regarded as an earthquake prediction. This research was carried out about this event.

B. Recognition (how accurately people recognized the information?)

	〈accurate recognition〉
1. Who issued the information	50.6%
2. About a seismic center	56.4%
3. About the time of occurrence	32.7%

Generally speaking, people accurately recognized the information but modified its contents toward a more critical direction.

C. Attitudes (whether or not people believed; whether or not people had any anxiety)

1. People who believed	51.1%
2. People who did not	22.9%
3. People who had anxieties	64.8%
4. People who do not	21.4%

Women rather than men, people who thought that the information was issued by local governments, people who perceived a stronger magnitude and a higher probability than that indicated in the information circulated, and people who had lived at their present residence for a long period, tended to believe the prediction.

Women rather than men, people who have lower level of education, and people who had lived at the present residence for a longer period tended to have stronger anxiety.

The degree of anxiety was clearly associated with whether or not they believed the information. That is, people who believed had a stronger anxiety than people who did not.

D. Contacts

	contacts	people who believed
1. newspaper	82.9%	49.3%
2. T.V.	72.7%	26.1%
3. P.R. by local government	36.6%	16.1%

Men are more likely to believe a newspaper report, while women are more likely to believe a T.V. report.

E. Responses to prediction

1. Preparing a flashlight	53.4%
2. Having a talk with family members at home	48.1%
3. Packing valuables	37.4%
4. Preparing a transistor radio	35.0%
5. Preparing foods and water	32.1%

People who experienced a disaster in the past are more likely to prepare something for the predicted earthquake than people who did not.

F. Evaluation

1. How people thought of the prediction information

a) a significant experience	58.9%
b) some merits and some demerits	13.6%
c) was a nuisance	11.3%

People who felt a stronger anxiety were more likely to perceive the predication information as significant than people who felt a weaker anxiety.

G. The prediction information was quickly clarified by the committee for earthquake prediction, and caused little troubles and confusions among people. However, it should be noted that in spite or because of their inaccurate understandings of the information, some people believed the information and felt a great anxiety. In addition to their inaccurate understandings and their great anxiety, the low degree of responsive measures among people observed here will facilitate the emergence of a panic situation.

I. Material:

Title: KIKI BAMEN NI OKERU NINGEN NO HANNO—Izu-Oshima Kinkai Jishin narabini Yoshin-Joho Dema no Shakai Shinrigakuteki Bunseki. (Human Responses in Crises—A Social Psychological Analysis of the Izu-Oshima Kinkai Earthquake and Rumor.)

Author: Kitao Abe and Ryoichi Kazama

Publisher and Year: Tokyo Gaikokugo Daigaku Ronshu, V-29, pp. 211-234, 1979

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake (the Izu Oshima Kinkai Earthquake)

Date of Occurrence: January 14, 1978, 12:24 p.m.

Location: Izu Peninsula, Shizuoka Pref., Japan

Casualties and Damage:
Not mentioned

(2) Method

Method in detail:
1) Telephone survey
2) Sample: 806 persons
3) Men and women between the ages of 20 to 59 drawn from the telephone directory by Stratified Random Sampling
4) Valid responses: 352 (43.7%)

Date of Study: February 1, 1978

III. Hypothesis and Findings.

I. The Analysis of Emergency Responses

A. The degree of shaking perceived is almost completely correlated with the degree of fear people had. ($r = -.923$)

B. People who were on the second floor when the quake occurred perceived the greatest degree of shaking, and people who were outside at that time perceived the least.

C. Women rather than men, and the elderly rather than youth are likely to have the greater degree of fear.

D. As the degree of perceived shaking increased, the ratio of people who took action increased. However, beyond the medium degree of perceived shaking, the ratio of people who did something decreased with the degree of perceived increased shaking.

E. Information-search behaviors after a quake

1. Most people tried to obtain information through television rather than radio.
2. People in their 20s are more likely to rely on radios.
3. Women are more likely than men to rely on T.V.

F. Extinguishing behavior after a quake.

(Sources of fire)	(Extinguished)
1. Gas range	90.7%
2. Boiler	91.7%
3. Oilstove	73.2%
4. Others (e.g., briquette brazier)	60.0%

5. The extinguishing behaviors occurred most frequently when people perceived a medium degree of shaking. As people perceived a greater or smaller degree of shaking, their extinguishing behaviors decreased.
6. The extinguishing behaviors occurred most frequently among people who were in their 30s. The older people are less frequently the ones to help extinguish a fire.

II. The Analysis of Rumor

A. People who heard the rumor that another great earthquake would occur soon 87.5%

B. As the degree of fear increased, the number of people who heard and/or believed the rumor increased.

C. People who gave credence to the rumor 29.6%

D. People who doubted the rumor 39.0%

E. Women were more likely to have believed the rumor than men.

F. The more education people have, the less they believed the rumor.

I. Material.

Title: Kasai Panic Ko (On Panics in Fires)

Author: Abe, Kitao and Ryoichi Kazama

Publisher and Year: Knowledge in Architecture (Kenchiku Chishiki), February 1981

II. Agent and/or Event.

Type of Disaster Discussed: Fire

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

1. Emergencies should be regarded as part of our routine everyday lives, and we should therefore be prepared.
2. There is a lag between cultural or technological development and our mental and physical adaptations to the development. We should be aware of the effects of new building materials on evacuation possibilities. (For example, new building materials such as plastic boards in a room can easily kill us in fires by producing toxic gas.)
3. Be aware of "flash-over effect." (A fire is abruptly spread by opening windows or doors.)
4. Anti-fire structures in buildings are similar to a furnace: although they defend the inside against externally derived fires, they facilitate the internally started fires. We should be aware that "anti-fire materials in buildings easily burn away."

5. Be aware of threats casued by toxic gas. (In the case of fire in Niigata, the carpet made of chemical fibers generated hydrocyanic-acid gas, and the "fire-balls" which were made from the carpet dropped over the heads of evacuees.)
6. We should be aware that a corridor is a fire path. Two emergency exits in opposite directions are desirable.
7. Ducts for air conditioning usually act as a chimney. In addition, fire can spread through a building by ducts without it being known by the people inside. We should reconsider the dysfunctional aspect of the central-air-conditioning system.
8. Stairways also function as a fire path or chimney. Therefore, in order to safely escape, we need two stairways in a building in opposite directions.
9. Emergency exits have a conflicting problem, i.e., for safe evacuation they should always be open or be easily unlocked; but for crime prevention they should be securely locked.
10. Fire-doors (doors which separate the area from the fire) should always be closed. Otherwise, they don't work. For example, all of the dead were found only on the fourth floor in the fire of Kushiro Orietal Hotel (Hokkaido), because the fire-door was open only on the fourth floor.

I. Material.

Title: Toshi to Saigai (City in Disaster)

Author: Akimoto, Ritsuo and Hideaki Ohta

Publisher and Year: Gakubunsha, Tokyo, 1980

II. Agent and/or Event.

Type of Disaster Discussed: Not specified

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

This volume is the first textbook in Japan on disaster studies for college students, written by a sociologist and a social psychologist. The author pigeon-holed some basic theories and findings in disaster studies in the past, focusing on two levels; (1) human behavioral and (2) organizational.

Contents

I. Material:

Title: Sennichi Departo Kasai Kenkyu Chosa Hokoku-sho. (Report of Research on the Sennichi Department Store Fire)

Author: Bosai Toshi Keikaku Kenkyusho and MANU Toshi Kenchiku (Laboratory of Urban Safety Planning) (MANU Institute of Urban Architecture)

Publisher and Year: 1972

II. Study:

(1) Agent and/or Event

Type of Disaster: Fire

Date of Occurrence: May 13, 1972, about 10:40 p.m.

Location: Osaka

Casualties and Damage: See the attached

(2) Method

Two field works

Method in detail:

(1) May 14; photos, hearing and interview with firemen, collection of local newspapers
(2) May 25; supplementary investigations

Date of Study:

III. Hypothesis and Findings.

The report consists of 13 chapters. Six chapters in the first half of the report are devoted to the description of a disaster. Some human and spatial factors and problems are indicated in the 7th and 8th chapters. Five chapters in the latter half of the report consist of further considerations and a summary and should be regarded as independent articles.

I. Disasters

A. On May 13, 1972, approximately 10:40 p.m., the seven-story Sennichi Department Store Building burned. The fire, caused by the careless discard of a lighted cigarette on the third floor, broke out while there were still 197 people in the building.

B. Major tenants of the building

1. Sennichi Department Store
2. Nichii Super Market
3. A Cabaret "Play Town"
4. Mexican Consulate
5. Game Corner
6. Bowling Lanes (under construction)

C. The precise count follows

1. The Cabaret "Play Town" (7th floor)	179 persons
2. Nightwatch-men and maintenance men (1st floor and ground floor)	6 persons
3. Workers for electric repair (3rd floor)	6 persons
4. Workers for the Bowling Lanes (6th floor)	6 persons

D. The total area devastated by the fire was 8,800 square meters (approximately 10,455 square yards).

E. Casualties due to fire were as follows

	Men	Women	Total
1. Slight injury	54	11	65
2. Serious injury	1	3	4
3. Killed	48	70	118

*The figures include those injured among fire-fighters.

F. Among 118 persons killed, 96 of the deaths resulted from smoke inhalation and 22 persons jumped to their death. All killed were (at the time of the fire) on the 7th floor (in the Cabaret "Play Town.")

II. Some observed problems

A. Cause of the fire: carelessness in discarding a lighted cigarette.

1. Problem: lack of "anti-disaster consciousness"

B. Spread of the fire: failure to use fire extinguisher, absence of automatic sprinklers, and all functioning anti-fire doors.

1. Problem: inadequate disaster-education and disaster-management.

C. Inhalation of poisonous gas: a large amount of sythetic fiber in the department store.

1. Problem: no regulations about management of those materials in a building.

D. Spread of smoke: spreads by air-circulation ducts, stairways, and elevator-shafts.
   1. Problems
      a) non functioning anti-fire damper in the ducts
      b) inadequate anti-disaster management
      c) flaws in construction
E. Detection of the fire: insufficient information was provided by fire alarm, and there was a delay of six minutes in sounding an alarm.
   1. Problems
      a) delay in notifying the fire department
      b) lack of a cooperative anti-disaster management system among tenants
      c) no information given to the Cabaret "Play Town"
F. Evacuation
   1. Problems
      a) failure to appropriately use evacuation equipment
      b) structural defects of the building
      c) emergency exits to the roof were locked
      d) Fire Department equipment inappropriate for mass evacuation
      e) no efficient way to save a large number of people from a high-rise building

III. Three types of human behavior in an emergency situation
A. Perception of unusualness
   1. Confirmation of the nature of the unusualness
B. Perception of danger
   1. Evacuation
C. Perception of hopelessness
   1. Desperate or drastic responses such as jumping out of windows
D. In the Sennichi Department Store Fire, the spatial or structural defects of the building made the situation worse for each type of human behavior.
E. Confirmation
   1. Delay in detection of fire on the 7th floor because of the isolation of that floor.
F. Evacuation
   1. Inappropriate location of emergency exits and outside-stairways
G. Desperate response
   1. The lack of places such as evacuation balconies on which the evacuees could wait to be saved, caused many falling deaths.

IV. Factors which should be examined for insuring safety
A. Preparedness
   1. Physical, structural, and human preparedness for fire (anti-fire structure, fire-fighting ability at the early stage of a fire, etc.)
B. Avoidability
   1. Preventive measures such as training, drilling, anti-fire doors, etc.
C. Escapability
   1. Escapable space, evacuation route, evacuation equipment, etc.
D. Communication
   1. Detection system, confirmation of abnormalcy, notification system, etc.

V. The items which should be improved
   A. Spacious or structural clearness or simplicity of the building
   B. Emergency stairways attached to the external wall of the building
   C. Emergency balcony
   D. Developing a way to quickly rescue a large number of people from a disaster in a high-rise building

VI. Human responses in an unusual situation
   A. Psychological response
      1. Mental readiness for emergencies
   B. Technical response
      1. The uses of emergency equipment
   C. Spatial responses
      1. Spatial movement or evacuation
   D. Psychological and technical responses aim at efficiently improving the spatial response. In the case of the fire discussed here, the worst factor was the space. That is, people were packed into a smokey building. Technically, they failed to effectively use equipment such as extinguishers, evacuation tubes, anti-fire shutters, emergency stairways, and so on. Mental readiness was lacking especially among managers and employees of Cabaret "Play Town."

VII. Public administrative problem
   A. Although the present fire and construction regulations (Shobo-ho and Kenchiku Kijun Ho) mention the structural frame of buildings, they do not refer to internal spaces in the buildings. Since the internal spatial arrangement of buildings creates problems which cannot be controlled by present regulations, a system of supervision, responsibility, and control will be necessary.

I. Material:

Title: The Behaviors of Injured Persons in Earthquake Emergency--A Research on the Behaviors of Injured Persons in the 1978 Miyagiken-Oki Earthquake Emergency (Jishinji ni okeru Fushosha no Kodo)

Author: Fujiyama, Yoshio et al

Publisher and Year: *The Study of Sociology* (Shakaigaku Kenkyu), Vol. 38, pp. 69-120, 1979. Tohoku Sociological Association

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: June 12, 1978, 5:14 p.m.

Location:

Casualties and Damage: Killed: 28 Injuired: 10,247
Completely destroyed houses: 1,279
Partially destroyed houses: 132,594
Flooded houses: 5
Destroyed portions of roads: 1,037
Landslides: 167
Fires: 12

(2) Method

Method in detail:

See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method

A. Structured interviews with 626 persons who were injured and went to a medical facility.

B. Samples were chosen from the list of the injured made by NHK (the Japan Broadcasting Corporation).

C. Samples were purposely chosen by areas.

1. Four areas were taken into account.

a) central part of Sendai city (Area 1)	11.0%
b) residential areas which were formed right after World War II (Area 2)	35.1%
c) residential areas which were formed after 1950s (Area 3)	19.7%
d) farming or fishing villages (Area 4)	34.2%

D. Date of study: September 30-October 4, 1978

II. Results

A. The degree of injury according to the areas

	(hospitalized)	(treated in a hospital)	(treated at home)
Area 1	2.9(%)	92.8(%)	4.3(%)
Area 2	10.5	83.2	6.4
Area 3	9.8	84.6	5.7
Area 4	7.0	87.9	5.1
(Total)	8.3	86.1	5.6

B. The time of injury

	(during the quake)	(just after the quake)	(after the quake)	(Total)
men	26.8(%)	1.6(%)	3.4(%)	31.8(%)
women	59.4	3.5	5.3	68.2
(Total)	86.3	5.1	8.6	100.0

C. The place of injury

1. Inside 78.1%

	men	women
a) in one's own house	46.1%	58.9%
b) at workplace or school	27.0%	11.4%

2. Outside 21.9%

a) within one's own garden	8.4%	14.5%
b) in someone else's garden	5.1%	1.0%
c) on street	2.8%	4.8%
d) on sidewalks	1.7%	4.6%

3. Injuries in one's own house were relatively slight, while injuries at workplace, schools, or outside (although not large in number) were relatively severe.

D. The kinds of injury

	(during the quake)	(just after the quake)	(after the quake)	(Total)
bruise	31.9(%)	9.4(%)	3.7(%)	28.3(%)
cut	45.4	75.0	79.6	49.8
abrasion	2.6	0	1.9	2.4
burn	4.1	0	3.7	3.8
sprain	3.7	0	3.7	3.5
fracture	11.9	9.4	1.9	10.9
other	0.6	6.3	5.6	1.3

5. What persons were doing when they were injured.

a) going into or out of houses	32.0%
b) attempting to hide somewhere	8.8%
c) sitting or standing	22.2%
d) attempting to prevent a fire or falling objects	9.5%

6. With what were persons injured

	(inside)	(outside)
a) falling objects	27.0%	17.9%
b) broken pieces of glass	10.6%	4.3%
c) falling persons	11.3%	42.7%
d) furniture which fell	24.3%	20.5%
e) collapse of the house	9.0%	-

Most injuries of infants were due to falling furniture or fallen concrete block walls.

7. What the injured learned

a) not to be upset; to behave prudently	26.3%
b) to set up a safety corner	19.2%
c) to make everyday preparations	17.7%
d) not to rush out	16.0%

8. Behavior just after injured

a) could not move	14.7%
b) moved away from the danger	12.3%
c) called someone for help	10.9%
d) gave first aid to themselves and went to a hospital	29.3%
e) prevented secondary disasters such as fire	5.3%
f) called the attentions of those who were around him	10.1%

9. Who helped the injured

	(Total)	(Area 1)	(Area 3)	(Area 4)
a) a family member	32.7%	41.5%	53.8%	52.1%
b) no one	28.8	-	-	-
c) a neighbor	18.1	31.7	16.7	15.4
d) a co-worker	11.7	-	-	-

10. How the injured came into contact with their families

a) a family member phoned or came to him	42.1%
b) went home for himself	20.8%
c) phones for himself	14.2%
d) asked someone to phone his family	12.6%

11. How long it took for the injured to come into contact with their families

a) within one hour after they were injured	47.4%
b) from one to two hours after they were injured	24.1%

12. Ratios of the injured who could come into contact with their families within two hours, according to areas

a) Area 1	85.2%
b) Area 2	61.2%
c) Area 3	70.0%
d) Area 4	77.7%

I. Material:

Title: Panic--The Day of Rebirth of the Aesop's Fables (Panic--Aesop no Guwa ga Yomigaeru Hi)

Author: Hirose, Hirotada et al

Publisher and Year: in Ushio, pp. 82-119, September, 1978

II. Study:

(1) Agent and/or Event

Type of Disaster: Volcanic eruption

Date of Occurrence: August 7, 1977, 9:14 a.m.

Location: Mt. Usu, Hokkaido, Japan

Casualties and Damage:

Direct damages: approximately 138 million U.S. dollars
Indirect damages: approximately 44.3 million U.S. dollars

(2) Method

Method in detail: Interviews with community leaders and residents

Date of Study: Not mentioned

III. Hypothesis and Findings.

The content overlaps with "A Study of Evacuation Behavior in the Case of the Volcanic Eruption of Mt. Usu." See the summary of that article. English edition of this article was written by Hirose, Hirotada. See "Volcanic Eruption and Local Politics in Japan," Mass Emergencies, 4, 1979.

I. Material:

Title: Saigai to Jumin no Hinau Kodo--Hokkaido Usu San Funka no Baai (A Study of Evacuation Behavior in the Case of the Volcanic Eruption of Mt. Usu)

Author: Hirose, Hirotada et al

Publisher and Year: in Shimbun Kenkysho (Institute of Journalism and Communication) ed., Jishin Yochi to Shakaiteki Hanno (The Earthquake Prediction and the Social Responses), The University of Tokyo Press, pp. 307-365, 1979.

II. Study:

(1) Agent and/or Event

Type of Disaster: Volcano eruption

Date of Occurrence: August 17, 1977

Location: Hokkaido, Mt. Usu

Casualties and Damage:

Casualties: 3
Damages: see the attached

(2) Method

Method in detail: Unstructured Interviews and questionnaires answered by mail

Sample for Quasi-Survey Research: 300
Return Ratio: (91) 30.3%

Date of Study: December 11-15, 1977 (interviews with city officials, police, and fire departments)
June 11-14, 1978 (interviews with residents)
June 30-July 1, 1978 (interviews with and questionnaire deliveries to community leaders)

III. Hypothesis and Findings.

I. Evacuation Process
   A. August 7, 1977
      1. 9:12 a.m. - the first eruption
      2. 11:00 a.m. - evacuation orders by local governments were issued for 6,423 residents in seven areas; 4,296 evacuated
   B. August 8, 1977
      1. 3:30 p.m. - the second eruption
         a) by evening, most residents in Abuta-cho voluntarily evacuated leaving about 2,000 residents in the town who did not evacuate
   C. August 9, 1977
      1. 6;20 a.m. - the evacuation order by the local government was issued for the residents who still were in town (2,000); of these 1,700 persons evacuated by trucks provided by the Self-Defense Force or by buses of a private bus company.
      2. Evacuees were sheltered in public facilities.
   D. August 12, 1977
      1. Permission for temporarily visiting their own houses was granted (1 hour).
   E. August 15, 1977
      1. Permission for temporarily visiting their own houses was granted (3 hours).
   F. August 18, 1977
      1. The association of the tourist industry of the town demanded the town headman to rescind the evacuation order.
         a) this demand reflected the evacuees' wishes to go home and the association's interests
   G. September 7, 1977
      1. The rescission of the evacuation order
      2. Traffic was still restricted by police to official or resident use only.
   H. September 23, 1977
      1. The rescission of the emergency traffic control

II. Socio-Economic Effects
   A. Direct effects
      1. Damages to houses, roads, agriculture, fishery, and so on, caused by ash
         a) loss of ¥31,700,000,000 (138 million U.S. dollars)
   B. Indirect effects
      1. Decrease in the number of sightseers caused the loss of expected incomes.
         a) loss of ¥ 10,200,000,000 (44 million U.S. dollars)
      2. Since the eruption occurred in the best sightseeing season of the year, the damages were serious
   C. Financial support
      1. Farmers or fishermen were supported by the farmers union or the mutual benefit association.
      2. Since the tourist industry and other related small business firms had no supporting organization or system, the town, the prefecture (Hokkaido), and the national government enacted remedial measures to give them special emergency loans.

III. Results of Survey Research

A. Ratio of evacuation 81.3%

B. Where they evacuated

(Name of Town)	Sahbetsu & Date	Abuta
1. Houses of their friends or relatives	47.9%	27.5%
2. Designated evacuation places	29.2%	33.3%

C. Duration of evacuation

1. Less than 10 days	52.1%	31.4%
2. 21-30 days	25.0%	25.4%
3. More than 30 days	-	23.5%

I.Material.

Title: Saigai eno Shakai Kagakuteki Appoach (Social Scientific Approach to Disasters)

Author: Hirose, Hirotada (ed.)

Publisher and Year: Shinyo-sha, Tokyo, 1981

II. Agent and/or Event.

Type of Disaster Discussed: Disaster as general

III. Table of Content.

See the attached

IV. Abstract (Major ideas and suggestions.).

See the attached

Social Scientific Approach to Disasters. edited by Hirotada HIROSE, 1981
Shinyosha, Tokyo, Japan

TABLE OF CONTENTS

Summaries of chapters

Chapter 1 - Disaster Process by Hirotada Hirose

Disasters are defined as loss of lives, property, and breakdown of social order caused by mal-adaptations of individuals, groups, organizations, and society as a whole to environmental threats brought by disaster agents.

Chapter 2 - Disaster and Organizations by Yasumasa Yamamoto

Reviews of the previous studies on disasters from the organizational viewpoint.

Chapter 3 - Disaster and Information by Hirosuke Mizuno

The role of disaster information for appropriate responses is emphasized. It is indicated that necessary information should be transmitted via proper channels.

Chapter 4 - Disaster and Public Administration by Hiroshi Miyagawa

The article describes the countermeasures by Shizuoka prefecture, reports the computer simulation on damage assessment in Shizuoka prefecture due to the so-called Tokai Great Earthquake.

Chapter 5 - Reconstruction after Disaster and Society by Takeo Matsumura and Makoto Nakada

Using historical records, the authors analyze the political and economic effects of disasters. In addition, the effects on urban structures and on life styles or life structures are discussed.

Chapter 6 - Helping Behavior in Emergency Situations by Hiyoshi Nakamura

Using many psychological studies and actual events, the author describes the psychological process through which people hlep others in emergency situations. Based on the discussion, psychological process model of helping behavior is provided.

Chapter 7 - Decision-Making and Disaster by Kenichi Ikeda

Mechanisms of individual decision-making in crises are described in terms of two phases of an information process and decision-making process. Then, the author indicates four types of roles played by others.

Chapter 8 - Case Study I: The Eruption of Mt. Usu by Yoshitomo Watanabe

This article is similar to "Panic--Aesop no Guwa ga Yomigaeru Hi (Panic--The Day of Rebirth of the Aesop's Fables)" by Hirose et al.

Chapter 9 - Case Study II: The Miyagiken Oki Earthquake by Takashi Ohmi

Using the results of several studies not only from an architectural point of view, but also from a sociological viewpoint, the author pointed out several factors which made urban areas vulnerable to an earthquake.

Appendix - The Eruption of Mt. Ontake and Its Effects by Osamu Hiroi and Yoshitomo Watanabe

They report (1) that area-specific media such as cable broadcasting systems are better in a small area than ordinary mass media, and (2) that a person who has a strong identity with an many human ties in a community tends to conform to police or governmental officials' directions and to be active in helping others.

I. Material:

Title: The Cognition of the Damages, caused by the 1978 Miyagiken Oki Earthquake, and Its Corresponding Behaviors. (Jishin Higai no Ninchi to Taio Kodo).

Author: Horige, Kazuya and Hiroshi Oura

Publisher and Year: in The Study of Sociology (Shakaigaku Kenkyu), Vo. 38, pp. 9-67, 1979
Tohoku Sociological Association

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: June 12, 1978, 5:14 p.m.

Location: Miyagi Prefecture, Japan

Casualties and Damage: Killed: 28; Injured: 10,247
Completely destroyed houses: 1,279
Partially destroyed houses: 132,594
Flooded houses: 5
Destroyed portions of roads: 1,037
Land slides: 167
Fires: 12

(2) Method

Method in detail:

See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method

A. Structured interviews with 1,014 housewives in 6 areas of Seudai city

B. Sampling procedure: Stratified two stage sampling

C. Date of Study: December 8-12, 1978

II. Results

A. Perceptions about the event

1. People who perceived the earthquake as great	96.0%
2. People who perceived the damages as great	73.0%
3. People who had strong fears	95.0%

B. Characteristics of the earthquake which people indicated

1. Breakdown of life-line functions	69.0%
2. Falling of concrete block walls	36.0%
3. Different degrees of damages by areas	34.0%

C. An act of God or a man-made disaster?

1. The earthquake disaster was an act of God	83.0%
2. The earthquake disaster was due to human failure	17.0%

D. When people were asked about who was responsible for the damages, those who regarded the disaster as an act of God decreased.

1. Government is responsible.	19.0%
2. Real estate companies are responsible.	32.0%
3. People who had damages are responsible.	4.0%
4. No one is responsible; it was an act of God.	43.0%

E. What people wanted to know on the day of impact (multiple choice)

1. About after-shocks	66.7%
2. About life-line functions	47.2%
3. About family members or friends	35.2%
4. About damages	27.4%

F. What people were troubled about

	on the day of impact	following days
1. Interruption of electricity	70.7%	26.5%
2. Interruption of gas	50.6%	65.1%
3. Interruption of telephone	24.3%	-
4. Interruption of water	18.7%	53.5%

G. Mutual assistance in neighborhood?

1. No mutual assistance	27.4%
2. People who answered "Yes"	70.9%
3. The mutual assistance was in	
a) providing meals or bathing facilities	24.4%
b) cleaning the debris up	11.8%
c) psychological support	19.0%
4. Whether or not any change occurred in neighborhood?	
a) no change	61.8%
b) people became better acquainted	12.6%
c) people became more cooperative	4.5%
d) people became more integrated	18.1%

5. The younger they are, the more changes they perceived.

6. People in the central part of the city perceived less change.

H. People's demands on the governments were

1. To accurately and effectively predict an earthquake	62.4%
2. To exercise a closer supervision over the real estate companies	82.0%
3. To establish a better system for compensating individuals losses due to disaster	29.0%
4. To set up a better evacuation system	22.0%
5. To set up a better communication system	25.0%

The Study of the Responses to Earthquake Prediction: Part II

(Zoku Jishin Yochi Joho eno Taio). Ikeda, Kenichi et al

NOT COMPLETE

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disasters--How Do Tokyo Residents Think About and Prepare Against an Earthquake Disaster?, Vol (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Tomin wa Dou Kangae Dou Sonaeteiruka? Dai 1-ho)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1965

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Methods

A. Questionnaires delivered and collected by police
   1. Samples: 10,000 individuals, chosen by purposive selection
   2. Valid answers: 9,720
   3. Date of Study: April-May, 1965

B. Questionnaire survey and interviews
   1. Samples: 700 individuals drawn by a sub-sampling method
   2. Valid answers: 502
   3. No details about interviews
   4. Date of Study: July 11-12, 1965

C. Group interviews with eight groups
   1. Community leaders in downtown areas
   2. Housewives in residential areas
   3. Principals or head teachers of elementary and junior high schools
   4. Hotel managers or owners
   5. Traders or manufacturers dealing with dangerous substances
   6. Managers of theatres or department stores
   7. Managers of big business firms
   8. Owners of small business firms
   9. Date of Study: July 13-20, 1965

II. Results

A. Supposed emergency responses

1. Put fire out	75.0%
2. Open a door	56.0%
3. Observe the situation	54.0%
4. Remove valuables	34.0%
5. Get dressed	30.0%
6. Rush out	.9%

As age increases, the number of people who would do a., b., d., or e. increases.

People who have experienced an earthquake disaster are more likely to indicate they would do a., b., d., or e. in comparison with people who have no such experience.

People who have a conversation at home on how to respond indicate they would more likely do a., b., d., or e. than people who do not have such a conversation.

B. Supposed disasters due to an earthquake

1. Fires	90.5%
2. Collapse of houses	71.2%
3. Shortage of water	39.0%
4. Shortage of foods	31.5%
5. Breakdown of traffic systems	21.8%
6. Infectious or contagious disease	10.5%

People who live in downtown areas tend to predict the greater damage.

What is emphasized varies according to areas of residence.

C. People who have had a conversation at home on how to respond 62.0%
   1. What they have talked about at home
      a) evacuation places 46.2%
      b) what they should remove 32.0%
      c) how to evacuate 30.0%
      d) where family members will meet 17.7%
      e) a temporary shelter 17.4%
      f) how to communicate with each other 16.9%
   2. People who have experienced an earthquake are more likely to have had a conversation regarding these possibilities.

D. Fear and psychological readiness

(fear)	ready	not ready
strong	48.6%	51.4%
medium	45.8	54.1
weak	36.1	63.9

   1. As the feeling of fear decreases, psychological readiness or preparation is less.

E. Evacuation and drills
   1. Where they would evacuate
      a) nearby open spaces 58.4%
      b) public facilities 25.1%
      c) nearby heights 3.4%
   2. Many youths answered they did not know where they would evacuate.
   3. People who have school-age children are more likely to indicate they would evacuate to public facilities, because most people who answered "public facilities" seemed to mean school facilities.
   4. As age increases, the number of people who would evacuate to nearby open spaces increases.
   5. How they would evacuate

	men	women	total
a) on foot	74.2(%)	76.4(%)	75.2(%)
b) by bicycle or motorcycle	3.0	1.0	2.3
c) by car	11.8	9.1	10.7
d) other	2.3	2.0	2.2
e) don't know	8.0	11.6	9.1

   6. People who have had a drill
      a) never 84.0%
      b) yes 16.0%
      c) for floods 15.0%
      d) for fires 73.0%
      e) evacuation 40.0%
   7. People who think that a drill is essential 70.0%
   8. People who think that a drill is not essential 10.0%

I. Material:

Title: Report on the psychological Research for Countermeasures Against Earthquake Disasters--How Do Companies, Schools, and Neighborhoods Respond to an Earthquake Disaster? Vol.2 (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Kigyo, Gakko Chiiki wa Ikani Taisho Sureba Yoika? Dai 2-ho

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1966

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Methods

A. After disaster drills in two areas of Tokyo, group interviews were carried out with 700 participants. Among them, 268 persons were administered questionnaires.

1. Samples for a questionnaire survey; 268 (Men: 91, women: 177)
2. Date of Study: June 12, 1966

B. After the disaster drills in two schools, group interviews were conducted.

1. Samples
   a) an elementary school: techaers - 26, pupils - 764
   b) a junior high school: teachers - 31, students - 805
2. Date of Study: June 18, 1966

C. A questionnaire survey was conducted of business firms.

1. Samples: 500 business firms in Tokyo (A general manager answered questions on behalf of his or her company.)

(Area)	(Size) large	medium	small	total
Yamanote area	64	133	55	252
Shitamachi area	58	127	52	237
Central part	37	61	15	113
Total	159	321	122	602

Yamanote area - mainly the residential areas in Tokyo, such as Shibuya Suginami, Bunkyo, and other wards

Shitamachi area - mainly the commercial areas or small-industry areas mixed with residences, such as Kohto, Ohta, and other wards

2. Size
   a) large (over 500 employees)
   b) medium (between 100 and 500 employees)
   c) small (less than 100 employees)
3. Date of Study: June 20-July 10, 1966

D. A questionnaire survey for employees of the companies chosen as above.

Samples	large	medium	small	total
Yamanote	326	668	306	1300
Shitamachi	272	624	254	1152
Central part	187	222	76	485
Total	787	1514	636	2937

1. Date of Study: June, 1966

II. Results

A. Business firms

1. Business firms which have emergency planning
   a) for fires 86.0%
   b) for typhoons or floods 49.0%
   c) for earthquakes 29.0%

Large business firms are more likely to prepare for disasters than small business firms.

2. Division of labor in an emergency
   a) business firms which have a division of labor for emergency responses 84.0%
3. Evacuation
   a) business firms which have a plan on how to evacuate (escape) 67.5%
   b) business firms which have a plan about evacuation places 65.0%
   c) among business firms which have a plan, those whose employees recognize the plan well 38.0%
4. Communication

	large	medium	small	total
face-to-face	42.7(%)	51.0(%)	61.5(%)	50.7(%)
loud speaker	7.6	2.9	2.5	4.1
wire telephone	43.4	39.8	19.7	36.1
wireless	1.9	0.3	0	0.7
other	3.8	4.0	9.0	5.0

5. Business firms which have prepared necessary equipment or material for an earthquake disaster 90.0%
   a) medicines or first-aid kits 87.0%
   b) flashlights 86.0%
   c) overalls 59.0%
   d) radio 57.0%
   e) tents and blankets 40.0%
   f) food and water 23.0%

B. Employees
1. Employees who have been informed of appropriate responses 43.2%

Men are more likely to be informed of appropriate responses than women.

2. Employees who have participated in a disaster drill 47.0%
   a) ratios of the employees who have participated

large :	54.3%	Yamanote :	46.5%
medium:	46.8%	Shitamachi :	48.6%
small :	37.9%	Central part:	43.8%

Most drills were conducted on how to extinguish a fire.

3. Recognition of an emergency commander
   a) employees who recognize it 65.7%

	heard instructions	never heard
(a) knew about an emergency commander	88.0%	51.3%
(b) did not know about an emergency commander	11.9%	48.6%

4. If an earthquake occurred before or after office hours
   a) employees who think they would go to their offices immediately 41.5%

	heard instructions	never heard
(a) should go to company	54.3%	33.7%
(b) do not have to go to a company	45.6%	66.2%

5. When they are outside

	(immediately go to company)	(immediately to home)	(D.K.)	(other)
large	29.2%	48.2%	6.5%	15.9%
medium	30.3	47.3	7.3	15.0
small	35.4	43.7	6.7	14.1

C. Schools
   1. Although they have had disaster drills, no drills against earthquake disasters have been carried out because it is hard to set up the hypothetical situation.
   2. Most teachers worried about whether or not they can successfully help children escape.

D. Neighborhood
   1. A conversation at home about a disaster
      a) people who have had a conversation at home 86.0%
      b) what they have talked about at home
         (1) how to put fire out and remove valuables 49.6%
         (2) where to evacuate 35.7%
         (3) emergency responses 26.3%
   2. Group evacuation
      a) people who prefer
         (1) an official order 49.6%
         (2) together with neighbors 45.5%
         (3) as one likes 35.5%
   3. Middle age people tend to prefer to evacuate with neighbors, while women are more likely to think they will evacuate in accordance with an official order.

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disasters--How Should Tokyo Residents Respond to an Earthquake Disaster in Underground Shopping Malls or on Bustling Strees?, Vol. 3

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1967.

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Method

A. Structured interviews at four underground shopping malls with

1. 1,102 residents chosen from selected areas
2. 1,080 workers or students chosen from selected companies or schools
3. 175 workers or owners of stores in underground shopping malls
4. 1,493 pedestrians chosen in a haphazard way in underground shopping malls

B. Date of study: June 8 - July 8, 1967
July 3 - July 4, 1967

II. Results

A. On samples 1, 2, and 4

1. Whether of not they have imagined an earthquake in underground shopping malls.
   a) yes 33.2%
2. Men are more likely to imagine that an earthquake may occur than women. Generally speaking, women are more optimistic than men.
3. As age increases, the number of people who imagine the occurrence of an earthquake increases.
4. People who frequently visit the underground shopping malls are more likely to imagine the occurence of an earthquake than people who less frequently visit.
5. People who visit the underground shopping malls at night are more likely to imagine the occurrence of an earthquake than people who visit during the daytime.

B. Perception about dangers of underground shopping malls due to an earthquake

1. People who perceive the underground shopping malls as dangerous 65.0%
2. As age increases, the number of people who do not perceive malls as dangerous increases.
3. People who frequently visit are more likely to perceive the underground shopping malls as less dangerous.
4. What is dangerous

	men	women	total
(1) collapse	45.4%	39.6%	43.1%
(2) fires	17.4	18.4	17.8
(3) crowds	17.6	24.0	20.2
(4) disruption of electricity	16.1	12.2	14.5
(5) don't know	3.5	5.8	4.4
total	100% (894)	100% (599)	100% (1,493)

5. Perceived possibility of evacuation from the underground shopping malls
   a) people who think it is possible 21.2%
   b) people who think it is impossible 55.2%
6. Women are more pessimistic about the possibility of successful evacuation.
7. People who frequently visit the underground shopping malls tend to perceive a greater possibility of successful evacuation than people who less frequently visit.

C. Emergency responses
1. Three types of emergency responses
   a) the wait-and-see attitude (WAS type) 35.0%
   b) the rush-into-exits type (RIE type) 40.0%
   c) the rush-to-and-fro type (RTF type) 20.0%
2. Men tend to respond with WAS type, while women tend to respond with RTF type.
3. As age increases, the WAS type of responses increases.
   a) Youth tend to respond with RTF type.
4. People who are familiar with the underground shopping malls tend to respond with WAS type, while people who are less familiar with them tend to respond with RTF type.

D. Recognition of countermeasures of the underground shopping malls
1. People who think that the underground shopping malls have
   a) some countermeasures 48.5%
   b) no countermeasures 34.8%
2. People in their 40s or 50s are more likely to think the underground shopping malls have some countermeasures against an earthquake than people in their 20s or 30s.
3. People who visit the underground shopping malls at night tend to think they have some countermeasures.
4. People who respond with WAS type tend to think that the malls have some countermeasures.
5. Preparations thought to be necessary
   a) set up self-defense organizations in the underground shopping malls 85.1%
   b) provide people with official instructions and to supervise them by police or fire departments 95.4%
   c) clearly indicate emergency exits and how to evacuate 97.0%
   d) educate people who visit the malls 89.5%
   e) be equipped with emergency lights and generators 95.4%
6. Evacuation drills
   1. People who think that the drills are essential 80.0%

III. Results

A. On sample 3

1. Perceived possibility of the occurrence of an earthquake
   a) people who perceive a great possibility 75.0%
   b) in comparison with the samples 1, 2, and 4, the ratio of people who think an earthquake will occur is markedly high
2. Perceived degree of safety of the underground shopping malls
   a) people who think that the malls are safe 33.0%
   b) in comparison with the samples 1, 2, and 4, the ratio of people who think the malls are safe is markedly high
3. Predicted damages from an earthquake

	Samples 1,2,4	Sample 3
a) buried alive due to collapse	74.1%	64.5%
b) injured due to collapse	92.7	90.3
c) killed by fires or smoke	86.3	77.1
d) killed by gas explosions	80.6	65.2
e) confusion due to darkness	92.7	78.3
f) crushed by crowds	85.7	52.0
g) trapped underground	80.6	51.4
h) floods	59.4	43.4

4. Perceived possibility of evacuation
   a) people (Sample 3) who think that
      (1) they can safely evacuate 55.0%
      (2) they cannot evacuate 27.0%
      (3) don't know 18.0%
5. Predicted actions if an earthquake occurred
   a) wait-and-see behavior 59.4%
   b) rush-into-exits behavior 28.6%
      (1) women are more likely to respond with this type of behavior
   c) measures to prevent looting 1.7%
   d) tell people about the safety of the underground shopping malls 2.3%
6. Preparations people have made for an earthquake
   a) flashlights 54.3%
   b) transistor radios 20.0%
   c) first-aid kits 51.4%
   d) candles 41.4%
   d) private generators 22.3%
7. How they would communicate with each other in an emergency
   a) wired broadcasting system 28.6%
   b) loud speaker 13.7%
   c) face-to-face 31.4%
   d) others 4.0%
   e) no ideas 40.6%

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disaster--Drivers' Consciousness About and Behaviors in Response to an Earthquake Disaster, Vol. 4 (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Daishinsai ni taisuru Jidosha Untensha no Ishiki to Kodo. Dai 4-ho)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1969

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Method

A. Structured interviews with 2,817 drivers who came to the drivers' license office to renew their licenses (ordinary drivers).

B. Questionnaires delivered and collected by police.

1. Samples

a) 505 taxi drivers
b) 500 truck drivers } professional drivers
c) 384 bus drivers
d) 200 managers of transportation companies

C. Date of Study: June, 1969

II. Results

A. On drivers

1. The degree of concerns about an earthquake
   a) drivers who have a relatively high concern 56.0%
2. Professional drivers have stronger concerns about an earthquake than ordinary drivers.
3. Professional drivers who belong to the larger companies tend to have stronger concerns than those of professional drivers of small companies.
4. Drivers who have been driving for a longer period are more likely to have strong concerns than drivers with fewer experiences.

B. Predicted traffic conditions

(Impossible to drive a car)

1. Ordinary drivers 66.3%
2. Professional drivers 71.7%
3. The young drivers tend to think that they can drive a car even after the quake occurs.
4. Truck drivers tend to think that they can drive even after the quake.
5. Professional drivers of large companies are more likely to think that it will be impossible to drive in Tokyo.

C. Expected emergency responses

	Ordinary Drivers	Professional Drivers
(a) parking a car on the left side of a road and waiting to observe the situation	27.2%	43.9%
(b) parking a car on the road and waiting to observe the situation	24.3%	33.3%
(c) leaving a car on a road and evacuating	30.7%	-
(d) continuing to drive until reaching a certain safe place	6.6%	15.6%
(e) letting customer leave and go back to a company	-	4.5%

1. Whether or not they should lock their car after an earthquake
   a) Although it is desirable for them not to lock their cars, the ratio of people who did not expect to lock their cars was 30.0% Most of them answered that it depended on the situation.

2. Whether or not they would use a car for evacuating

	(Ordinary Drivers)	(Professional Drivers)
Yes	16.0%	22.2%
No	60.5%	53.9%
Don't know	9.8%	11.6%

D. Recognition of the emergency traffic control system

	Ordinary Drivers	Professional Drivers
Know about it	12.1%	20.4%
Don't know	87.6%	79.6%

E. Expected basis of their decision
   1. To conform to police instructions 56.9%
   2. From information from radios 33.0%
   3. What other drivers would do 4.6%

F. Drivers who would try to conform to police instructions are more likely to
   1. Carry a fire extinguisher in their car
   2. Have a stronger concern about an earthquake
   3. Have more knowledge about the emergency traffic control system

Drivers who would make a decision on the basis of other drivers' behavior tend to have less concern about an earthquake, to have less knowledge about the emergency traffic control system, and would try to evacuate by car.

G. On managers of transportation companies
   1. Instructions for drivers
      a) managers who gave instructions 44.0%
   2. What the managers instructed
      a) to report where drivers are and to evacuate leaving the car at a safe place 27.0%
      b) to conform to police instructions 21.0%
      c) to evacuate leaving a car at a safe place 13.4%

H. Preparation against an earthquake
   1. Preparations such as carrying a fire extinguisher in a vehicle or giving instructions for drivers are carried out more often in bus companies than other transportation companies. Truck companies are the poorest in preparing for an earthquake.
   2. The more cars they have, the more and better they tend to prepare.

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disasters--On Evacuation Behaviors, Vol. 5 (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Hinan Kodo ni tsuite, Dai 5-ho)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1970

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Method

A. A questionnaire survey

1. Questionnaires were delivered and collected by police.

B. Samples: 7,200 Tokyo citizens chosen by police stations (Seventy-two police stations in Tokyo chose 100 citizens, respectively.)

C. Return Ratio: 6,938 96.0%

D. Date of Study: May 2-11, 1970

II. Results

A. On evacuation

1. Predicted damages

a) collapse of house	20.0%
b) fires	23.1%
c) disruptions of gas, electric, and water supplies	22.6%
d) failure to evacuate due to traffic confusion	15.0%
e) increased anxiety because of social disorder	6.9%

People over age 19 indicated "fires" as the most probable disaster.

Residents of one- or two-story houses tend to be in fear of fires, while residents of three- or more-story houses tend to be anxious about disruptions of gas, electric, and water supplies.

2. Predicted damages for their own houses

a) completely collapsed	25.0%
b) partially collapsed	50.8%

As age increases, the number of people who predict that their houses will completely collapse decreases.

Residents of three- or more-story houses are more likely to predict that they will not experience great damage.

3. When they think they will begin to evacuate

a) immediately	19.3%
b) when they see fires	34.3%
c) when the dangers approach	11.5%
d) when the order is issued	31.5%
3) don't know	3.3%

a) and b) ⇒ positive type of evacuation
c) and d) ⇒ passive type of evacuation

Men tend to be the passive type in evacuating, while women tend to be the positive type.

People over sixty years of age tend to be the positive type.

Residents of one-or two-story houses tend to be the positive type.

People who intend to try to evacuate to nearby open spaces, parks, or public facilities (mainly schools) tend to be the positive type, while people who intend to try to evacuate to the designated evacuation place tend to be the passive type.

4. How they think they will evacuate

a) with all family members	76.7%
b) with neighbors	14.0%

5. Where they think they will evacuate
   a) nearby parks 29.6%
   b) nearby high or open spaces 26.4%
   c) designated evacuation place 19.9%
   d) nearby public facilities 13.7%
6. How long they think it will take for them to reach facility of evacuation
   a) 5 minutes or less 56.2%
   b) 6 minutes to 10 minutes 18.5%
   c) 11 minutes to 30 minutes 13.4%
   d) over 60 minutes 2.1%
7. Parks or open spaces they intend to try to evacuate to
   a) 500 square meters or less 10.3%
   b) 500-3,000 square meters 32.6%
   c) 3,000-10,000 square meters 27.7%
   d) 10,000-50,000 square meters 18.4%
   e) greater than 50,000 square meters 11.0%
8. Whether or not they perceive they can safely evacuate
   a) yes 59.1%
   b) no 16.9%
   c) don't know 23.5%
9. Reasons why they think the cannot safely evacuate
   a) confusing traffic conditions 70.1%
   b) fires and smoke 13.8%
   c) breakdown of roads or bridges 13.6%
10. Present knowledge of designated evacuation place
   a) people who know 31.6%

Although there is no significant difference regarding sex, there is regarding ages. That is, people who are over 30 tend to have better knowledge about the designated evacuation place.

People who know about the designated evacuation place tend to perceive the place as safe.

11. Major reasons why they do not think they will evacuate to the designated evacuation area
   a) not safe 5.0%
   b) too far 21.3%
   c) don't know the way 64.9%
12. Attitudes toward a disaster drill
   a) favorable to and have participated in a drill 39.9%
   b) favorable to a drill, but few chances to participate 40.8%
   c) favorable to a drill, but it should be improved 16.6%
   d) not favorable 2.7%

B. On subways
1. The place perceived as most dangerous during a quake
   a) on subway trains 33.2%
   b) in subway stations or underground shopping malls 29.1%
   c) in high-rise buildings 15.5%
   d) on ordinary trains 11.1%
   e) in automobiles 5.1%

2. What is dangerous in subways
   a) being trapped because of possible collapse 30.7%
   b) darkness due to disruption of electric service 20.7%
   c) being crushed by crowds 14.5%
   d) fires on trains 8.5%
   e) floods in subway systems 8.5%
   f) danger from high voltage electricity 6.9%
   g) being injured by falling objects 6.3%
3. Emergency responses (prediction of their own responses)
   a) they would conform to the operator's or the conductors' instructions 81.0%
   b) they would stay in a train 3.9%
   c) they would conform to what other people do 7.4%
   d) they would walk to a nearby station 5.2%
4. What people predict about other's responses in a quake
   a) conform to the operator's or the conductor's instructions 40.2%
   b) stay in a train 1.5%
   c) conform to what other people do 18.0%
   d) walk to a nearby station 37.0%

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disasters--Earthquake and Human Behaviors (Daishinsai Taisaku no tameno Shinrigaku teki Chosa Kenkyu--Jishin to Ningen Kodo)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1971

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquakes and hypothetical earthquakes

Date of Occurrence: _____

Location: _____

Casualties and Damage: Not mentioned

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

This book consists of summaries of 10 research studies by Guard Police Psychology Research Society.

Chapter 1 - Research on the 1964 Niigata Earthquake

I. Method

A. After the preliminary research by interviewing, field work, and questionnaires, a questionnaire survey was conducted with 600 residents. The sampling procedures were that nine areas in Niigata city were chosen by area sampling, and then 600 residents were chosen by preportionate sampling.

B. Date of Study: December, 1964

II. Results

A. Emergency Responses

1. Rushing-out or Staying-inside
   - a) people who rushed out of houses 60.3%
   - b) people who stayed inside houses 22.5%
   - c) other responses 17.2%
2. People who left fire in home as it was, when they rushed out; people who rushed out 64.7%
3. Evacuation

Time of	Ratio of evacuation
a) 20 minutes after the major quake	30.0%
b) 2 hours after the major quake	60.0%

4. Factors impeding evacuation were
   - a) attachment to household goods 37.0%
   - b) attachment to family members away in other locations (i.e., work) 13.4%
   - c) normalcy bias 33.0%
5. Sources of information about earthquake
   - a) NHK (a public broadcasting system) 29.9%
   - b) Radio Niigata (a commercial broadcasting system) 29.9%
   - c) other people 18.2%
   - d) a newspaper extra 9.8%
   - e) police 7.6%
6. Rumors
   - a) people who heard a rumor 40.3%
     - (1) the ratio decreased as time passed
   - b) places where people heard a rumor
     - (1) controllable places (shelter, home, office) 54.1%
     - (2) uncontrollable places (street, outside) 45.9%
   - c) media in which rumor occurred
     - (1) neighbors 20.6%
     - (2) other people 45.4%
     - (3) radio (people's misunderstandings of radio reports) 20.6%
   - d) degree of credence to rumors
     - (1) people who gave credence 52.6%
     - (2) people who did not give credence 14.4%
7. Workers' responses
   - a) Over one half of workers deserted their posts or jobs and went home without permission of their supervisors or consultations with their colleagues.

B. Lessons
   1. Since it is unavoidable for people to temporarily lose their composure, training or drills should be conducted focusing on how people might regain their composure, instead of telling them not to be upset.
   2. Since it is hard to extinguish fire at a critical moment, people should be taught to say "Check fire" loudly.
   3. Accurate information should be given to people as soon as possible.
   4. The stories which come from strangers, especially the stories which contain the words such as "definitely," "totally," "all," "completely," and the like, should be regarded as rumors.

Chapter 2 - Research on the Matsushiro Earthquakes

I. Method
   A. After preliminary field work, four researchers and two police representatives carried out interviews with five groups
      1. Town elites
      2. Youths
      3. Housewives
      4. Ordinary residents
      5. Teachers
   B. Date of Study: June 3-5, 1966

II. Results
   A. Psychological acclimatization to the quakes was the most apparent tendency among people.
   B. Through their experiences, some disaster subcultures were developed, especially concerning people's self-defensive measures.
      1. To consider what furniture could serve as sheltering spaces
      2. To put valuables in a sack so they could easily be removed
      3. To keep a set of clothes outside the home
      4. To put a vinyl bag filled with sand by an oil stove (At a critical moment, the sand which comes out from the melted bag will put fire out. What people have to do is only to put the vinyl bag on the top of the oil stove.)
   C. Countermeasures by elementary and junior high schools
      1. To inspect and reinforce the structure of buildings
      2. To keep emergency exits open all the time
      3. To prohibit the wearing of wooden clogs in schools
      4. To force children to wear hats and not to carry anything when on playground or elsewhere outside
      5. To warn and instruct children about dangerous places by taking and showing them the places
      6. To set up several shelters on the routes to schools or homes
      7. To sew, on the inside pocket, a piece of cloth on which the child's name, address, and type of blood are written
      8. To use a sitting mat as a protective head covering

Chapter 3 - Research on the 1968 Ebino Earthquake

I. Method
   A. Group interviews, individual interviews, and questionnaire surveys
   B. Samples
      1. Students of an elementary school (36) and a junior high school (34)--group interviews
      2. Residents of five areas (93)--individual interviews
      3. Residents who had the most severe damage in the areas (8)--in-depth interviews
      4. Five hundred questionnaires were delivered and 455 of them were collected by police

II. Results
   A. Nobody was killed by collapses of houses, because Japanese wooden houses are flexible enough to stand the quake, and rarely fell.
   B. Responses during the quake
      1. Rushing-out of houses 38.9%
      2. Being upset 14.0%
      3. Putting fires out 11.2%
      4. No actions 12.1%
   C. When the quake occurred, approximately two thirds of the people were using fires. Among them, only about half succeeded in putting the fires out during the quake.
   D. People who heard a rumor 74.3%
      1. The rumors they heard were about damages due to the quake or other secondary threats. As time passed, more people heard a rumor.
   E. Troubles after the quake
      1. Shortage of drinking water 80.2%
      2. Shortage of foods 56.0%
      3. Lack of lights 35.0%
      4. No place to sleep 29.6%

Chapter 4 - Research on the 1968 Tokachi-Oki Earthquake

I. Method
   A. Observations and Interviews
   B. No further information about the methods used
   C. Date of Study: May 18-22, 1968

II. Results
   A. Determinants of responses during the quake
      1. The person's location at the time of the quake
      2. Behavior of other people around the person
      3. Knowledge about appropriate actions
      4. The person's responsibility in an organization
   B. The ferro-concrete buildings did not suddenly collapse, but gradually fell down thus allowing people inside to go out.
   C. Some findings about drivers' responses and traffic conditions
      1. When the quake occurred, most drivers thought that they had a flat tire, and stopped driving to check tires.

2. Most drivers stood outside of their cars to observe the situation.
3. After they drive their cars back home, people did not drive for a day or two. Three or four days after the quake, the traffic conditions in the areas were worse than ever.
4. Almost all traffic signals in the impact area did not function.

Chapter 5 - Research on the 1971 Los Angeles Earthquake

I. Method
   A. Interviews with residents and with officials
   B. No further details about the methods used

II. Results
   A. The earthquake disaster happened at a fortunate time.
   B. Although there occurred 350 fires in the city, they did not spread. The wider spaces in American cities can explain this lack of spread of fires.
   C. Some factors which prevented panic
      1. The wide open spaces
      2. The high accessibility to safe places
      3. No fires or smoke which threatened people
      4. A lack of feelings that the situation was critical

Chapter 6 - How do Tokyo residents think about and prepare against an earthquake disaster?

See the summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--How Do Tokyo Residents Think About and Prepare Against an Earthquake Disaster? Vol. 1.

Chapter 7 - How do companies, schools, and neighborhoods respond to an earthquake disaster?

See the summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--How Do Companies, Schools, and Neighborhoods Respond to an Earthquake Disaster? Vol. 2.

Chapter 8 - How should Tokyo residents respond to an earthquake disaster in underground shopping malls or on bustling streets?

See the summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--How Should Tokyo Residents Respond to an Earthquake Disaster in Underground Shopping Malls or on Bustling Streets? Vol. 3.

Chapter 9 - Drivers' consciousness about and behaviors in response to an earthquake disaster

See summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--Drivers' Consciousness About and Behaviors in Response to an Earthquake Disaster, Vol. 4.

Chapter 10 - Evacuation Behaviors

See the summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--Evacuation Behavior, Vol. 5.

Chapter 11 - People's Response on Subways

See the summary of Report on the Psychological Study for Countermeasures Against Earthquake Disaster--Evacuation Behavior, Vol. 5.

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disasters--On Evacuation Behavior to the Designated Evacuation Places, Vol. 6. (Daishinsai Taisaku no Tameno Shonrigakuteki Chosa Kenkyu--Shitei Hinan Basho eno Hinan Kodo, Dai 6-ho)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1971

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Method

A. Questionnaires distributed and collected by police.

B. Samples: 72 police stations in Tokyo chose 60-200 persons on their own accord. The total number of respondents was 9,525.

C. Return Ratio: 9,068 96.0%

D. Date of Study: May 6-15, 1971

II. Results

A. Damage prediction

People predicted the following as highly possible damages due to an earthquake

1. fires
2. collapses of houses
3. breakdowns of life-line functions

People who predicted floods were significantly different in choosing an evacuation place from people who did not predict floods.

B. Evacuation behavior

1. Time of evacuation

a) at a very early stage 20.0%
b) at an early stage 30.0%
c) when the order is issued 34.0%
d) when the situation becomes dangerous 12.0%

Women or the elderly are more likely to indicate they will evacuate at an early stage in comparison with men or the young.

Residents in shopping areas or industrial areas tend to indicate they will evacuate at an early stage.

People who predict greater damages tend to indicate they will evacuate at an early stage.

People who live in the area far from the designated evacuation place tend to indicate they will evacuate at an early stage.

2. How to evacuate

a) on foot 90.0%
b) by car, motorcycle, or bicycle 5.0%

The unmarried young people tend to indicate they will evacuate by motorcycle or bicycle.

3. If an earthquake hits when people are outside

a) people will try to go home 40.0%
b) people will go to the nearby evacuation place 30.0%
c) people will conform to official directions 10.0%

People who have children or the elderly at home, or people who live in their own wooden houses indicate they will try to go home as soon as possible.

4. Places they will evacuate to

a) to the designated evacuation place 29.0%

As the distance to the designated evacuation place increases, the number of people who will evacuate to the place decreases.

People in shopping areas or office areas indicate they are more likely to evacuate to the designated evacuation place than people in residential areas.

5. Recognition of the designated evacuation place
   a) people who know the designated evacuation place 50.0%

The factors which affect the degree of people's recognition about the designated evacuation place
   a) distance; if it is less than two kilometers, the degree of recognition is high
   b) whether or not people have children or elderly in their homes; if they have, the degree of recognition is high
   c) age; men in their 40s or 50s, or women in their late teens tend to recognize an evacuation place
   d) when they evacuate; people who would evacuate in accordance with the evacuation order tend to know the evacuation place well
   e) how they perceive the designated evacuation place; people who perceive it as appropriate or safe tend to know about it

6. Reasons why they do not evacuate to the designated evacuation place
   a) because they do not know about the place 42.4%
   b) because the place is too far 35.9%
   c) because the place does not seem safe 7.0%

People who live within a radius of 5 kilometers of the place tend to be strongly affected by the degree of their recognition of the place, while people who live in the area over 5 kilometers from the place tend to be strongly affected both by the degree of their recognition and by the distance. However, people who live in the area over 10 kilometers from the place tend to be strongly affected by the degree of their recognition with the weak influence being that of distance.

C. Opinions on evacuation drills
   1. People who are favorable about the drills 97.0%

The ratio does not vary according to sex, but according to age; that is, people in their 30s, 40s, or 50s are more likely to be favorable to the drills than people in their 20s or 60s.

The ratio does not vary according to the kinds of areas they live in. However, residents in areas where there are some sources of danger, or in the low grounds which are susceptible to floods are more likely to be favorable to the drills than people in other areas.

D. What people expect a local government to do.
   1. What people expect when or just after they evacuate.
      a) food supply, drinking water, or other necessary goods 73.6%
      b) aids for them to communicate with their families 52.0%
      c) guides for them on how to evacuate 44.0%

I. Material:

Title: Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu, Vol. 7, Chiiki Bosai Soshiki ni kansuru Chosa (Reports on the Psychological research for Countermeasures against Earthquake Disasters, Vol. 7. Research on the Community Organization for the Prevention of Disaster)

Author: Guard Police Psychology Research Society

Publisher and Year: Guard Police Psychology Research Society and Tokyo Metropolitan Police Department, 1972

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical Earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: Questionnaire
Sample: 3,600 Valid Responses: 3,451 (96.6%)
Tokyo Metropolitan Police Department ordered each of 72 police stations in Tokyo to deliver and to collect 50 questionnaires, which makes 3,600

Date of Study: May 30-June 8, 1972

III. Hypothesis and Findings.

I. Percentage of those sampled who think a great earthquake will occur 85.0%
   A. Percentage of people in their 40s or 50s who foresee the possibility of a great earthquake 90.0%
   B. Percentage of people in their 20s who foresee the possibility of a great earthquake 75.0%
   C. People in their 40s or 50s are more likely to foresee the possibility of a great earthquake than are people in their 20s.
   D. Of the people who foresee the possibility of a great earthquake, the percentage of those who prepare against it is 93.6%
   E. Percentage of those sampled who think that certain preparations are necessary for an earthquake 84.0%
   F. Of the people who prepare for an earthquake, percentages of the major preparations are
      1. Discussions at home on emergency responses 68.0%
      2. Confirming places of evacuation and routes 51.0%
      3. Preparation for removal of valuables 43.0%
   G. Percentage of people who know the location of the designated evacuation area 58.0%
   H. Percentage of people who know the location of the designated evacuation area but do not know how to reach it 30.0%
   I. Percentage of people who can effecitvely utilize the designated evacuation area 26.0%
   J. Percentage of participation in evacuation training in a community
      1. Postively participate 37.7%
      2. Participate if asked 42.0%
      3. Do not know 12.9%
      4. Reluctant to participate 5.1%
      5. Do not participate 2.1%
   K. Percentage of those who positively participate in the drill or training
      1. Men 41.4%
      2. People in their 40s 41.5%
      3. People in their 50s 43.6%
      4. Women 33.9%
      5. People in their 20s 26.6%
      6. People who do not care about an earthquake 27.0%
      7. Men, people in their 40s or 50s, and people who foresee a great earthquake are more likely to positively participate in the drill or training than women, people in their 20s, and people who do not care about an earthquake.
   L. Percentage of those who feel neighborhood organization against disasters is necessary
      1. Necessary 78.7%
      2. Opposed 7.9%
   M. Percentage of the major reasons for opposing neighborhood organization against disasters
      1. In emergency situations, nobody can afford to take care of

others; therefore, the neighborhood organization would be useless in emergency periods. 53.5%

2. What the neighborhood organization tries to do in emergency periods is what the national or local government should do. That is not our task. 18.1%
3. Since the neighborhood organization has neither responsibilities nor authority, it would be useless in emergency periods. 12.2%

N. Percentage of opinions about voluntary activities in emergency periods (the voluntary activities in (a) prevention and extinction of fires, (b) guiding evacuees, (c) traffic control, (d) first aid, (e) distribution of water and food, (f) communication, (g) maintaining social order, (h) recovery activities, and (i) prevention of epidemics):
1. Positive attitude toward voluntary activities 73.6%
2. Negative attitude toward voluntary activities 5.7%
3. Don't know or not applicable 20.7%

O. Percentage of positively accepted voluntary activities
1. (e) Distribution of water and food 84.8%
2. (d) First aid 80.2%
3. (h) Recovery activities 79.5%
4. Probably the fact that those activities have been voluntarily performed in the past explains why they are positively accepted.

P. Percentage of less positively accepted voluntary activities
1. (c) Traffic control 61.7%
2. (g) Maintenance of social order 62.7%
3. (f) Communication 66.0%
4. Probably the fact that these activities cannot be performed by ordinary citizens in their every day lives explains why they are not as greatly accepted.

I. Material:

Title: Report on the Psychological Research for Countermeasures Against Earthquake Disaster--Tokyo Citizens' Expectations for Police, Vol. 8. (Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Keisatsu Katsudo ni taisuru Tomin no Kitai. Dai 8-ho)

Author: Guard Police Psychology Research Society (Keibi Shinrigaku Kenkyukai)

Publisher and Year: Tokyo Metropolitan Police Board (Keishi-Cho), 1973

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence: Not mentioned

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Method

A. Questionnaires delivered and collected by police.

B. Samples: 7,100 individuals chosen by 72 police stations in Tokyo

C. Date of Study: May 10-23, 1973

D. Return Taio: 6,789 — 95.6%

II. Results

A. People who expect a great earthquake — 82.2%

1. People in their 40s or 50s are more likely to expect a great earthquake than people in their 20s.
2. People who expect a great earthquake tend to actively participate in neighborhood organizations.

B. How people prepare against an earthquake

1. Conversations at home — 63.2%
2. Preparations for saving valuables — 39.0%
3. Talking with neighbors or in neighborhood organizations — 27.3%
4. Participating in the drills — 16.9%

As people grow older, the degree of preparation increases.

C. The degree of recognition of the designated evacuation place — 62.0%

1. Percentage of ratio increase compared to previous year — 5.0%

D. What Tokyo citizens expect of the police department in the pre-disaster period.

1. Assuring that there be safe evacuation places and letting citizens know of such places — 44.4%
2. Preparations for guiding or leading citizens to a safe evacuation place — 38.2%
3. Preparations for quickly providing citizens with food or drinking water — 33.0%
4. Making effective plans for an emergency communication system — 22.8%
5. Developing evacuation routes and informing citizens of their existence — 21.0%

E. What information citizens expect from the police department

1. Information on evacuation places — 25.6%
2. Information on rescue and medical service systems — 16.8%
3. Advice on evacuation — 13.1%
4. Information on damages — 12.6%
5. Information on social order — 11.0%
6. Traffic information — 8.3%

Generally speaking, citizens expect information for protecting their own lives.

The older citizens tend to expect the information on damages or on social order, while the younger citizens tend to expect the information on rescue and medical service systems.

F. How do citizens expect the police department to guide or lead them in evacuating?

1. Advising them about the time of evacuation — 80.1%
2. Advising them on the place of evacuation — 85.0%
3. Leading citizens to a safe evacuation place — 77.1%
4. Advising citizens what they should bring in evacuating — 58.8%

G. What the citizens expect as to traffic control.
   1. People who think that police can effectively cope with traffic problems after a quake. 80.0%

H. What citizens expect about the maintenance of social order.
   1. Prevention of looting 71.0%
   2. Guarding of storages of emergency goods and other important facilities 79.0%
   3. Prevention of rumors 61.0%
   4. Prevention of crimes and arrest of criminals 81.0%

I. What the citizens expect from several organizations related to a disaster.
   1. Percentage expecting leading of citizens to a safe evacuation place
      a) Ratios of citizens who expect if from
         (1) police 85.6%
         (2) fire departments 28.4%
         (3) neighborhood organizations 28.0%
         (4) a broadcasting company 20.6%
         (5) a local government 20.2%
   2. Provision of evacuation places
      a) Ratios of citizens who expect it from
         (1) police 76.8%
         (2) a local government 44.4%
         (3) neighborhood organizations 30.8%
         (4) fire departments 20.2%
   3. Expecting that citizens will be provided with foods and/or drinking water
      a) Ratios of citizens who expect it from
         (1) a local government 68.6%
         (2) neighborhood organizations 33.0%
         (3) a public health center 28.6%
         (4) police 25.8%
   4. Ratios of citizens who expect medical services from
      a) a public health center 86.6%
      b) a local government 51.6%
   5. Provision of first aid
      a) Ratios of citizens who expect it from
         (1) fire departments 56.4%
         (2) police 56.2%
         (3) a public health center 31.0%
         (4) a local government 21.4%
   6. Provision of necessary information
      a) Ratios of citizens who expect it from
         (1) police 70.6%
         (2) a broadcasting company 69.2%
         (3) neighborhood organizations 19.6%
   7. Ratios of citizens who expect traffic controls from
      a) police 97.2%
      b) neighborhood organizations 32.6%
   8. Expectation of maintenance of social order
      a) Ratios of citizens who expect it from
         (1) police 95.0%
         (2) fire departments 39.0%
         (3) a local government 16.8%

I. Material:

Title: Kumamoto Taiyo Depaato Kasai ni Kausuru Keibi Shinrigakuteki Chosa Kenkyu. (On the Fire at the Kumamato Taiyo Department Store)

Author: Keibi Shinrigaku Kenkyu Kai (Guard Police Psychology Research Society)

Publisher and Year: Keishi-cho (Tokyo Metropolitan Police Board), 1973

II. Study:

(1) Agent and/or Event

Type of Disaster: Fire

Date of Occurrence: November 29, 1973, about 1:15 p.m.

Location: Kumamato Prefecture

Casualties and Damage:

Killed: 103
Injured: 109
Area burned: 13,587 m^2 (16,250 square yards)

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method

A. Group interviews with six groups

1. Slightly injured customers — 7 persons
   December 8, 1973
2. Safely escaped customers — 6 persons
   December 8, 1973
3. Employees of Taiyo Department Store — 11 persons
   December 9, 1973
4. Residents around Taiyo Department Store — 8 persons
   December 9, 1973
5. Policemen who worked on the spot — 8 persons
   December 9, 1973
6. Officials of related organizations — 9 persons
   December 10, 1973

II. Findings

A. Since people use elevators or escalators in normal situations, they are less aware of stairways which caused awareness difficulties in escaping.

B. Being poisoned by smoke was a major cause of casualties. People should recognize that smoke is most dangerous in high-rise building fires, and internalize the knowledge that they have to escape upon seeing smoke.

C. To avoid casualties due to smoke, the authorities should force companies to install an emergency smoke duct system in every high-rise building and underground shopping mall.

D. Responses of organizations to the fire showed weaknesses in cooperating with other organizations. Japanese organizations are usually structured along vertical lines so that inter-organizational cooperation requiring horizontal ties becomes difficult. A certain cooperative system among related organizations should be established, clarifying the roles of each organization.

E. Especially, a cooperative system between police and fire departments should be established as soon as possible.

III. Comments by Psychologists

A. Comment by Professor Abe

1. The worst thing in this fire was that the building did not have an exterior emergency stairway.
2. Anti-fire shutters, emergency exits, and the like have proved capable of protecting people.
3. On the higher floors, a short time was available between recognizing the fire and being driven into strained circumstances. In other words, the higher the floor, the higher the degree of urgency.
4. Quick and instinctive responses saved persons in this fire. But this is not always true, especially in a crowded place.
5. A notification system across different floors in a building should be established. This will decrease the degree of urgency on the higher floors.

B. Comment by Professor Ohta

1. In this case, quick and instinctive responses seem to have been better. However, in the case of the Osaka Sennichi

Department Store Fire, composed responses were better. It is too early to definitely say which is better, being instinctive or being composed.

2. There were many part-time workers in the department store because it was the busiest season of the year. This was one reason for no organizationally coordinated responses.
3. Since the building was partially undergoing reconstruction unusual circumstances were accepted as normal. This may have been one reason for the delayed recognition of a fire.
4. Establishing an inter-organizational coordination system is a matter of great urgency.
5. The convergence of T.V. or radio reporters, journalists, and researchers has both merits and demerits. In order to avoid problems, it may be necessary for involved organizations to set up a special section for the release of information wanted and necessary by different interested parties.

I. Material:

Title: Daishinsai Taisaku no Tameno Shinrigakuteki Chosa Kenkyu, Vol. 9, Kohtsu ni kansuru Chosa (Reports on the Psychological Research for Countermeasures against Earthquake Disasters, Vol. 9, Research on Traffic Condition)

Author: Guard Police Psychology Research Society

Publisher and Year: Guard Police Psychology Society and Metropolitan Police Department, 1974

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical Earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail:

1) Questionnaire (Drivers who came to the Driver's License Bureau for renewing their licenses.)
2) Sample: 4,000 drivers (men: 3,392,women: 602, unknown: 6)
3) Questionnaire and interviews (Managers)
4) Sample: 173 managers who attended the lecture on the managing of safety driving held by police.

Date of Study: (1) June 5 and 6, 1974 (2) June 11, 1974

III. Hypothesis and Findings.

I. Drivers

A. Percentage of drivers equipped with fire extinguishers 32.0%
   1. Likelihood of a driver being equipped with fire extinguishers increases with the age of the driver.

B. Percentage of professional dirvers equipped with fire extinguishers 40.0%
   1. Professional drivers are more likely to be equipped with fire extinguishers.

C. In an imminent situation,
   1. Percentage of drivers who will wait in or around their cars, parking on the edge of a road (the recommended response) 36.2%
   2. Percentage of drivers who will run away, leaving their cars on the edge of a road 36.0%
   3. Percentage of drivers who will keep driving 3.0%
   4. Percentage of drivers who will immitate what other drivers do 2.4%

D. In a more severe situation, such as evacuation
   1. Percentage of drivers who leave their cars unlocked (the recommended response) 56.6%
   2. Percentage of drivers who leave their cars locked 10.7%
   3. Percentage of drivers who answered that it depends upon the situation 31.3%

E. Percentage of people who are familiar with the emergency traffic control system 26.0%
   1. Percentage of professional drivers who are familiar with the emergency traffic control system 29.4%
   2. Percentage of average drivers who are familiar with the emergency traffic control system 27.7%
   3. Percentage of drivers with driver's license but who do not drive in everyday life situations and who are familiar with the emergency traffic control system 16.4%

F. Percentage of drivers who think that the emergency traffic regulations will be observed 10.1%
   1. Percentage of drivers who tend to think that the regulations will be violated 61.9%
   2. Young drivers are more likely to think that the regulations are violated and the traffic conditions will be out of order.

G. Percentage of drivers who in an emergency period will follow suggestions by police on the road 44.0%
   1. Percentage of drivers who in an emergency period will follow radio broadcast suggestions 45.6%
   2. Men are more likely to rely on radio and women are more likely to follow suggestions given by police.
   3. Likelihood of a driver to follow suggestions given by police increases with the age of the driver.

II. Managers of shipping, bus, and taxi companies

A. Percentage of managers who answered that every car in his or her company was equipped with fire extinguishers 50.9%

B. Percentage of managers who answered that they made company drivers familiar with police department emergency traffic control systems 12.1%

1. Percentage of managers who answered that since they did not know how the police would control traffic in an emergency period, they did not try to make the drivers familiar with a possible system 26.6%

C. Percentage of companies that have a certain kind of training or guidance for appropriate responses to an emergency 32.9%

1. The larger the company, the more training or guidance.

D. Percentage of managers who know the emergency shift of the traffic system when several main routes in and around Tokyo are shut off for evacuation and emergency activities 22.0%

I. Material:

Title: Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Jidosha Untensha no Ishiki Chosa, Dai 10-Ho. (Report on the Psychological Research for Countermeasures Against Earthquake Disaster--The Drivers from Outside of Tokyo, Vol. 10)

Author: Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)

Publisher and Year: Keishi-Cho (Tokyo Metropolitan Police Board), 1976

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: Survey Research: Questionnaires were delivered and collecte by police

Sample: (1) persons who drive their own cars for going to a from their offices and for doing their business in the daytime
(2) persons who drive their own cars only for going to and from their offices
(3) persons who drive company cars only for doing business in the daytime

Total number of Valid Answers: 1,014

Return Ratio: 93%

Date of Study: Oct. 22-Nov. 5, 1976

III. Hypothesis and Findings.

I. Expected Emergent Responses by Drivers--Four Types
   A. Observation Type
      1. Would stop driving and observe and attempt to comprehend the situation
   B. Follower Type
      1. Would follow or immitate others
   C. Leave-Behind Type
      1. Would stop driving, exit and leave a car on the road
   D. Run-Away Type
      1. Would keep driving as long as possible

	(on less crowded road)	(on crowded road)	(on highway)
1. Observation Type	83.4 (%)	72.2(%)	68.3(%)
2. Follower Type	10.7	22.7	18.3
3. Leave-Behind Type	13.0	18.4	14.0
4. Run-Away Type	16.8	-	15.7

   E. The Follower Type is dominant among women, and the Run-Away Type is dominant among men.
   F. Drivers of compact cars are more likely to be the Leave-Behind Type, while drivers of trucks are more likely to be the Follower Type.
   G. The more driving experience drivers have, the more likely they are to be either the Observation Type or the Leave-Behind Type.

II. Desirable Responses as Indicated by Drivers (multiple choice)

A. To park the car on the left edge of a road	77.1%
B. To stop the engine	64.7%
C. To listen to a radio	68.1%
D. To park the car at the center of a road	2.6%
E. To leave the car with the engine on	4.5%
F. To exit the car	15.3%

III. Expected Behavior after the Quake as Estimated by Drivers

A. Would conform to the directions of the police	85.6%
B. Would exit and leave the car with the key in it	32.3%
C. Would immitate others	28.2%
D. Would evacuate by driving the car	7.7%
E. Would evacuate depending on the situation	6.7%
F. Would exit and leave a locked car	3.8%

IV. Percentage of the Drivers Who Know More or Less about the Emergency Traffic Control System 27.6%

A. Male drivers who know it	27.8%
B. Female drivers who know it	20.7%

   C. Drivers in their mid-forties or mid-fifties know best about the system.
   D. The older the drivers are, the more accurate information they know regarding the system.
   E. The degrees of recognition and of accuracy about the emergency traffic control system are lower among drivers of trucks

than among drivers of passenger cars, and lower among drivers who use highways than among drivers who use ordinary roads.

V. Contacts with Information about Appropriate Responses
   A. Drivers who have some contacts with such information
      1. Male 82.0%
      2. Female 75.9%
   B. The older the drivers are, the more they are in touch with such information.
   C. The sources of information
      1. Television 59.8%
      2. Radio 42.6%
      3. Newspaper 47.6%
      4. Public relations by governments 47.1%
      5. Weekly magazines 20.9%
   D. Drivers who are familiar with such information are more likely to be the Observation Type.

I. Material:

Title: Daishinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu Vol. 11, Saigaiji ni okeru Koso Biru Riyosha no Ishiki Chosa. (Report on the Psychological Study for Countermeasures against Earthquake Disaster, Vol. 11, Survey Research on People's Consciousness in the High-Rise Buildings)

Author: Guard Police Psychology Research Society

Publisher and Year: Guard Police Psychology Research Society and Tokyo Metropolitan Police Department, 1976

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail:

1) Questionnaire delivered by police and responded to by mail.
2) Sample: 3,855 persons from buildings over 31 meters high (includes office buildings, residential buildings, and department stores)
3) Valid responses: 2.530 (67%)

Date of Study: Office and residential buildings: May 15-25, 1976
Department stores: May 18-19, 1976

III. Hypothesis and Findings.

I. People who were anxious about a possible earthquake disaster
   A. Residents of high-rise buildings 83.6%
   B. Frequent visitors to high-rise buildings 82.0%
   C. Less frequent visitors to high-rise buildings 75.3%
   D. Workers in high-rise buildings 77.1%

II. People who perceive high-rise buildings as less dangerous 40.6%
   A. Men are less likely than women to perceive high-rise buildings as dangerous.
      1. Men who answered high-rise buildings were dangerous 35.1%
      2. Women who answered the same 51.7%
   B. The elderly are less likely than the young to perceive high-rise buildings as dangerous.
      1. People in their 20s who answered high-rise buildings were dangerous 54.2%
      2. People in their 30s who answered high-rise buildings were dangerous 46.5%
      3. People in their 40s who answered high-rise buildings were dangerous 37.5%
      4. People over the age of 50 who answered high-rise buildings were dangerous 29.2%
   C. Residents of high-rise buildings were more likely than workers to perceive high-rise buildings as dangerous.
      1. Residents who perceived high-rise buildings as dangerous 43.3%
      2. Workers who perceived high-rise buildings as dangerous 38.6%
   D. Visitors are more likely than residents to perceive high-rise buildings as being dangerous in an earthquake.
      1. Frequent visitors who perceive high-rise buildings as being dangerous in an earthquake 45.4%
      2. Less frequent visitors who perceive high-rise buildings as being dangerous in an earthquake 47.3%
   E. People on the higher floors are less likely to perceive high-rise buildings as dangerous.
      1. People living or working higher than the 30th floor 34.6%
      2. People living or working between the 10th and the 30th floor 42.6%
      3. People living below the 10th floor 41.0%
   F. People who have been assigned an emergency role in their organizations compared to people who have no emergency role tended to perceive high-rise buildings as less dangerous.

III. People who perceived high-rise buildings as dangerous attributed this view to
   A. The disorder and confusion which would ensue in an earthquake 27.7%
   B. Possible fires 22.1%
   C. Being unable to follow the evacuation route 17.5%

IV. Five projected response patterns if there were an earthquake
- A. People will wait and see what the situation will be (observers)
- B. People who will try to extinguish fires (extinguishers)
- C. People who will try to protect themselves under a desk or furniture (Shelter-seekers)
- D. People who will lose their composure (the discomposed type)
- E. People who will try to leave a house or building (evacuaters)

V. Most persons who have experienced an earthquake in the past were
- A. Observers 83.8%
- B. Extinguishers 11.6%

VI. People in high-rise buildings tended to be observers.
- A. The projected responses of people in high-rise buildings were
  1. Observers 57.4%
  2. Extinguishers 17.5%
  3. Shelter-seekers 11.9%
  4. Evacuaters 5.6%
  5. The discomposed type 4.5%
- B. Women and youth more than men and the elderly are more likely to be discomposed.
- C. Resident on the higher floors compared to those on the lower floors think they will be calm in an earthquake.
- D. The longer people have lived in their present residence, the less likely they are to think they will be discomposed in an earthquake.
- E. What people are most anxious about if an earthquake were to happen
  1. Observers expected social disorder and confusion and then the threat of fire
  2. Extinguishers expected fires and then the collapse of houses or buildings

VII. After the quake there is the expectation that
- A. People will conform to the instruction of leaders or play their allocated role in an emergency organization. 66.0%
- B. People will try to immediately escape or to rush into stairways or elevators. 29.0%
  1. Women and youth think they are more likely to try to escape or rush into stairways or elevators.
  2. People who are above the 30th floor think they will be more likely to follow instruction of leaders to play their allocated emergency roles.

VIII. Emergency organizations
- A. People who are organized for emergency operations
  1. Workers in high-rise buildings 78.9%
  2. Residents of high-rise buildings 35.8%

IX. Disaster drill in high-rise buildings
- A. Residents who have had such a drill 93.0%
- B. Residential high-rise building occupants are less likely to have had a drill than workers in office buildings.

X. Emergency equipment and facilities
   A. People in high-rise buildings who are familiar with
      1. Emergency exits 74.6%
      2. Fire extinguishers 73.5%
      3. Anti-fire doors 59.2%
      4. Fire plugs 52.9%
   B. People in high-rise buildings who are unfamiliar with relief sacks 18.2%
   C. People in high-rise buildings who are unfamiliar with emergency elevators 19.2%
   D. Men are more familiar than women with these facilities.
   E. The older the person, the more likely they are familiar with these facilities.
   F. Workers more than residents in high-rise buildings are familiar with these facilities.

XI. The degree of credence or trust given to evacuation planning for high-rise buildings
   A. People who trust such planning 38.2%
   B. Men are more likely than women to trust.
   C. Older persons are more likely than younger to trust.
   D. Workers more than residents of high-rise buildings trust.
   E. People from the 30th or higher floors more than those from the lower floors are likely to give higher credence to evacuation planning.

I. Material:

Title: Daishinsai Taisaku no tameno Shinrigakuteki chosa Kenkyu - Dai Jishin ni mottomo Kiken to Sareta Chiiki deno Ishiki Chosa, Dai 12 - ho. (Report on the Psychological Research for Countermeasures Against Earthquake Disaster - The Residents of the Areas More Vulnerable to Earthquake, Vol. 12)

Author: Keibi Shinrigabu Kenkyukai (Guard Police Psychology Research Society)

Publisher and Year: Keishi - cho (Tokyo Metropolitan Police Board), 1977

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical Earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Samples
   A. 3,000 persons living in or working in the 14 wards in Tokyo which are ranked as relatively highly dangerous
      1. Residents: 2,500
      2. Workers: 500
   B. Questionnaires, answered by mail
      1. Valid answers: 1,586 — 52.9%
   C. Study done: May 10-20, 1977

II. Concerns about earthquake
   A. Percentage of persons who are anxious about earthquakes in their everyday lives — 84.7%
   B. No significant difference between men and women in the degree of concerns about an earthquake.
   C. Residents are more concerned about earthquake than workers.
   D. Persons who had an experience of earthquake tended to predict the occurrance of a great earthquake.
   E. Persons who live in rented houses are more likely to predict the occurrance of a great earthquake than persons who live in their own houses.
   F. Men and women who are anxious about an earthquake
      1. Anxious about
         a) men — 87.7%
         b) women — 91.3%

III. What people would worry about if an earthquake occurred
   A. Fires — 70.3%
   B. The long distance to the evacuation place — 44.5%
   C. The unavailability of roads to the evacuation place — 25.5%
   D. The collapse of houses — 17.9%

IV. Subjective possibility of evacuation
   A. Impossible to evacuate — 34.9%
   B. Possible to safely evacuate — 2.8%
   C. Possible to evacuate but with difficulty — 22.1%
   D. Persons who think that it will be impossible to evacuate
      1. Men — 31.0%
      2. Women — 42.6%
   E. Workers are more optimistic about the possibility of evacuation than residents.

V. What people would worry about after a major quake
   A. The possibility of communicating with a family-member — 60.1%
   B. Confusion or panic — 27.1%
   C. Rumors — 5.2%
   D. Women are more likely to worry about the possibility of communicating with family-members, while men are more likely to worry about confusion or panic.
   E. Workers worry about confusion and panic to a higher degree than residents.

I. Material:

Title: Dai Shinsai Taisaku no Tameno Shinrigakuteki Chosa Kenkyu—Jishin Yochi Keiho Hatsureiji ni okeru Kodo Yosoku, Dai 13-ho. (Report on the Psychological Research for Countermeasures Against Earthquake Disaster—Responses to an Earthquake Prediction Warning, Vol. 13)

Author: Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)

Publisher and Year: Keishi-cho (Tokyo Metropolitan Police Board), 1978

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Questionnaire answered by mail
   A. Samples
      1. Managers of Business Firms: 700
         a) valid answers: 449
      2. Employees of business firms: 3,000
         a) valid answers: 1,707
      3. Managers of Schools, Kindergartens, Hospitals, and the Senior Citizens Homes: 608
         a) valid answers: 408
      4. Employees of Senior Citizens Homes: 1,600
         a) valid answers: 1,078
      5. Housewives: 2,092
         a) valid answers: 1,238
      6. Total: 8,000
         a) valid answers: 4,880 61.0%
   B. No description about sampling procedures
   C. Date of Study: June 1-20

II. On the possibility of earthquake prediction

〈Sample No.〉	(1)	(2)	(3)	(4)	(5)
possible	72.4(%)	70.4(%)	74.5(%)	74.0(%)	62.6(%)
impossible	15.6	21.0	14.0	12.7	20.6

III. On issuing an earthquake warning

〈Sample No.〉	(1)	(2)	(3)	(4)	(5)
Should be done cautiously	58.8(%)	65.8(%)	63.7(%)	67.1(%)	57.8(%)
should be done as soon as possible	35.9	29.5	32.1	25.9	35.8
should not be issued	1.6	-	1.0	1.1	0.7

IV. The degree of trust in the warning

〈Sample No.〉	(1)	(2)	(3)	(4)	(5)
trust	85.3(%)	81.9(%)	88.9(%)	83.8(%)	87.4(%)
distrust	10.7	14.4	8.5	8.4	8.1

V. Expected responses to the warning
   A. If heard at home

〈Sample No.〉	(1)	(2)	(3)	(4)
1. would go to workplace immediately	29.8(%)	10.4(%)	31.1(%)	18.7(%)
2. would phone workplaces	34.2	-	38.2	-
3. would attempt to confirm the warning	17.8	53.5	17.6	51.1

B. If heard at workplace

⟨Sample No.⟩	(1)	(2)	(3)	(4)
1. would indicate employees to wait for further information	45.9(%)	-	48.5(%)	-
2. would indicate employees to play an emergency role	35.4	-	40.7	-
3. would play an emergency role	-	42.8	-	-
4. Would phone to families	-	33.9	-	20.2
5. would go home or evacuate	-	5.0	-	5.9

VI. Expected responses of housewives to the warning

A. Would put fire out	87.1%
B. Would communicate with husband	76.8%
C. Would communicate with children	76.4%
D. Would check things to be removed from the home	64.4%
E. Would evacuate	40.3%
F. Would discuss with neighbors	33.2%

I. Material:

Title: Dai Shinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Keikai Sengen Hatsureiji ni okeru Jidosha Untensha no Ishiki to Kodo, Dai 14-ho. (Report on the Psychological Research for Countermeasures Against Earthquake Disaster--The Drivers' Responses to an Earthquake Prediction Warning, Vol. 14)

Author: Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)

Publisher and Year: Keishi-cho (Tokyo Metropolitan Police Board), 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: 1980

III. Hypothesis and Findings.

I. Method
   A. Questionnaire answered by mail.
   B. Sample: 5,000
   C. Valid answers: 2,972 — 59.44%
   D. Sampling procedure was not discussed.
   E. Details of the sample
      1. Managers for Safety Driving: 1,000
      2. Taxi Cab Drivers: 1,000
      3. Truck Drivers: 1,000
      4. Ordinary Drivers: 1,000
      5. Private-truck Drivers: 1,000

II. On preparations in transportation companies for responding to an earthquake warning
   A. The emergency system in a company
      1. clearly planned — 5.0%
      2. roughly planned — 15.4%
      3. not planned — 54.9%
      4. never thought about — 22.5%

   There was no significant difference according to the size of company. In comparison with others, taxi companies showed the stronger concerns about planning of emergency systems.

   Major actions defined in the emergency planning.
      1. to phone the company — 52.5%
      2. to drive back to the company — 20.9%
      3. to go back to the company but leaving the vehicle at a certain place — 12.2%
   B. Predictions made by managers about there drivers probable responses to the warning.
      1. They would phone the company — 66.7%
      2. They would drive back or go back to the company — 14.8%
      3. They would evacuate and leave the vehicle. — 12.9%
      4. They would go home. — 4.0%

   Predictions made by drivers about their own responses to a warning.
      1. They would phone the company. — 37.1%
      2. They would walk away leaving the vehicle. — 17.9%
      3. They would phone a family member. — 12.8%
      4. They would go back or drive back to the company. — 12.1%
      5. They would drive home. — 7.2%

III. Drivers expected responses to the warning.
   A. How would they know about the warning?
      1. car radio — 67.4%
      2. from other cars — 19.1%
      3. loud-speaker trucks — 6.7%
      4. C.B. radios — 3.6%

   The young drivers and the drivers of trucks thought they would be more likely to rely on car radios.

   B. Expected responses on less crowded roads to a warning.
      1. They would phone the company — 37.1%
      2. They would walk away leaving a car. — 17.9%

3. They would phone a family member. 12.8%
4. They would go back or drive back to the company. 12.1%
5. They would drive home. 7.2%

C. Expected responses on crowded roads to a warning.
1. They would walk away leaving the car on a side road. 36.1%
2. They would phone the company. 27.3%
3. They would try to go back to the company. 11.2%
4. They would phone a family member 8.8%

D. Expected responses on highways to a warning.
1. They would get off the highway. 84.0%
2. They would drive to the exit closest to the company. 7.6%
3. They would drive the the exit closest to home. 3.9%

E. Predicted responses two hours after the issuing of a warning.
1. Would be at the company. 38.4%
2. Would be somewhere in Tokyo, but out of the car. 25.1%
3. Would be at home. 22.2%

Persons who live in central parts of Tokyo tended to believe they would be at home, while persons who live in suburbs of Tokyo or outside of Tokyo tended to believe they would be at the company.

Drivers of taxi cabs felt they would be at the company, while drivers of their own cars thought they would be home.

F. If there is a police officer on the road, most drivers would expect to conform to the police officer's directions. 97.0%
Without a police officer they would
1. park the car on the left edge of the road 69.5%
2. do what other cars were doing 20.6%
3. keep on driving 9.5%

G. As to traffic control in response to a warning, drivers expect
1. total control of traffic by the police 50.5%
2. voluntary control of traffic in each area 26.1%
3. partial control of traffic at major traffic points by the police 19.1%

H. Several problems to be solved
1. Only a few companies have an emergency plan.
2. Most people rely upon telephones.
3. Most drivers would leave cars on roads in order to phone or evacuate, and this will make the traffic worse.
4. Most drivers on highways will try to get off the highways and this will make the traffic on ordinary roads worse.

I. Material:

Title: Dai-shinsai Taisaku no tameno Shinrigakuteki Chosa Kenkyu--Keikai Sengen Hatsureiji ni okeru Tonai Kakueki de no Jitai Yosoku, Dai 15-ho (Report on the Psychological Research for Countermeasures Against Earthquake Disaster--The Railway- and Subway-stations an Earthquake Warning, Vol. 15)

Author: Keibi Shinrigaku Kenkyukai (Guard Police Psychology Research Society)

Publisher and Year: Keishi-cho (Tokyo Metropolitan Police Board), 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: Questionnaire answered by mail
Sample: salaried-workers 2,500
residents near stations 1,500
Nothing mentioned about sampling procedures
Return ratio: 62.2%

Date of Study: 1980

III. Hypothesis and Findings.

I. The purpose of this study is to canvas responses to earthquake warnings.
   A. How did people understand the warning?
      1. People who correctly understood the content of the warning — approximately 70.0%
   B. How do people expect to respond to the warning?
      1. Most people would take some preventive measures and preparations against earthquake.
      2. Many people would try to phone their families.
         a) People are generally dependent upon telephones and are family-oriented.
      3. Men are more likely to take preventive measures and have positive attitude, while women are more likely to do nothing until someone issues an order.
      4. Women and youth tend to conform or be a source of panic.
   C. How do people predict traffic conditons after the issuance of the warning?
      1. Most people predict that public transportation systems will break down in the immediate situation.
      2. Most people think that subway systems are most dangerous when an earthquake hits.
      3. However, if the warning includes the words of "within a few days," people predict that public transportation systems will be available as usual.
   D. How do people predict the situations at stations after the issuance of a warning?
      1. Most people predict that considerable confusion and crowds will be caused half an hour after the issue of the warning.
      2. Most people think that all of the station-staffs will work to prevent severe confusion and crowd formation.
         a) At the same time, most people think that the confusion and the crowds will not be controllable by the station-staffs.
      3. Most people have strong anxiety about confusion and crowds at stations.
         a) Since the anxiety can be a source of panic, some measures to decrease the degree of anxiety are necessary.
   E. Some problems clarified by this study
      1. Responses to a warning including "within several hours" are different from those including "within a few days." We should make the difference clear.
      2. Anxieties about public transportation systems are very strong. To avoid the anxieties becoming a panic source, we should let people know about the emergency plans of public transportation systems.
      3. Anxieties about subway systems are especially strong. The authorities should let people know about subway system safety measures. The same thing can be said for underground shopping malls.
      4. Since women and youth can easily be a source of panic, we should provide them with more opportunities for disaster education and training.

5. Most people still rely on telephones in emergencies. The authorities should let them know the fact that telephone systems are not always available, and guide them toward appropriate responses without using a telephone.

I. Material:

Title: Managua Jishin--Taikensha o Kakomu Zadankai Kiroku (Round Table Talks by Japanese Engineers on Their Experiences of the Managua Earthquake)

Author: Keishi-cho (Tokyo Metropolitan Police Board)

Publisher and Year: Keishi-cho (Tokyo Metropolitan Police Board), 1973.

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: 1972

Location: Managua, Nicaragua

Casualties and Damage:

(2) Method

Method in detail:

Date of Study: January 26, 1973

III. Hypothesis and Findings.

This is a record of a round-table talk by four Japanese who experienced the Managua Earthquake, as well as three psychologists, nine police officials, and some observers.

Four Japanese reported

1. why they were in Managua at the time of the earthquake
2. what they were doing on the previous day
3. how they responded to the quake
4. what the situations in the town were.

No analysis is provided.

I. Material:

Title: Dai Jishin ni kansuru Kita Kumin no Ishiki Chosa (Survey of the Awareness of the People in Kita Ward About a Major Earthquake)

Author: Kita Kuyakusho (Kita Ward Office)

Publisher and Year: Kita Kuyakusho (Kita Ward Office), 1974

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: Questionnaires answered by mail.
Sample: 3,988 of Kita Ward residents over 20 years of age
Sampling Procedure: Stratified random sampling
Valid answers: 1,303 (32.67%)

Date of Study: January, 1974

III. Hypothesis and Findings.

I. People who think that a great earthquake will occur in the near future — 53.0%
   A. The young are more likely to think that it will not occur.
   B. Residents in houses of reinforced structure tend to think that it will not occur.

II. Prediction about major damages due to an earthquake
   A. Fire — 85.3%
   B. Disruption of water supply and electricity — 69.1%
   C. Collapse of houses — 66.2%
   D. Traffic confusion — 40.4%

III. Expected determinants of evacuation behavior
   A. Approaching fires — 33.2%
   B. Issuance of an evacuation order — 34.8%
   C. Perception of other risks — 18.3%

IV. Expected temporary evacuation place
   A. Nearby heights — 18.1%
   B. Designated places — 38.4%
   C. Public facilities — 17.3%
   D. Nearby parks — 16.7%

   The older the person, the less likely they would evacuate to the designated evacuation place.

V. The designated evacuation place (by sampling subclusters)
   A. Ratio of recognition — 61.4%-87.6%
   B. People who have been there — 42.9%-100%
   C. Whether or not they evacuate to the designated places — 22.8%-67.8%
   D. Reasons they would evacuate to the designated places
      1. Safe — 54.6%
      2. Near — 26.5%
   E. Reasons they would not evacuate to the designated places
      1. Far — 55.1%
      2. Not safe — 19.6%
      3. Do not know the way — 11.8%
   F. How they would evacuate
      1. On foot — 96.5%
      2. By bicycle or motorcycle — 0.6%
      3. By car — 0.4%
   G. Whether or not they think they can reach the designated places
      1. Can reach — 33.4%
      2. Cannot reach — 17.8%
         a) Reasons they think they cannot reach
            (1) traffic confusion — 50.0%
            (2) road debris or destruction — 17.2%
            (3) fires — 26.3%
      3. Don't know — 48.8%

VI. Preparations made for an earthquake

A. Have

1. Flashlight	81.0%
2. Transistor radio	69.5%
3. Have discussions at home	60.9%
4. Made confirmation of safer places	49.1%
5. Fire extinguisher	49.7%
6. First-aid kit	48.2%
7. Taken care of valuables	42.1%
8. Water for fire	30.9%
9. Emergency food	27.9%
10. Emergency drinking water	18.5%

B. The older people are, or the longer they have lived in their present residences, the more they are prepared for an earthquake.

C. People who think that a great earthquake will occur in the near future or who live in their own houses were more likely to prepare.

VII. Conversation with neighbors about emergency cooperations

A. Have talked	6.9%
B. Have not	54.3%
C. Want to talk	34.8%

VIII. Participation in community organizations for disasters

A. Would join, if established	55.0%
B. Would definitely join	20.0%
C. Would join, if asked	13.9%
D. Would not join	7.1%

I. Material:

Title: Experimental Study of Escape Behavior in a Simulated Panic Situtation. (Mogi Hisai Jokyo ni okeru Hinan Kodo Rikigaku ni kansuru Jikkenteki Kenkyu.)

Author: Kugihara, Naoki et al

Publisher and Year: in The Japanese Journal of Experimental Social Psychology, Vol. 20, pp. 55-67, 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Experiment

Date of Occurrence:

Location:

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Experiments

A. Subjects: 295 freshman and sophomores (men: 173, women: 122)

1. They were divided into 55 groups segregated by sex.
   a) 7 groups of 3 men, 3 groups of 3 women
   b) 5 groups of 4 men, 5 groups of 4 women
   c) 6 groups of 5 men, 4 groups of 5 women
   d) 7 groups of 6 men, 3 groups of 6 women
   e) 6 groups of 7 men, 4 groups of 7 women
   f) 2 groups of 9 men, 3 groups of 9 women

B. Design

A room was divided into 9 enclosed booths. In each booth, there was a box containing three buttons of "escape," "attack," and "concession," and the counter which shows the subject the distance to an exit. On the front wall, there was a panel containing 27 lamps (9 lamps for each of three colors: red, yellow, and green). The red lamps show by being lit that a crisis (electric shock in this experiment) is approaching the subject. Upon the red lamps being lit, the subject push the "escape" buttons so that the counters show how many "escape" buttons were pushed, indicating the distance to a safe place. When one of the subjects pushes the "escape" button, the red lamps disappear and the yellow lamps are temporarily lit. If two or more subjects push the "escape" button at the same time, all counters for all of the subjects stop in spite of the "escape" buttons being pushed so that nobody can escape.

In this situation, the subjects have three choices, the "attack" buttons, the "concession" buttons, or to await other subjects' responses with no response on their own. When one subject pushes the "attack" button, the number on the counters for all of the other subjects except the subject is turned back to zero, which means that other subjects are forced to be back in a crisis situation. When the "concession" button is pushed by a certain subject, only the subject who pushed the button turns back to zero.

Repeating these procedures, the subjects who gain 100 points on the counter are regarded as successful evacuees. When a certain subject successfully escapes, the green lamp in front of the subject is lit. The time was 30 seconds per subject after the red lamps are lit. Therefore, 90 seconds were given to the group of 3 persons, while 270 seconds were given to the group of 9 persons.

The experiments were conducted in a dark room and each subject wore a headphone during the experiments so that the subjects could see and hear nothing and would do nothing but look at the counters, three buttons, and three lamps.

C. Date of Study: Not specified

II. Purposes and Hypotheses

A. Purpose

1. To experimentally examine the effect of group size on escaping behaviors in a simulated panic situation

B. Hypotheses

1. As the size of a group grows, the ratio of successful escapes will decrease and the degree of confusion will increase.
2. As the size of a group grows, the "escape" or the "attack" behaviors will increase and the "concession" behaviors will decrease.

III. Findings

A. As the size of a group grows, the degree of confusion increases and the ratio of successful escapes decreases. The most distinctive decrease in the ratio of escapes was observed between experiments with groups of four persons and groups of five persons.

B. Subjects of medium-size groups (groups of six persons) were more likely to be aggressive than those of large groups (groups of seven or nine persons) or of small groups (groups of three or four persons).

C. In the situation that aggressive responses (the "attack" behaviors) increased and concession responses decreased, there was almost no possibility for the subjects to successfully escape together.

I. Material:

Title: Reliability and Effectiveness of Actions for Earthquake Disaster Prevention (Toshi no Bosai Taisei no Shinraisei Yukosei ni kansuru Kenkyu)

Author: Institute for Future Technology (Mirai Kohgaku Kenkyusho)

Publisher and Year: 1979

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquakes

Date of Occurrence: January 14, 1978, 12:24 p.m.
June 12, 1978, 5:14 p.m.

Location: Shizuoka Prefecture and Miyagi Prefecture, Japan

Casualties and Damage: The 1978 Izu Oshima Kinkai Earthquake*

Killed: 25 Injured: 205
Total loss: 39.3 billion yen (164 million U.S. dollars)
Completely destroyed houses: 96
Partially destroyed houses: 4,786
Landslides: 191
Destroyed portion of roads: 1,126

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

*The 1978 Miyagiken Oki Earthquake

Killed: 28 Injured 10,247
Completely destroyed houses: 1,279
Partially destroyed houses: 132,594
Flooded houses: 5
Destroyed portions of roads: 1,037
Landslides: 167
Fires: 12

I. Methods
   A. Interviews with a large number of persons
   B. Analysis of documents
   C. Date of Study: 1977-1978

II. The report consists of four parts
   A. Case study of the 1978 Izu Oshima Kinkai Earthquake
   B. Case study of 1978 Miyagiken Oki Earthquake
   C. Status quo of anti-earthquake measures and problems
   D. Roles of organizations in promoting the implementation of countermeasures and future direction

III. Case Study of the Izu Oshima Kinkai Earthquake
   A. After the description of the event, damages, emergency responses, recovery processes, fifty-four problems or lessons in 12 disaster-related functions are indicated. Some of them are as follows:
      1. Earthquake prediction
         a) to recognize the limit of prediction and to make the public and the government understand the failure of prediction
         b) to legally elaborate the prediction notification system
      2. Emergency operation center
         a) to clearly allocate roles
         b) to set up a group which would deal with incoming or outgoing information in emergency situations
         c) to seek a more effective network of organizations
      3. Communication system
         a) to set up an interorganizational network sharing information in common
         b) to improve a format to effectively receive information
      4. Rescue activity
         a) to accurately estimate necessary equipment and materials
         b) to clarify the routes on which extra-heavy equipment can be transported
      5. Evacuation
         a) to provide sufficient food and water at shelters
         b) to use mobile houses as shelters
      6. Evacuation of tourists
         a) to clarify who is in charge
         b) to inform them of shelters and provide them with food or water
         c) to get them home
      7. Management of industrial waste
         a) to amend the regulation about dumps
         b) to regulate the storing of poisoneous materials in a river basin
      8. Supply of water
         a) to set up an emergency water supply system, especially by sea
         b) to repair according to the present rule of priority
      9. Supply of gas
         a) to have gas cylinders equipped with quake-proof devices (propane gas)
         b) to set up a mutual aids system covering a broad area in order to supply gas as soon as possible after the earthquake

10. Telephones
    a) to improve a means to transport staffs and equipment for repairing
    b) to prevent the congestion and breakdown of the telephone system by educating the public, and by giving a priority to disaster-related organizations
11. Electricity
    a) to reinforce the structures of facilities against an earthquake
    b) to set up a more effective communication network with other organizations
12. Roads and traffic
    a) to cooperate with private construction companies in adjacent areas
    b) to assign a clearly defined role
    c) to set up a priority order of recovery

IV. Case Study of the Miyagiken Oki Earthquake
A. After the description, sixty-three lessons are specified. Some of them are as follows:
1. Emergency operation center
    a) to set up a more effective communication channel with mass media
    b) to elaborate the notification system among staffs
2. Fire fighting
    a) to safely store chemical substances
    b) to prepare against simultaneous, multiple fires
3. Rescue activity
    a) to use taxi or private cars to transport the injured
    b) to make an emergency plan for elevators
4. Evacuation
    a) to set up voluntary mutual aids systems in addition to checking the existing evacuation sites
5. Areas of industries which store the dangerous materials such as gas stations, oil refineries, and the like
    a) to check oil tanks
    b) to elaborate emergency plans for industrial areas
6. Roads and traffic
    a) to have major signals equipped with batteries or self-generators
    b) to elaborate an emergency traffic control system
7. Telephone
    a) to make use of mass media so as to prevent the breakdown of the telephone system
8. Public relations activity
    a) to provide the public with private information
    b) to report not only negative news (such as damages or casualties) but also positive news (such as children's safety at a kindergarten)
    c) to specify the source of information
    d) not to use telephones for obtaining information

V. Status quo of anti-earthquake measures and problems
A. A summary is given of six current functions. In addition, each measure is classified according to the degree of urgency and importance and according to time dimension (pre-disaster, post-disaster, etc.). Finally, obstacles in taking measures are indicated. The obstacles are classified into:

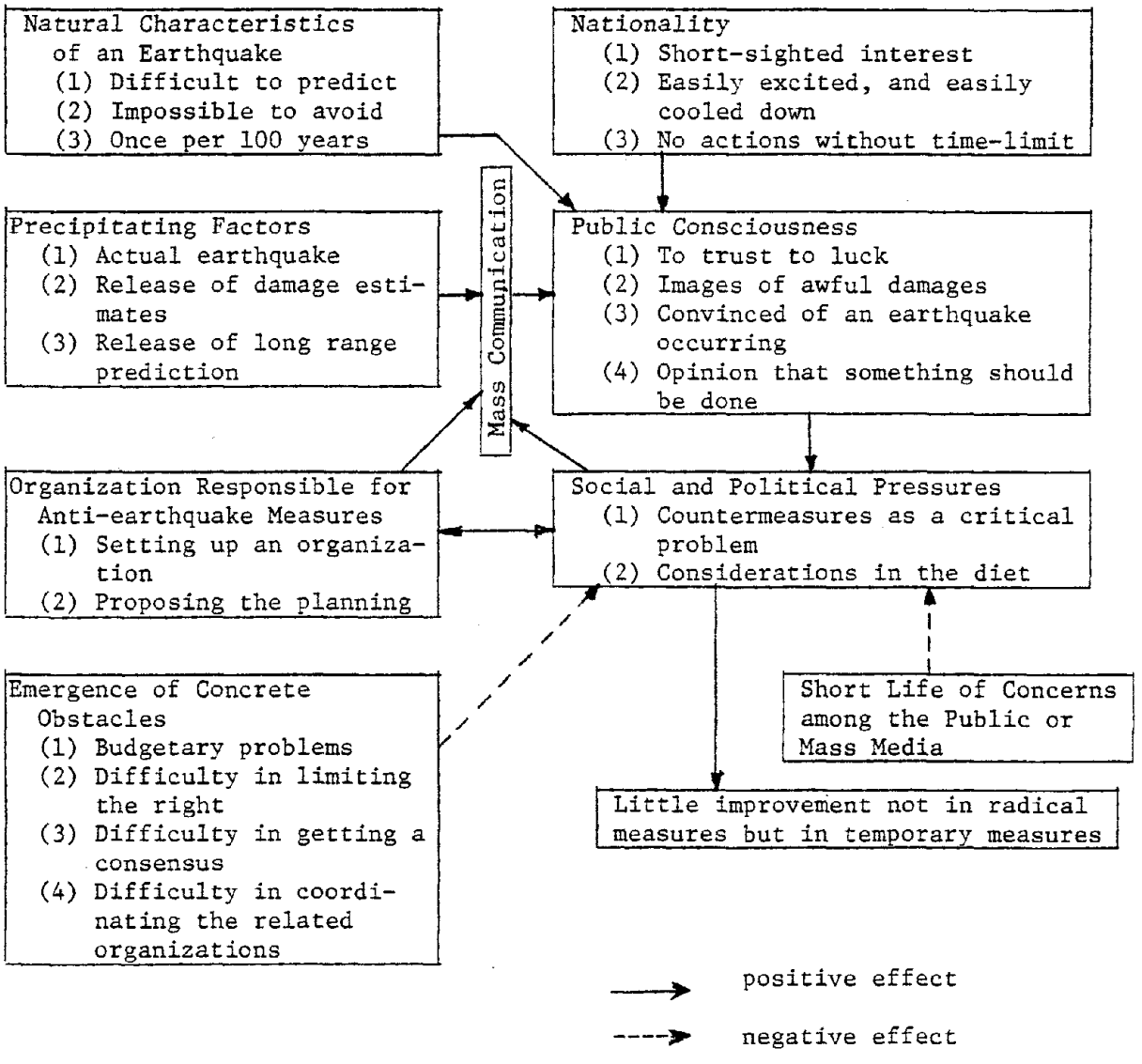
1. organizational obstacles
2. legal obstacles
3. budgetary obstacles
4. public opinion
5. technological obstacles

The six functions discussed are

1. fire prevention (includes 26 measures)
2. rescue, medical services, and evacuation (includes 36 measures)
3. supply of water, food, and other essential goods (includes 28 measures)
4. supply of energy (includes 35 measures)
5. traffic and transportation (includes 25 measures)
6. communication (includes 35 measures)

VI. Roles of organizations in promoting the implementation of countermeasures

A. The mechanism of stagnancy in implementing countermeasures



B. Three major problems to be solved
   1. To elaborate emergency planning. The planning should especially be concrete and practical.
   2. To coordinate organizations and their planning. Organization should be coordinated both vertically and horizontally.
   3. To set up a special section directly responsible for measures against a future great earthquake at the national level.

C. Four directions of organizational or interorganizational development
   1. To remain in the present situation, improving each organization individually.
   2. To remain in the present situation, but creating a certain coordinating agency.
   3. To establish a "National Emergency Management Agency."
   4. To establish a "Ministry of Disaster Management."

I. Material.

Title: Jishin to Toshi (Earthquake and Cities

Author: Murakami, Suminao

Publisher and Year: Nikkei Shinsho, Tokyo, 1973

II. Agent and/or Event.

Type of Disaster Discussed: Not specified

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

The author discussed urban disasters from the viewpoint of policy making and emphasized the lack of comprehensive studies on disasters.

Contents

Conclusions - Safe Cities for Human Beings

1. Difficulties in Ensuring Safety
2. Difficulties in Comprehending Cities
3. Anti-Disaster Urban Planning: Long Term Planning

I. Material.

Title: Shinsai Yobo no Kadai (Problems in the Mitigation and Prevention of Earthquake Disaster)

Author: Nakano, Takamasa

Publisher and Year: in Sogo Toshi Kenkyu (The Comprehensive Urban Studies), No. 2, March 1978, Tokyo Metropolitan University

II. Agent and/or Event.

Type of Disaster Discussed: Earthquake

III. Table of Contents.

IV. Abstract (Major ideas and suggestions).

The article indicated three major aims and four major topics on prevention of earthquake disaster which was recognized as one of the project themes of the Center for Urban Studies, Tokyo Metropolitan University.

1. The Basic Studies for Constructing a Theory of Earthquake Prevention.

2. The Basic Studies for Constructing a Theory of Urban Disaster Prevention.

3. The Construction of a Comprehensive Theory for Earthquake Prevention, Including Socio-Economic Effects of Earthquake.

Four specific topics are:

1. Seismo-engineering studies of buildings should be reexamined from the viewpoint of earthquake disaster prevention.

2. Earthquake disasters should be studied not only from the viewpoint of seismo-engineering, but also from the viewpoint of the social sciences.

3. The effects of earthquake disasters in urban areas are clearly characterized by urban structure and functions.

4. Social scientific studies of earthquake disasters are basically necessary in order to elucidate the socio-economic damage due to earthquake.

I.Material.

Title: Studies on Human Behavior in Disasters (Saigai Kodo Kenkyu)

Author: Nakano, Takamasa and Ryoichi Kazama

Publisher and Year: in Comprehensive Urban Studies, No. 2, March, 1978, pp. 103-109, Tokyo Metropolitan Unviersity

II. Agent and/or Event.

Type of Disaster Discussed: Not specified

III. Table of Content.

IV. Abstract (Major ideas and suggestions.).

The article consists of summaries of two articles written by Alexander Mintz and by E. L. Quarantelli. After the summaries, the authors indicated the following on the basis of the two articles.

1. A strong fear is not always a necessary and sufficient condition for maladaptive group behavior.
2. As the size of group grows, maladapted behavior by one member tends to be a powerful incentive to a breakdown of coordinated group behavior.
3. A reward structure for a behavior can explain many maladapted behaviors.
4. Panic is not irrational but non-rational.
5. Panic in disastrous situations has been overestimated.

I.Material.

Title: Systematization of Research Methods on Accute Disruption of Urban Structure and Functions in Earthquake Disasters. (Shinsaiji ni okeru Toshi no Kozo to Kino no Kyuhen ni kansuru Kenkyu Hoho no Taikeika)

Author: Nakano, Takamasa et al

Publisher and Year: in Comprehensive Urban Studies, No. 1, November, 1977, pp. 5-32, Tokyo Metropolitan University

II. Agent and/or Event.

Type of Disaster Discussed: Earthquake and fires

III. Table of Content.

IV. Abstract (Major ideas and suggestions.).

The authors discuss the accute change of urban structure and functions which result from an earthquake. They utilize several archives and historical documents. Sakata city is examined, as a model city, because it has had a number of experiences of fires and earthquakes. The events discussed are (1) the 1976 great Sakata Fire, (2) the 1894 Shonai Earthquake and fires, and (3) a number of fires the city has had since 1600.

I. Regarding the 1976 great Sakata Fire
   A. The cause of the disaster was a delay in a notification of the fire. If the Fire Department had been notified at an early stage, of the fie, the disaster could not have occurred.
   B. Water for extinguishing a fire should be cyclically used. That is, water used once should be stored via an effective sewage system and be used again.
   C. The reconstruction planning emphasized effective land use or spatial arrangements rather than the fire-proof structures of newly constructed buildings.

II. Regarding the 1894 Shonai Earthquake
   A. The physical cause of the disaster was the characteristics of the land; the softness of the land, and the liquefaction of the land.
   B. The earthquake devastated seven percent of the houses in the Sakata area and burned an area of 38.6 ha.

In conclusion, the authors indicate four problems to be solved in future studies:

1. human behavior in disasters
2. organizational responses to disasters
3. a tracing of the process of a disaster to its pre-disaster situation
4. a need to systematize the records or archives of past disasters

I. Material:

Title: '78 Miyagiken Oki Jishin Saigai no Jittai (Report on the Investigations into the Actual Condition Caused by the 1978 Miyagi-ken Oki Earthquake)

Author: Nihon Kenchiku Gakkai, Tohoku Shibu (Research Committee of the Miyagiken Oki Earthquake, 1978, Architectural Institute of Japan, Tohoku Branch)

Publisher and Year: 1979

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: June 12, 1978, 5:14 p.m.

Location: Miyagi Prefecture

Casualties and Damage: Killed: 28 Injured: 10,247
Completely destroyed houses: 1,279
Partially destroyed houses: 132,594
Flooded houses: 5
Destroyed portions of roads: 1,037
Landslides: 167
Fires: 12

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

This book consists of eight research reports on different aspects of the Miyagiken Oki Earthquake. The reports on the organizational responses by associations of contruction companies and on the damages and responses of offices are excluded from this abstract.

Chapter 1 - Damages and People's Responses to the Quake

I. Method
   A. Three methods used
      1. Questionnaires
         a) no mention about their delivery and collection
         b) sample: 6,000
         c) return ratio: 5,229 87.2%
         d) sampling procedure: Two Stage sampling from the
      2. Interviews with 100 householders
      3. Students' compositions on the earthquake.
      4. Date of study: July-August, 1978

II. On preparations
   A. Although the citizens experienced an earthquake in February of 1978, their experiences did not improve preparations.
   B. The degree of preparation was little associated with their emergency responses. Their responses were determined by the strength of the quake and the risks they perceived.

III. On Emergency Responses
   A. At home
      1. The ratio of homes which had elderly or children was high at the time of the quake. However, they first put fires out, then helped the elderly or children.
         a) other major responses
            (1) checking exits
            (2) rushing out
   B. At workplace or school
      1. Major responses
         a) stopped working and tried to define the situation
         b) hid themselves under desks or chairs
   C. In buildings they were visiting
      1. In many cases (about one quarter of all cases), there was sudden darkness due to the failure of inside emergency lights
      2. Major responses
         a) rushed out
         b) clung to nearby pillars
         c) cowered
   D. Outside
      1. They had a stranger fear than people in houses or buildings.
      2. Two major responses characteristic of people outside

a) cowered or fell on their legs
b) helped children or people who were old or handicapped

E. Men, as a whole, tried to define the situation, while women quickly responded with actions such as putting fire out or helping children or the elderly.
1. Women's quick actions seemed to reflect the customary roles of women.

F. Behaviors in the 15 minutes after the quake.
1. Cleared away the debris
2. Went home
3. Checked other people's safety
4. Gathered information by phone or radio

Chapter 2 - Damages and Responses by Several Social Facilities

I. Medical facilities
A. Method
1. Structured interviews with staffs of 20 hospitals in June-July, 1978
B. Findings
1. Building-structures of hospitals were quite safe. Most damages were caused to internal facilities, medical equipment, and furniture. Furthermore, the energy systems in hospitals suffered severe damages. Since electricity and water are indispensable, the hospitals should have had substitute systems, such as emergency generators or deep wells.

II. Child Welfare Institutions
A. Methods
1. Interviews with staffs of 16 institutions in June-August, 1978
B. Findings
1. Since the quake occurred in the evening, there were no severe problems.
2. The number of chilren is usually much more than that of teachers or staffs. Therefore, it is essential for these institutions to secure inside safety-corners and evacuation routes.
3. Another possible problems will be how to let parents know about the condition of their children.
a) In this earthquake, radios provided this kind of information.

III. Facilities for the handicapped
A. Method
1. Structured interviews with staffs of 25 facilities in June-August, 1978.
B. Findings
1. There was overlap between evacuation practices for fires and earthquakes. Usually, there were not many practices for earthquakes, but for fires. So some people responded to the quake as they had practiced for fires. As a result, they evacuated by passing through dangerous parts of buildings.

2. Different facilities took different responses measures.
   a) Major responses
      (1) let the handicapped stay in their rooms
      (2) let them gather in the hall or tearoom
      (3) let them gather outside
3. The different responses seemed to be due to the type of inmates in the institutions. In the cases of facilities for mental disability, facilities whose inmates were adults let them gather outside, while facilities for mentally disables children let them gather in a certain place inside.

IV. Welfare institutions for the elderly
   A. Method
      1. Structured interviews with staffs and inmates of 20 institutions during June 29-August 19, 1978
   B. Findings
      1. Although most inmates will need some help in emergencies, the proportion of staff personnel to inmates is very low. As in the case of child welfare institutions, this will cause a major problem, especially at night.
      2. Disaster drills had been carried out in most institutions. The drills had always involved staffs but only certain of the inmates. As a result, the drills could not be brought into effect in most emergencies.
      3. Not all of the staffs were familiar with how to operate equipment or facilities. Therefore, some of them failed, for example, to control sources of fire.
      4. Most institutions were equipped with slides for evacuating inmates. Since the slides did not work as expected, the efficiency of the slides should be checked from a psychological or medical viewpoint.

V. Meeting places
   A. Method
      1. Interviews with staffs of 25 public meeting places
      2. Study conducted June 29-July 29, 1978
   B. Findings
      1. As a whole, little damage was reported. It should be noted that most bookshelves in stockrooms feel down.
      2. In some cases, since equipment such as lockers or bookshelves were located in passageways, they could block evacuation routes.
      3. Staffs should always be informed about who and how many people will be using the meeting rooms.

Chapter 3 - Damages and Reconstruction Process of Newly Developed Area

I. Method
   A. Interviews with representatives from two organizations of people who had damages (2 representatives)
   B. Questionnaries delivered and collected by researchers
      1. Samples: 821 households
      2. Date: September 11-20, 1978

II. Findings
- A. An indirect cause of the disaster was the high demand for and building of houses in rapidly growing urban areas.
- B. Some weaknesses of regulations about house-construction were made clear.
- C. Three factors complicated the reconstruction process
  1. Difficulties in suspending or restricting the ownership of land.
  2. Ambiguous responsibility for managing the space.
  3. Difficulties in evaluating the degree of damages.
- D. Recognition of the degree of damage was influenced by
  1. Perception of superficial characteristics of their and others' damages
  2. Information on damages from governments or other community organizations.
- E. On the other hand, their recognition of their damages affected
  1. The kind of emergency measures
  2. Their evacuation behaviors
  3. Consciousness about the safety management system in the area

Chapter 4 - Damages and Responses in Nearby Agricultural Areas

I. Methods
- A. Questionnaires for three areas
  1. Sample
     a) All households which were defined by the local government as "totally collapsed"
        (1) 103 houses
     b) 267 households chosen by a probability proportionate sampling
  2. Date of study: August, 1978
- B. Interviews
  1. No details mentioned
  2. Date of study: March, 1979

II. Findings
- A. Some unique problems to agricultural areas were made clear
  1. The farmers could not easily move out in spite of their recognition that their lands were highly vulnerable to an earthquake.
  2. The ordinary urban planning process excluded the agricultural areas.
  3. Farming in these days is done mainly by the elderly and women. As a result, most farm houses are composed of women and the elderly. Furthermore, modernization has weakened the traditional ties of mutual assistance among farmers. These characteristics of modern agricultural areas should be taken into consideration in planning countermeasures.

Chapter 5 - Damages and Reconstruction of High-Rise Residential Buildings

I. Methods
- A. Interviews with residents of eight high-rise residential buildings; July-October, 1978

B. Interviews with managers of 94 high-rise residential buildings; October, 1978
C. Questionnaires delivered and collected by researchers
   1. Sample
      a) 805 residents in 13 high-rise residential buildings
   2. Date of study: October, 1978

II. Findings
A. Although some damages of external structures were reported, damages to internal facilities such as doors, walls, windows, or maintenance systems were far more extensive.
B. Many injuries were reported which resulted from the falling-over of furniture in high-rise residential buildings.
C. The degree of damage varied according to the floor. That is, the higher the floor, the more the damages.
D. Emergency responses were determined by
   1. If residents were using a fire
   2. If they had children or elderly
E. Disruption or breaking down of maintenance systems was compensated by individual efforts rather than by cooperative efforts of residents and management companies. A cooperative system in emergencies for residents should be established.
F. Residents in high-rise buildings had little knowledge about the building structures and the appropriate responses to an earthquake. Buyers of units of high-rise residential buildings should be provided with such information.
G. The reconstruction processes of high-rise buildings had some unique features.
   1. It was difficult to distinguish the private spaces from the shared public spaces.
   2. The need for specialized knowledge and skills to manage high-rise buildings left residents uninformed about the reconstruction process.

Chapter 6 - Damages and Reconstruction of Urban Facilities

I. Method
A. Interviews with eight related organizations' staffs in July, 1978 and February, 1979

II. Findings
A. Roads
   1. A major highway was closed to traffic. Twenty-eight national and prefectural roads, and twelve muncipal roads were closed. Furthermore, because of the breaking-down of traffic signals, the traffic conditions in downtown were bad until the late evening. Some measures for preventing the breaking-down of traffic signals will be necessary.
B. Railways
   1. All trains stopped because of the disruption of electricity but no accidents were reported. Since the railways are highly dependent upon the electric company, they should establish an emergency cooperation system with the electric company.

C. Water supply
   1. Over seven thousand households suffered from the disruption of the water supply.
D. Electricity
   1. Electricity was disrupted in the entire area of Sendai. Recovery was smoothly and quickly done through the emergency network among several major electric companies.
E. Gas
   1. Gas service was also totally disrupted. They should build multiple pipeline systems so that all lines into an impacted area will not be damaged.
F. As a whole, there is a need for a certain system which can be substituted in emergencies so that the energy supply in urban areas can be secured.

I. Material.

Title: Dai Jishin ni Ikinokoru-Ho (Techniques on How to Survive an Earthquake)

Author: Ohta, Hideoki

Publisher and Year: Tokyo Sports Newspaper Co., Tokyo, 1977

II. Agent and/or Event.

Type of Disaster Discussed: Earthquake

III. Table of Contents.

Chapters on:

1. Emergency Responses to Earthquakes
2. Evacuation
3. Emergency Time Life
   a. Clothing
   b. Food
   c. Housing
4. Preparations Against Earthquakes
5. Countermeasures
6. Predictions of Earthquakes

IV. Abstract (Major ideas and suggestions).

I. Material:

Title: Jishin Joho no Dentatsu to Jumin no Hanno (An Analysis of Individual and Group Responses to the So-called After-shock Information)

Author: Okabe, Keizo et al

Publisher and Year: Shimbun Kenkyu-sho (Institute of Journalism and Communication), University of Tokyo, 1978

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: January 14, 1978

Location: Shizuoka Prefecture, Izu area

Casualties and Damage:

Not mentioned

(2) Method

Method in detail:

(1) Interviews and questionnaires answered by mail

(2) Samples: Shimoda City - 300
Numazu City - 200
Return ratio: Shimoda - 54%, Numazu - 48.5%

(3) Interviews with 714 housewives in Numazu City.

Date of Study: January 21-24 and February 10-19, 1978

III. Hypothesis and Findings.

I. Dissemination of "After-shock Information"

A. January 14, 1978 - the major quake

B. January 18, 1978 - the issuing of "After-shock Information" by the prefectural government

C. The information flows

1. There is an administrative route. This goes through local governmental offices. It involves the slowest flow of information, but reaches almost all residents of an area.
2. There is a mass-media route. This involves the second quickest flow of information. Unlimited number of persons can be reached by such a flow.
3. There is a propane-gas-company route. The information flows quickest by this route but gets only to certain people.

D. Most people responded to the "After-shock Information" by confirming-behaviors.

E. The information was more severely and badly transformed in those areas where there were relatively small damages rather than in those areas of greatest damage.

F. People who received information from others in private personal communication tended to create rumors.

G. Persons who believed a rumor in the after-shock period

1. Shimoda City 44.6%
2. Numazu City 69.1%

H. Reasons they believed rumors

1. Their earthquake experiences two years ago
2. Trust they had in the source of information

I. Reasons they did not believe rumors

1. They doubted the possibility of scientific prediction
2. Experiences in the past
3. Distrust in the source of information

J. People who attempted to confirm the information they received

1. Shimoda City 25.0%
2. Numazu City 20.0%

K. Passive confirming-behavior such as listening to a radio or watching television was dominant. People who tried to actively confirm information by making a phone call to public organizations were

1. Shimoda City 15.0%
2. Numazu City 9.0%

L. Some major factors which affected the acceptance of a rumor

	(Partial Correlation)
1. Anxiety and fear	0.403
2. Surprise at being in a major quake	0.265
3. Higher education	0.221

M. Responses to the "After-shock Information"

	(Shimoda City)	(Numazu City)
1. Did nothing special	22.2%	28.1%
2. Some preventive measures such as putting fire out, mental preparation, communicating with a family member	23.4%	13.5%
3. Prepared for evacuation	27.2%	46.1%
4. Evacuated	1.9%	0.0%

N. Characteristics of people who did nothing special
   1. Low anxiety about an earthquake
   2. Limited trust in prediction information
   3. Mild concern about disaster information on TV
   4. They also were less accepting of a rumor.
   5. Less likely to attempt to confirm the rumor
   6. Less likely to transmit a rumor to others

I. Material.

Title: The Earthquake Prediction Warning and the Social Responses, Part II (Zoku Jishin-Yochi to Shakaiteki Hanno)

Author: Okabe, Keizo et al

Publisher and Year: University of Tokyo Press, 1981

II. Agent and/or Event.

Type of Disaster Discussed: Experiment

III. Table of Contents.

This book consists of five research reports.

Chapter 1 - People's Response to an Earthquake Warning, Part I

See the summary of Report of the Survey Research on People's Responses to an Earthquake Prediction Warning by Okabe, Keizo et al, Institute of Journalism and Communication, University of Tokyo, 1979.

Chapter 2 - People's Responses to an Earthquake Warning, Part II

See the summary of The Study of the Responses to Earthquake Prediction, Part II by Ikeda, Kenichi et al, Institute of Journalism and Communication, University of Tokyo, 1980.

Chapter 3 - Responses to TV News "Earthquake Warning"

See the summary of "Responses to TV News 'Earthquake Warning'" by Okabe, Keizo et al, 1980.*

IV. Abstract (Major ideas and suggestions).

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*Chapter 4 - Experimental Study on Insurance Purchasing Behaviors

See the attached for the summary.

Chapter 5 - A Disaster Warning and Responses of Residents

See the summary of A Disaster Warning and Responses of Residents: A Study of Evacuation Behavior During a Warehouse Fire in Ohbu City by Okabe, Keizo et al, Institute of Journalism and Communication, University of Tokyo, 1981.

I. Material:

Title: Survey Research on the Attitude of Tokyo Residents Toward the Prospective Earthquake and the Prediction Warning. (Saigai ni kansuru Tomin no Ishiki Chosa.)

Author: Okabe, Keizo et al

Publisher and Year: in The Earthquake Prediction Warning and the Social Responses (Jishin Yochi to Shakaiteki Hanno) edited by Institute of Journalism and Communication (Shimbun Kenkyusho), University of Tokyo, pp. 137-303, 1979.

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo, Japan

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

I. Stratified sampling
   A. 1,500 persons chosen from the voters' list, 15 persons from each of 100 voting areas
   B. Valid answers
      1. 1,093 72.9%
   C. Structured Interviews
      1. January 18-28, 1978
   D. Possibility of scientific prediction

Predictions of	Possible	Impossible	Don't Know (NA)
Time	67.7%	23.2%	9.1%
Area	72.6%	16.1%	11.0%
Magnitude	50.8%	31.0%	17.9%

      1. Women are more likely to think that scientific prediction of time is possible.
      2. Young women are more likely to trust the scientific prediction.
      3. People with more education, rather than people with less education, tend to think that scientific prediction of earthquake is possible.
      4. In comparison with other categories professionals, managers, company or store owners, and clerical workers are more likely to think that prediction for the area is scientifically possible.
      5. Car-owners and people who have bought earthquake insurance tend to think that scientific prediction is impossible.
      6. Relationships to personality
         a) the optimists tend to be pessimistic about the possibility of prediction
         b) people who have a scientific attitude tend to think that predicting magnitude is not possible, but predicting area is possible
   E. On the perception of natural phenomena as possible symptoms of earthquake

	yes	probably	no	don't know (NA)
1. catfish acting violently	14.6	50.2	21.3	13.8
2. rumblings of the ground, etc.	10.6	44.7	15.2	29.2
3. no wind, or heat	8.9	43.2	19.9	27.8
4. a pheasant cries	4.8	26.8	27.3	41.0
5. a special rainbow	1.8	17.0	32.3	48.9
6. a devine message or fortune telling	0.9	8.1	70.5	19.8

   F. There were four types of attitudes toward earthquake prediction, differentiated by the degree of trust in prediction possibility and in the acceptance of natural phenomena indicators as symptoms:
      1. Type I: Distrust in scientific prediction
      2. Type II: Trust in scientific prediction
      3. Type III: Trust in natural symptoms
      4. Type IV: Trust in everything

5. People of Type I tend to distrust prediction information issued by public organizations, while people of Type IV tend to trust.
6. People with a high educational background tend to be Type IV, while people with a lower educational background tend to be Type I.
7. People in their 20s tend to be Type IV, while people in their 60s tend to be Type I.
8. People in their 30s or 40s tend to be Type II.
9. People of Type III are characterized by their optimistic nature.

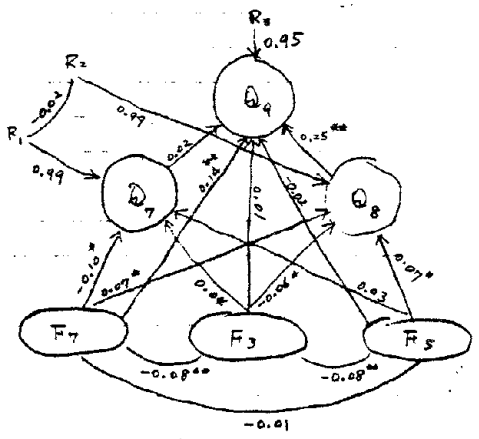
G. Responses to prediction information (multiple choice)

1. Do nothing	3.0%
2. Prepare for removal of valuables	67.1%
3. Prepare for emergency food	65.5%
4. Check on evacuation place	58.3%

5. People in their 20s are likely to do nothing in response to prediction information, while people in their 40s or 50s do something.
6. Unmarried persons are likely to do nothing.
7. The greater their income is, the more they prepare in response to prediction information.
8. People in their own houses are more likely to prepare in response to prediction information, rather than people in rented houses.
9. People who prepare well in response to prediction information are more likely to trust prediction information.
10. People who prepare well tend to have greater fear.
11. People who prepare well tend to predict their own damages to be larger due to an earthquake.
12. The higher the educational background, the more the preparation.

H. Two models relating demographic factors, anxiety about an earthquake, and desire to move:

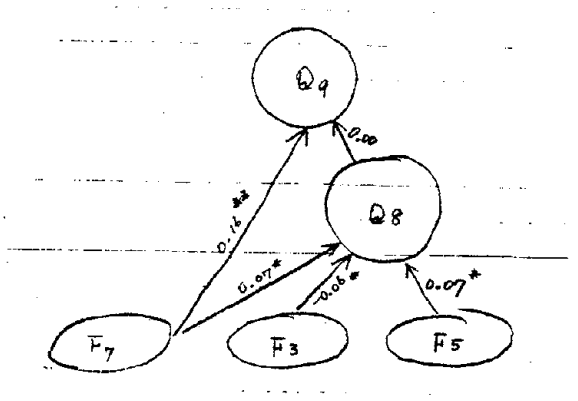
Recursive Model



F3: level of education
F5: family size
F7: density of houses
Q7: knowledge of evacuation places
Q8: anxiety
Q9: desire to move

*p < .05
**p < .01

Overidentification Model



*p < .05
*P < .01

1. From the recursive model, it can be said that "knowledge of evacuation places" is not an intermediate variable, but "anxiety about an earthquake" is.
2. From the overidentification model, it can be said that three demographic factors (F3, F5, F7) and "anxiety about an earthquake" have significant direct effects on "anxiety about an earthquake" and "wishfulness of house moving," respectively. However, "anxiety about an earthquake" does not play a role of an intermediate variable.

I. How people obtain information about a disaster

1. TV or radio	67.7%
2. Newspaper	55.8%
3. P.R. by local government	24.2%
4. Weekly or monthly magazine	8.7%
5. Books	7.5%

6. People who have less contact with information about an earthquake
   a) people in their 20s
   b) unmarried persons
   c) people whose incomes are low
7. People who have frequent contact with information about an earthquake
   a) people who live in their own houses (not in rented houses)
   b) people who live in separate houses (not in apartments)
   c) people who bought the earthquake insurance
   d) people who are the members of self-governed neighborhood organizations
8. Relationships of "frequency of contacts with the information" with several other variables
   a) the more frequently people come into contact with the information
      (1) the more they trust "an earthquake prediction"

(2) the more they prepare against an earthquake
(3) the stronger their anxieties are
(4) the stronger their desires to move are
(5) the more severe damages they predict
(6) the more frequently they talk at home about

9. Factor analysis of "frequency of contacts with the information"
   1. The following are positively associated with the frequency of contacts with the information

	(Partial correlation)
a) anxiety	0.187
b) level of education	0.108
c) knowledge about evacuation places	0.104
d) optimistic personality	0.101

J. Damage Prediction
   1. By asking about predictions regarding damages in their neighborhoods and in Tokyo as a whole, four types of predictors can be classified:

(Damage) in Tokyo / in Neighborhood	Small	Great
Small	Type 1 22.5%	Type 3 17.9%
Great	Type 2 40.7%	Type 4 18.8%

   2. The greater their income, the more they will be Type 1 and the less they will be Type 4.
   3. People who live in their own houses tend to be Type 1, and people who live in rented houses tend to be Type 4.
   4. People who trust n earthquake prediction information tend to be Type 1.
   5. Factor Analysis of "damage prediction"

	(partial correlation)
(determinant factors of damage prediction)	
a) anxiety (positively associated)	0.222
b) structure of their houses (People who live in wooden houses tend to predict the greatest damages, and people who live in reinforced concrete houses tend to predict the least damages.)	0.173
c) age (the older, the greater damages they predict)	0.161
d) personality (Optimistic persons predict the smaller damages, and pessimistic persons predict the greater damages.)	0.146

e) density of housing (People who live in the area of greater housing density tend to predict the greater damages.) 0.135

K. Sources of information which people will trust after the quake
   1. TV or radio 55.8%
   2. Governments, police, or fire departments 37.1%
   3. Newspaper 3.8%
   4. Don't know; NA 1.6%
   5. Neighbors 1.3%
   6. People in their 20s or 40s tend to trust TV or radio, while people in their 50s or 60s trust more governmental information.
   7. People who had experienced disasters tend to trust the governmental information, while people with no experience tend to rely upon mass media.

L. Conversations at home about emergency responses
   1. Four major topics of conversation at home
      a) on what they should do first 60.5%
      b) on what they should prepare 69.7%
      c) on where and how they should make contacts with each other 43.6%
      d) on where they should evacuate 39.9%
   2. Factor analysis of "frequency of conversations at home"

(partial correlation)

(determinant factors)
      a) frequency of contacts with information (The more frequently they are in contact with information about a disaster, the more frequently they have a conversation.) 0.171
      b) perceived possibility of safe evacuation (People who think that they can safely evacuate tend to more frequently have conversations at home regarding evacuation.) 0.175
      c) anxiety (The greater their anxieties, the more frequent their conversations.) 0.138
      d) sex (Women tend to more frequently have these conversations than men.) 0.106
      e) age (The elderly rather than youth tend to more frequently have conversations.) 0.103

I. Material:

Title: Jishin Yochi Joho eno Taio (A Survey Research on People's Responses to an Earthquake Prediction Warning)

Author: Okabe, Keizo et al

Publisher and Year: Shimbun Kenkyusho (Institute of Journalism and Communication), University of Tokyo 1979

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence:

Location: Shimizu City and Fukuroi City, Shizuoka Prefecture

Casualties and Damage:

(2) Method

Method in detail: Interviews with Questionnaires.
Samples: Shimizu City; 990, Fukuroi City; 660
(Total; 1,650)
The Sizes of Population: Shimizu City; 165,088
Fukuroi City; 29,527
Sampling Procedure: Probability Proportionate Sampling.
Return Rate: Shimizu City; 90.6%, Fukuroi City; 88.6%

Date of Study: February 21-26, 1979

III. Hypothesis and Findings.

I. Knowledge on earthquake and prediction methods
   A. The younger they are, the more they know.
   B. Men know more that women.
   C. Those who perceive the large possibility of danger are likely to know more than those who perceive less.

II. Degree of trust in earthquake prediction
   A. More than half of the respondents think that earthquake prediction is technically possible.
   B. Younger people are likely to think that it is technically possible.
   C. The more highly educated are likely to think that it is technically possible.
   D. Those who perceive the large possibility of danger are likely to think that it is technically possible.

III. Responses to earthquake prediction information
   A. The major responses
      1. Listen to radio or watch TV (over one third of respondents).
      2. Make a phone call to the family (approximately one half of respondents).
      3. Go home or go to meet a member of the family outside (approximately one half of respondents).
      4. Put out the fire or turn off the gas (over two thirds).
      5. Evacuate (approximately two fifths).
   B. Those who want to go home tend to use a car or a bicycle, while those who want to evacuate tend to walk.
   C. Major determinants of these responses
      1. Age, occupation, and the degree of trust in the prediction information affect the responses. That is, the young salaried-workers, the persons with infants or elderly dependents, the people who often talk about earthquakes at home, and the people who trust in warnings are likely to take quick and active responses.
   D. Preparation against earthquake
      1. Few people have often discussed at home how to respond to an earthquake (only 12%)
      2. Their major preparations against earthquake
         a) flashlights, transistor radio, and an extinguisher
         b) packing important things to be easily removed during an emergency period
      3. Age, income, and the degree of anxiety about an earthquake, are positively associated with the degree of concern with preparations against earthquake, respectively.

I. Material:

Title: Keikai Sengen wa Donoyoni Uke Torareruka (Responses to T.V. News "Earthquake Warnings")

Author: Okabe, Keizo et al

Publisher and Year: Shimbun Kenkyusho Kiyo (The Bulletin of Institute of Journalism and Communication), Vol. 28, 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method
   A. Two kinds of questionnaires
      1. One asked about general attitude toward an earthquake
      2. One was administered after the samples looked at a video-taped TV program on the process of issuing an earthquake warning
   B. Both kinds of questionnaires were administered to the same samples
   C. Sample
      1. 168 housewives in their 30s and 40s who live in Tokyo
   D. The samples were randomly split into six groups.
   E. The video-taped TV program consists of three parts.
      1. From finding symptoms of a possible earthquake to the consensus of the judgement committee (the committee composed of earth scientists for evaluating the data and making suggestions to the Prime Minister)
      2. From the release of the results by the committee to the explanation of the results by TV announcer
      3. The issuing of a warning, and recommendations on preparations and countermeasures
   F. The six experimental groups views different parts of the video-taped TV program
      1. Group 1 - Part 1 only
      2. Group 2 - Part 1 and 2
      3. Group 3 - All parts
      4. Group 4 - Part 2 only
      5. Group 5 - Part 2 and 3
      6. Group 6 - Part 3 only
   G. The study was done August 4-5, 1979

II. Findings
   A. General attitude toward an earthquake
      1. Most people had strong or relatively strong anxieties about an earthquake. 85.0%
      2. Predicted damages in their residential areas
         a) percentage show the ratio of persons who indicated the item as possible
            (1) major fires 60.1%
            (2) collapse of houses 64.3%
      3. Their predictions about damages to life-line functions are not so pessimistic.
      4. The ratio of persons who knew the correct definitions of "magnitude" and "intensity" 58.3%
      5. Places people thought of as extremely dangerous
         a) subway 28.6%
         b) underground shopping mall 23.2%
         c) elevator 20.2%
         d) streets surrounded by high-rise buildings 12.5%
      6. The sample size is not large enough to generalize the findings.
   B. Persons who looked at more parts of the TV program understood the content more correctly. That is, fragmentary information caused misunderstandings.

C. Since some special terms such as "magnitude" or "Keikai Sengen" (it literally means "the declaration of a warning or imminent stage") are difficult to be correctly understood, they should be used with caution.

D. Persons who watched only a part of the TV program tended to think that the program was difficult for them to understand.

E. Major predicted responses in an earthquake right after people watched the program

1. Contact family member or relative, mainly by phone	approximately 56.0%
2. buy or prepare food	approximately 54.0%
3. put fire out	approximately 51.0%
4. prepare for saving valuables	approximately 46.0%
5. make water provisions (for drinking or extinguishing fires)	approximately 42.0%

F. After they watched the programs, many inter-personal communications emerged. There is a high possibility that ideas were modified as a result of these inter-personal communications.

I. Material:

Title: Saigai Keiho to Jumin no Taio (A Disaster Warning and Responses of Residents: A Study of Evacuation Behavior After a Warehouse Fire in Ohbu City)

Author: Okabe, Keizo et al

Publisher and Year: Shimbun Kenkyusho (Institute of Journalism and Communication), University of Tokyo, 1981

II. Study:

(1) Agent and/or Event

Type of Disaster: Warehouse Fire

Date of Occurrence: October 1, 1980

Location: Ohbu City, Aichi Prefecture (Close to Nagoya)

Casualties and Damage: No casualty
Loss: ¥ 900,000,000 ($4,500,000)

(2) Method

Method in detail: Telephone interview with questionnaires
Sample: 1,134 housewives within a radius of one kilometer from the spot
Valid Answers: 713 (62.9%)

Date of Study: October 8-14, 1980

III. Hypothesis and Findings.

I. Where people evacuated
   A. Evacuation place designated by the city 32.0%
   B. Houses of their friends or relatives 59.6%
   C. The percentage of persons who were anxious in the designated evacuation place 61.6%
   D. The percentage of persons who were anxious in the houses of their friends or relatives 7.4%

II. Most people evacuated with all of their family members. 93.0%
   A. This explains the fact that most people evacuated after 6:00 p.m. in spite of an earlier evacuation order (at 3:30 p.m.) 92.3%

III. They evacuated
   A. By car 88.2%
   B. On foot 6.1%
   C. By bicycle 4.8%

IV. What made them decide to evacuate
   A. Perception of smoke or bad smell 53.5%
   B. Directions by city officials or the police 30.3%

V. Discussion about Evacuating
   A. The percentage of persons who discussed with others about evacuating 84.0%

VI. Whom they consulted
   A. A member of their family 50.0%
   B. Neighbors 18.0%
   C. Both of them 10.0%
   D. This shows that their reference groups will have a stronger effect on their evacuation decision rather than the order or direction made by the city or police. In fact, the ratio of evacuation are different according to the source of hearing the evacuation order.
      1. Heard from a member of the neighborhood organization 55.2%
      2. Heard from police or city officials 37.2%

VII. Some factors which affected the ratio of evacuation
   A. The direction of the wind
      1. People on the leeward side were more likely to evacuate.
   B. The distance from the site of the disaster
      1. The closer they were, the more the evacuated
   C. Age
      1. As age increased, the ratio of evacuation decreased
         a) those in their 20s 46.8%
         b) those in their 30s 34.9%
         c) those in their 40s 27.7%
         d) those in their 50s 24.7%
         e) those in their 60s 17.6%
   D. People who have children, the elderly, or handicapped people in their families, are more likely to evacuate.

VIII. Partial correlations of some factors which affected evacuation behavior

	(Partial correlations)
A. The direction of wind	0.394
B. The number of persons who needed help	0.122
C. If they heard the order or direction by the city or police	0.120
D. Away from home	0.112
E. Older age categories	0.089

IX. The evacuation orders or warnings were not well understood by the public.
   A. People who heard about the designated evacuation place were more likely to evacuate to the place.

X. Two sources of information about evacuation

A. From police or city officials (via loud-speaker cars)	86.5%
B. From a member of "Han"	12.7%
1. Han is a subgroup of a neighborhood organization.	
C. From both of them	5.3%
D. However, there was no significant difference in the ratio of evacuation according to the sources. There was a significant difference in their recognizing the designated evacuation place. That is, persons whose source of information was a member of "Han" knew the designated evacuation place (a percentage of 62.5) while persons whose source of information was police or city officials were less informed about the evacuation place	35.9%

XI. Reasons for not evacuating
   A. Own judgement
   B. Neighbors' responses
   C. Difficulties in evacuating

I. Material:

Title: Tokyo Eki Yaesu Chika-gai no Tsukoryo oyobi Chika-gai Riyosha no Jittai. (An Empirical Study on the Behavior of Pedestrians in an Underground Shopping Arcade in Tokyo and Their Attitudes toward an Earthquake Disaster)

Author: Okabe, Keizo et al

Publisher and Year: Shimbun Kenkyusho (Institute of Journalism and Communicatio University of Tokyo, 1981

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical Earthquake

Date of Occurrence:

Location: Tokyo

Casualties and Damage:

(2) Method

Method in detail: Interviews with questionnaires with pedestrians at ten different locations in an underground shopping arcade. Samples: 839

Date of Study: 9:30 a.m. - 5:30 p.m. August 29-31, 1981

III. Hypothesis and Findings.

I. Purposes for being in the underground shopping mall
   A. Shopping 36.2%
   B. On the job 22.3%
   C. Passing by 17.5%
   D. Lunch or tea 9.3%
   E. Dating or meeting 6.9%
   F. Strolling 9.5%

II. Number of persons with the respondent
   A. Zero 59.2%
   B. One 26.9%
   C. Two 8.0%
   D. Three 3.7%
   E. Four or more 2.1%
   F. Persons who were with elderly 0.7%
   G. Persons who were with children 9.8%
   H. Persons who were with both children or elderly 0.1%

III. Degree of geographical familiarity with the underground shopping mall
   A. Know well 23.6%
   B. Know roughly 49.2%
   C. Not familiar 27.2%
   D. Men are more likely to be familiar wtih the geographical setting of the underground shopping mall.
   E. The older the person, the better they know.

IV. Knowledge about private emergency generators in the underground shopping mall
   A. Know about it 51.5%
   B. Don't know 48.5%

V. Anxiety
   A. When an earthquake hits, they think that the underground shopping mall would be
      1. Safe 5.8%
      2. Probably safe 16.4%
      3. Probably dangerous 30.0%
      4. Dangerous 47.6%
      5. Don't know; NA 0.1%
   B. Women have stronger anxieties than men.
   C. The younger they are, the stronger their anxieties.

VI. Reasons for anxieties
   A. Collapse of structure 19.2%
   B. Being trapped 22.5%
   C. Fire and smoke 70.9%
   D. Gas explosion 59.4%
   E. Flood 9.7%
   F. Something falling down 36.8%
   G. Panic 68.2%

VII. Predictions about other people's behavior in emergencies	
A. Selfish behavior	85.8%
B. Conforming behavior	76.9%
C. Altruistic behavior	21.0%
VIII. Predictions about his or her own behavior in emergencies	
A. Go to a stairway	21.0%
B. Go to the surface	26.6%
C. Watch and try to understand the situation	33.4%
D. Follow what other people would do	5.0%
E. Conform to the leaders' direction	14.1%

I. Material:

Title: Sakata Taika ni okeru Hinan Kodo no Shinrigakuteki Bunseki (A Psychological Analysis of Evacuation Behavior in the Case of the Great Sakata Fire)

Author:

Publisher and Year: Saigai Kodo Kagaku Kenkyukai (Society for the Behavioral Science of Disaster), 1978

II. Study:

(1) Agent and/or Event

Type of Disaster: Fire

Date of Occurrence: October 29, 1976, approximately 5:40 p.m.

Location: Sakata, Yamagata Prefectura

Casualties and Damage:

Killed: 1
Injured: 964
Number of Burned Houses: 1,017
Burned Area: 22.5 ha
Total Loss: ¥ 10 billion (approximately $172 million)

(2) Method

Method in detail:

See the attached

Date of Study: July, 1977

III. Hypothesis and Findings.

I. Method
   A. Questionnaire
      1. Sample: persons who lived in the burned area
         a) The burned area was divided into four subareas according to the distance from the point the fire broke out
            (1) A block: the closest area to the fire site
            (2) B block: the second closest area
            (3) C block: the third farthest area
            (4) D block: the farthest area

These subareas are relatively homogeneous in sex and age composition. But there are some other marked differences among the subareas. A and C areas are characterized by the dominance of owners or workers in commercial industry, while B and D blocks are charaterized by the dominance of clerical or salaired manual workers.

II. On awareness of the fire
   A. The farther from the original fire site, the later the awareness of the fire.
   B. When they became aware of the fire, people thought that
      1. Their houses would also be involved. 14.2%
      2. Their hourses would not be involved. 84.9%

Men were more likely than women to be optimistic about not becoming involved.

III. On behavior right after the awareness of the fire
   A. Went to see the fire 26.4%
   B. Asked others about the fire 16.3%
   C. Turned on television or radio 8.4%

IV. Evacuation behavior
   A. Whether or not they evacuated with all family members together
      1. All together 45.2%
      2. Separately 54.8%

Families with the elderly or children were more likely to separately evacuate. That is, in most cases, the elderly or children evacuated at an earlier stage.

   B. When they evacuated
      1. The peak of evacuation was approximately eight o'clock.
      2. Families which evacuated with all family members together began evacuation one hour earlier, than families which evacuated separately.
   C. What led people to evacuate
      1. Saw the flames 61.9%
      2. Followed the behavior of neighbors 8.8%
      3. Suggestions by neighborhood organization 8.8%
      4. Directions by loud-speaker cars 3.8%
      5. Directions by the police 2.5%

In A and C blocks, more people evacuated in response to suggestion by neighborhood organizations, while, in B and D blocks, more people evacuated in response to neighbor's evacuations.

D. How they evacuated

	(by car)	(on foot)
1. Evacuated all together	48.7%	43.5%
2. Evacuated separately	17.6%	69.5%

E. Where they evacuated

Temporary Shelters

evacuated	(all together)		(separately)
	(with elderly or children)	(w/o them)	
(a) nearby parks or vacant lots	6.1%	20.2%	18.3%
(b) houses of friends or relatives	78.3%	51.3%	60.3%
(c) public facilities	1.7%	10.1%	6.9%

In both cases of "all-together" and "separate" evacuations, most people (74.9% and 76.3% respectively) stayed at the houses of their friends or relatives.

F. What was an obstacle to evacuation

1. Presence of many cars — 40.0% or 61.9%

(varying according to the type of evacuation (all-together type or separate type))

2. Spectators — 16.9% or 23.8%
3. Fire and/or smoke — 16.1% or 27.1%

Percentage show the ratio of persons who indicated the item as an obstacle.

Roughly speaking, evacuees from the areas closest to where the fire started suffered most from fire and/or smoke; evacuees around the middle area suffered from spectators; and evacuees from the farthest area suffered from cars.

G. Perceived confusion in each area

	much confusion	don't know	less confusion
1. A block	44.9%	30.0%	28.0%
2. B block	39.6	39.7	20.8
3. C block	48.2	25.9	25.9
4. D block	58.1	27.9	14.0

I. Material:

Title: Research on Human Responses to Crises--On Evacuation Behavior in a Fire of a High-Rise Residential Building. (Kinkyu Jitai ni okeru Ningen no Hanno ni kansuru Chosa Kenkyu--Mansion Kasai ni okeru Hinan Kodo ni kansite)

Author: Sako, Shuichi et al

Publisher and Year: A paper presented at the 92nd Meeting of Kansai Psychological Association

II. Study:

(1) Agent and/or Event

Type of Disaster: Fire

Date of Occurrence: May 9, 1980, 2:00 p.m.

Location: Osaka, Japan

Casualties and Damage:

No casualties
Burned Area: not specified

(2) Method

Method in detail: See the attached

Date of Study: Not specified

III. Hypothesis and Findings.

I. Method
   A. Interviews with eleven households in the high-rise building where the fire started.
   B. No date of study is specified.

II. Purpose
   A. To examine the following widely believed idea.

      "Human responses to a fire are characterized by the tendency to go away from fire or smoke and toward open spaces."

III. Events
   A. The fire started at the entrance of a ten-story building in Osaka at about 2:00 a.m. on May 9, 1980.
   B. Tennants of the building were
      1. Offices (first floor)
      2. Stores (second, ninth, and tenth floors)
      3. Residences (other floors)
   C. The fire was completely extinguished at around 2:16 a.m.
   D. The damages were small
      1. A few bicycles or motorcycles at the entrance were burned.

IV. Results
   A. Fire alarm
      1. Recognized: all households 100%
   B. Immediate response
      1. Heard the alarm but did nothing: 9 households 82.0%
         because:
         a) thought the alarm was false: 6 67.0%
         b) was dubious of the alarm: 3 33.0%
   C. Evacuation after their recognition of a fire
      1. Evacuated to a veranda: 6 households
      2. Evacuated to the outside: 3 households
      3. Stayed in a room: 2 households
   D. Evacuations were directed by husbands in four cases.

V. Findings
   A. Going away from fire or smoke and toward spaces were the residents major response.
   B. However, some families (3 households) evacuated toward the smoke.
   C. Decisions about evacuation were made not individually but by a family as a whole.

I.Material.

Title: Miyagihen Oki Jishin Saizai ni Kansuru Sho-Chosa no Sogoteki Bunseki to Hyoka. (The Comprehensive Summary and Assessment of Several Empirical Studies on the Miyagiken Oki Earthquake)

Author: Sendai Toshi Kagaku Kenkyukai (Sendai Research Committee of Urban Sciences)

Publisher and Year: 1979

II. Agent and/or Event.

Type of Disaster Discussed: Earthquake

III. Table of Content.

IV. Abstract (Major ideas and suggestions.).

See the attached

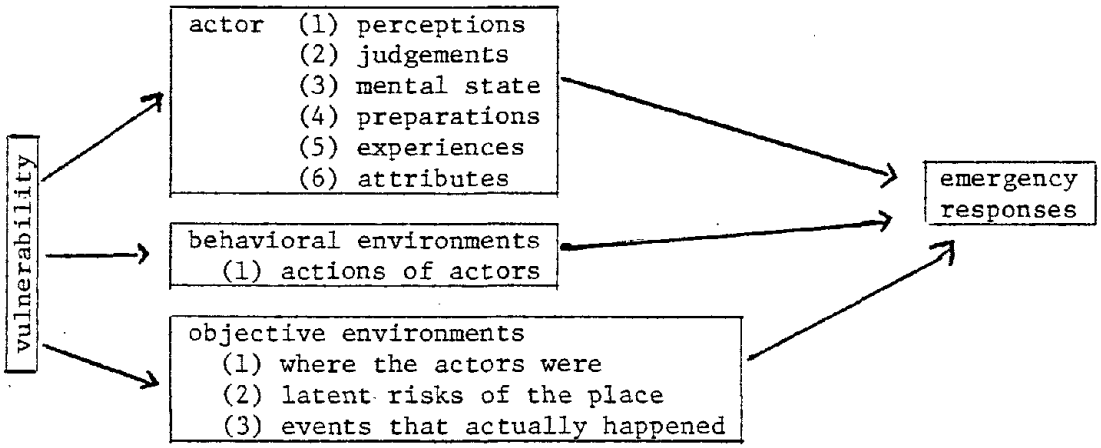
Summaries

This book consists of two parts. The first part, "Damages and Problems," reports on the characteristics of the land and damages to buildings and facilities such as bridges, railroads, harbors, or life-line facilities. Since the first part, consisting of four articles, are studies done from the architectural viewpoint, they are not summarized here. Only the second part, "Earthquake Disaster and People's Lives," is summarized.

II. Earthquake Disaster and People's Lives

Chapter 1 - Human Responses to the Earthquake

This chapter is a review of three reports on emergency responses written by three different research committees. The frame of reference is as follows.



I. Perceptions, preparations, and experiences
   A. Most people had thought that their areas were quite safe from an earthquake. 76.0%
   B. Although most people think that their experiences of a previous earthquake (February, 1978) contributed to their safety in several aspects, only a few people (10%) had attempted any remedial measures after the previous earthquake. 60.0%
   C. Although people thought of several different kinds of preparations, the actual degree of preparation was not high.

II. What people were doing when the earthquake hit.

	at home	outside home
men	chatting or watching T.V.	office works or manufacturing something chatting or drinking
women	household matters	sales activities shopping

III. Where they were when the earthquake hit

A. At home	approximately	40.0%
B. At workplace or school	approximately	25.0%
C. On car or train	approximately	10.0%
D. Outside home	approximately	25.0%

E. Latent risks
   1. Inside the houses or buildings being near fragile material, the kinds of fires being use, aggregations of anonymous people, being beneath something
   2. Outside the houses or buildings being near walls, poles, or in a place with heavy traffic

IV. Mental state

A. People who felt a strong fear	80.0%
B. People who could not be calm	40.0%

V. Emergency responses reported
   A. Stood up
   B. Observed
   C. Did nothing
   D. Could not stand and sat down
   E. Hid

VI. Behavior around 15 minutes after the quake

A. Cleaned up the debris	50.0%
B. Turned on T.V. set	45.0%
C. Checked other people's safety	35.0%
D. Tried to phone	30.0%

Chapter 2 - Casualties

This chapter is a summary of two previous studies and the contents almost totally overlap with "The Behaviors of the Injured in Earthquake Emergency" by Fujiyama, Yoshio et al.

Chapter 3 - Breakdown of Life-line Functions and People's Responses

Most parts of this article overlap with the "Investigation on the 1978 Miyagiken Oki Earthquake and Its Influences on the Civil Life," reported by Horige and Oura's "The Cognition of the Damages caused by the 1978 Miyagiken Oki Earthquake, and Its Corresponding Behaviors."

I. Problems indicated
   A. Since damages of life-line functions were not severe as a whole and the recovery activities were relatively successful, the optimistic attitudes prevailing among life-line organization staffs toward the prospective earthquake might be strengthened. However, since the little damage and the successful recovery were primarily due to lucky circumstances, the organizations should better prepare against a future earthquake.

B. The idea was dominant that the disaster was an act of God. This idea tends to undermine human efforts to mitigate damages.
C. The public administration should educate the public and increase anti-earthquake consciousness among the public.

Chapter 4 - Damages of Houses and the Reconstruction Process

The contents of this chapter overlap "Some Problems of the Damages of Residential Lands Houses and in Its Repairing Process" by Yasuda, Takashi, and Yasuyuki Sato.

Since the degree of damage varied widely depending on the area, people tended to think of the disaster as an act of God. However, in order to mitigate possible damages from future earthquake, people should recognize that disasters involve man-made aspects. If this is done there can be comprehensive preparation against future earthquakes. Reconstruction was separately carried out by individual efforts and most repairs were of a temporary nature. This fact reflects the idea that disasters are an act of God.

I. Material.

Title: Shimbun Kenkyusho. Experimental Study on Insurance Purchasing Behaviors in The Earthquake Prediction Warning and the Social Responses, Part II (Zoku Jishin Yochi to Shakaiteki Hanno)

Author: Okabe, Keizo et al

Publisher and Year: University of Tokyo Press, 1981

II. Agent and/or Event.

Type of Disaster Discussed: Experiment

III. Table of Contents.

This book consists of five research reports.

Chapter 1 - People's Response to an Earthquake Warning, Part I

See the summary of Report of the Survey Research on People's Responses to an Earthquake Prediction Warning by Okabe, Keizo et al, Institute of Journalism and Communication, University of Tokyo, 1979.

Chapter 2 - People's Responses to an Earthquake Warning, Part II

See the summary of The Study of the Responses to Earthquake Prediction, Part II by Ikeda, Kenichi et al, Institute of Journalism and Communication, University of Tokyo, 1980.

Chapter 3 - Responses to TV News "Earthquake Warning"

See the summary of "Responses to TV News 'Earthquake Warning'" by Okabe, Keizo et al, 1980.*

IV. Abstract (Major ideas and suggestions).

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*Chapter 4 - Experimental Study on Insurance Purchasing Behaviors

See the attached for the summary

Chapter 5 - A Disaster Warning and Responses of Residents

See the summary of A Disaster Warning and Responses of Residents: A Study of Evacuation Behavior During a Warehouse Fire in Ohbu City by Okabe, Keizo et al, Institute of Journalism and Communication, University of Tokyo, 1981.

I. After the author indicates that a traditional theory of decision-making (i.e., a utility theory) cannot explain the insurance purchasing behavior, he conducted simulation studies on the basis of Kunreuther et al's process model of insurance purchasing behavior.
   A. Simulation I
      1. Hypothesized conditions
         a) probabilities of a disaster: (.001, .01, .05, .10, .25, .50)
         b) premium: (¥10,000, ¥50,000, ¥100,000, ¥500,000)
         c) amount of losses: (¥100,000, ¥500,000, ¥1,000,000, ¥5,000,000 ¥10,000,000, ¥50,000,000, ¥100,000,000)
      2. The subjects (208 college students) were asked if they wanted to buy insurance in each situation of 135 different combinations of these three conditions.
      3. Results
         a) The subjects overestimated the probability of a disaster in a lower probability level, while in a higher probability level the subjects underestimated the probability of a disaster
         b) The subjects were likely to buy insurance when the probability of a disaster was low and the premium was not expensive. But, beyond a certain high probability level, they were not likely to buy any insurance regardless of the amount of the premium.
   B. Simulation II
      1. Six variables
         a) the possibility of a disaster
         b) the amount of losses
         c) the amount of assets
         d) the premium
         d) income
         e) reward
      2. The premium and the income were controlled. The members of an experimental group were paid rewards and the others were not.
      3. The subjects were asked to try to increase their own assets, either by purchasing insurance or by not purchasing insurance. When a disaster happened, a certain amount of losses was substracted from the subject's total assets. A disaster did not always happen, so that the subjects who bought insurance would lose some assets if they did not encounter a disaster.
      4. Results
         a) Group which was paid rewards
            (1) The first experience of a disaster strongly affected the insurance purchasing behavior. That is, after their first experiences, every subject bought insurance in situations of the lower probabilities.
            (2) As the subjects experienced more disasters, their insurance purchasing behavior increased.
         b) Group which was not paid
            (1) No clear tendency was observed.
            (2) Since no reward was paid, the subjects did not seem serious in making decisions about purchasing insurance.

I. Material:

Title: Joho no Dentatsu-Kiko ni kansuru Tokeiteki Kenkyu—Saigaiji ni okeru Johono Tsutawarikata (Matsushiro Jishin no Baai ni tsuite) (A Statistical Study on the Diffusion of Information—The Process through Which Rumors Originated and Spread in a Disaster Area—in the Case of the Matsushiro Earthquake)

Author: Taga, Yasushi et al

Publisher and Year: Tokei Suri Kenkyu-sho (Institute of Statistical Mathematics), Tokyo, 1967

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake (a swarm type)

Date of Occurrence: August 1965

Location: Nagano Prefecture

Casualties and Damage:

Total Damages are not specified.
See the attached about the damages in several areas

(2) Method

Method in detail: The first fieldwork: Group interviews with 319 junior high and high school students.
September 26 - October 10, 1966

The second fieldwork: Interviews with all residents (96 residents) in five villages chosen on the basis of results from the first fieldwork.
October 13 - October 17, 1966.

Date of Study:

III. Hypothesis and Findings.

I. Results of the first interviews

A. Damages

1. Percentage of households which had some damages — approximately 60.0%
2. Major damages
   a) falling-down of walls — 56.0%
   b) breaking-down of roof tiles — 12.0%
   c) collapse of stone fence or wall — 7.0%

B. Sources of information about the earthquake

1. T.V. — 98.0%
2. Newspaper — 70.0%
3. Radio — 50.0%
4. Cable broadcasting system — 48.0%

C. Rumors

1. As the swarm of earthquakes decreased, apathetic attitudes increased among residents and rumors about the causes of earthquakes decreased abruptly. Such topics as forecasts of earthquakes, damage predictions, and the like increased.

II. Results of the second interviews

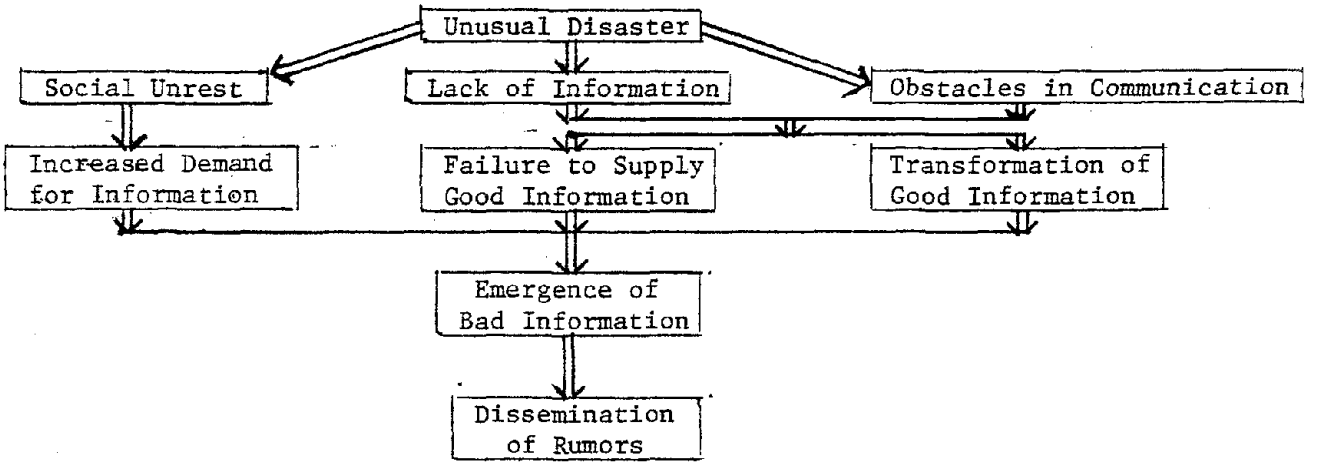
Five villages investigated can be dichotomized according to the degree of countermeasures they instituted. The Matsushiro area, which includes three villages, had land slides recently, and is characterized by a relatively high degree of countermeasures. The Mori area, which includes two villages, can be characterized by a relatively low degree of countermeasures in spite of frequent earthquakes in the area.

A. In both areas, the percentage of households which had some damages — 80.0%
B. In both areas, the ratio of residents who predict a future great earthquake — 30.0%
C. There is no significant difference in the quantities of rumors in both areas.
   1. The significant difference was found in the contents of rumors.
      a) The Matsushiro area
         (1) Major rumors were about the eruption of Mt. Minagami or about the land slides.
      b) The Mori area
         (1) Rumors about the eruption of Mt. Kyodaiyama were dominant, forming 60% of all rumors.
   2. Judging from these results, it can be said that the content of rumors tend to be limited to the local topics which have something to do with people's own area or their own lives.
D. Degree of trust in rumors
   1. Most people answered that they did not trust rumors.
E. Classification of rumors according to the contents
   1. Causal inferences with a certain scientific basis
      a) This type of rumor was dominant between mid-September, 1965 and March, 1966
   2. Predictions based on scientific or quasi-scientific observations.
      a) This type was dominant between the end of 1965 and the beginning of 1967.

3. Non-scientific predictions
   a) This type emerged in the areas in 1965.
   b) Fortune tellers played an important role.
4. Imaginary inferences
   a) "Japan will be divided into two-parts due to an earthquake" or "A monster lives beneath Mt. Minagami" is an example of this type of rumor.

F. In the dissemination of rumors, community leaders were more important than personal communication among residents.

G. Based on the investigations, the following model can be advanced for explaining the genesis of rumors.



I. Material:

Title: Research on Damages and Human Responses; the 1978 Miyagiken Oki Earthquake. ('78 Miyagiken Oki Jishin ni okeru Jumin no Taio oyobi Higai no Chosa Kenkyu.)

Author: Research Committee of the Miyagiken Oki Earthquakes, 1978, Tohoku University

Publisher and Year: 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: June 12, 1978, 5:14 p.m.

Location: Miyagi Prefecture, Japan

Casualties and Damage: Killed: 28; Injured: 10.247
Completely destroyed houses: 1,279; Partially destroyed houses: 132,594; Flooded houses: 5
Destroyed portions of roads: 1,037
Land slides: 167
Fires: 12

(2) Method

Method in detail: See the attached

Date of Study: See the attached

III. Hypothesis and Findings.

This book consists of four reports of research carried out by Tohoku University.

Chapter 1 - Damages of Facilities and Problems

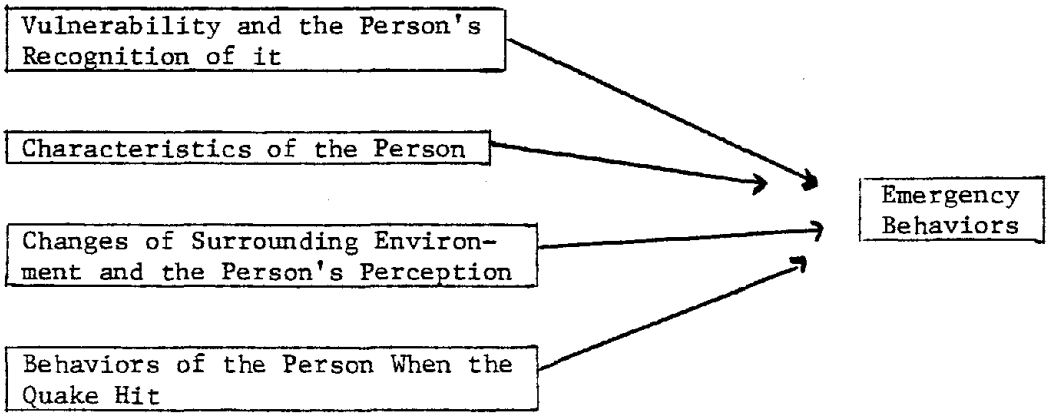
I. Medical facilities: 161 hospitals and clinics
   A. Breakdowns of water supply system, electric system, air conditioning system, sewage system, and communication system of medical facilities 65.0%
   B. Damages of medical equipment 39.0%
      1. Major damages were the loss of medicines, the breakdown of x-ray apparatus, the loss of microscopes)
   C. The injured 9.7%
      1. 1.8 persons per facility is average
   D. The following severely hindered medical activities in facilities:
      1. Interruption of electricity
      2. Breakdowns of several systems as indicated above
      3. Equipment damage
      4. Gas service interruption
      5. Water supply interruption
   E. Several problems
      1. Although most facilities had been equipped with emergency generators for private use, the generators did not work well because of unsuitable maintenance, insufficient generator size, failure of distributing, or water supply interruption.
      2. Hospitals which had patients in their facilities were especially troubled by the disruption of gas, electric, and water supply in their attempts to provide meals.
      3. We should carry out certain countermeasures not only for building structures, but also for equipment.

II. Schools
   A. Damages to school buildings were relatively large.
   B. Since the earthquake occurred after school hours, no casualties were reported.

III. Welfare institutions: interviews with staffs and inmates of 41 institutions, were conducted from June to August 1978.
   A. Relatively few damages were reported with regard to the structure of buildings.
   B. Few institutions had an elaborate evacuation plan for an earthquake.
   C. Institutions for the disabled and for the elderly responded to the quake in a haphazard way, and were problematic because of a high dependency of inmates upon the small number of personnel.

Chapter 2 - Behavior during and just after the quake

I. Framework for analyzing emergency behaviors



A. Preparation
   1. Although they had experienced a relatively great earthquake in February, 1978, the experience did not tend to make people prepare well for earthquakes.

B. Places they were in when the quake hit
   1. Men: mostly in their offices, workplaces, or schools
   2. Women and the elderly: at home

Many people indicated that being in a house or a building with which they were not familiar is more dangerous than being at home or in their own offices or workplaces.

C. Behaviors of people when the quake hit
   1. Men: most were working in their offices or workplaces, and some of them were drinking and chatting.
   2. Women: most were doing housework such as cooking, taking care of children, cleaning-up, and the like, and some of them were shopping.

D. Emergent responses
   1. Emergent responses seemed to significantly vary according to the places people were.
      a) at home: dominant behavior was to prevent secondary disasters such as fires, and to protect themselves or someone
      b) in offices or schools: wait-and-see attitude was dominant
      c) in an unfamiliar house or building: rushing-out behavior was dominant

E. Changes in surrounding environments and people's perception
   1. People who encountered a certain dangerous change 85%
   2. People who were dazed or perceived the situation as highly critical over 60%

F. Behaviors within 15 minutes after the quake
   1. Four major types of behavior were identified
      a) to assure whether or not their families were safe
      b) to accurately comprehend the situation
      c) to protect themselves
      d) to engage in recovery activities

G. Responses of residents in high-rise buildings
   1. To put fires out
   2. To open a door for evacuation
   3. To go shopping for batteries, flashlights, or candles
H. Responses of residents in newly developed areas
   1. People who are optimistic tended to respond with hasty and sometimes wrong judgement independent of official or other private information.
   2. In the area where residents had a greater fear and feeling of c rises, the recovery problems were coped with in more cooperative fashion in comparison with areas where there was less.

Chapter 3 - Earthquake Disasters and Civil Life

I. After a discussion of responses to disruptions of water supply systems, gas, electric, and telephone services, they concluded that responses were relatively good in avoiding a panic situation, and that people recognized the vulnerability of urban structures and functions to an earthquake.

II. Injuries
   A. Rushing-in or -out of buildings proved highly dangerous
   B. Injuries from
      1. falling down
      2. falling downstairs
      3. broken glass
      could be avoided if people remained calm in an emergency
   C. Those injured by a fire or a collapsed ceiling, concrete block wall, or furniture, felt that it was unavoidable

III. Damages of Residences
   A. Damages were unevenly distributed among several residential areas.
      1. Old residential areas tended to have fewer damages than newly developed residential areas.
   B. Recovery processes in devastated residences were badly delayed.
      1. Major reasons
         a) financial problems
         b) legal procedures
         c) impossibility of suspending business or services (in case of stores of small businesses)
   C. People's consciousness about countermeasures
      1. After their quake experiences, positive measures such as strengthening house-structures, preparing against quakes, or allocating a specific role to family members decreased, and passive measures such as insuring a safe evacuation increased.

Chapter 4 - Views of the Disasters

I. Most people perceived the disaster as extremely severe.

II. Characteristics of the disaster identified by

A. Ordinary citizens (multiple choice)
   1. Breakdowns of life-line functions 70%
   2. Collapses of concrete block walls 30%
   3. Uneven distribution of damages 30%

B. Citizens whose houses were devastated (multiple choice)
   1. Uneven distribution of damages 60%
   2. Breakdown of life-line functions 50%
   3. Damages in newly developed areas 30%

C. The injured
   1. Breakdown of life-line functions 60%
   2. Uneven distribution of damages 40%
   3. Casualties due to collapses of walls 33%

D. Most people perceived the disaster as an act of God rather than as an inevitable result of social and technological failures. 80%

E. Lessons which people learned
   1. To fix furniture to walls or pillars
   2. To strengthen the structures of houses
   3. To set up communication systems among family members

The significant difference was in the nature of lessons learned by ordinary citizens and by people who suffered certain damages. That is, ordinary citizens who did not have any damage tended to passively prepare against an earthquake.

F. Citizens' demands to the government
   1. To set up an effective prediction system
   2. To set up a more effective and convenient system of compensating for losses

G. The division of labor for coping with a disaster should be brought about among the public administrations, the public and the private business firms, and the neighborhood organizations or individual citizens.

I. Material:

Title: An Animal Experiments on Evacuation Behavior in Disasters. (Saigaiji no Hinan Kodo ni kansuru Dobutsu Jikken)

Author: Committee of Disaster Prevention, Tokyo Metropolitan Government (Tokyo-To Bosai Kaigi)

Publisher and Year: 1973

II. Study:

(1) Agent and/or Event

Type of Disaster: Experiment

Date of Occurrence:

Location:

Casualties and Damage:

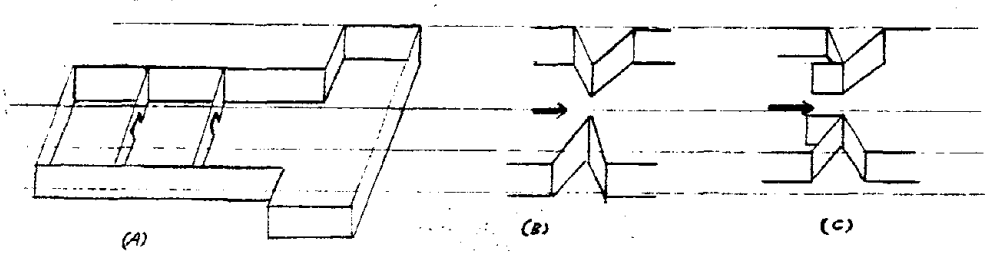
(2) Method

Method in detail: See the attached

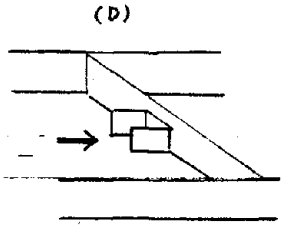
Date of Study: See the attached

III. Hypothesis and Findings.

I. Method
   A. Subjects: mice
   B. Design
      1. Mice are put in the box as shown below.
      2. Very weak and very strong electric shocks are given to them.
      3. Experimental conditions
         a) structure of building (box)
         b) training or drills (weak shocks are given for training)
         c) size of group (the number of mice)



II. Experiment 1
   A. Purpose
      1. To clarify the effects of structures of emergency exits
      2. To clarify the effects of the number of exits
   B. Design; (A), (B), (C), (D)
   C. Results
      1. Several types of partition walls in a box did not affect the required time of evacuation in the cases of training (weak electric shocks), but did affect in the cases of panic (strong electric shocks).



      2. That is in panic situations, the partition walls delayed the evacuation. Therefore, even in the actual situation, setting up the partition walls for guiding people is inappropriate for evacuation.
      3. As the exits increase, the required time of evacuation decreases.

III. Experiment 2
   A. Purpose
      1. To clarify the effects of training
   B. Design; (A), (B), (C), (D)
   C. Results
      1. Hypothese
         a) mice which had training would evacuate faster than ones which had no training
      2. No clear result was obtained on the interactional effects between mice with and without training.

IV. Experiment 3

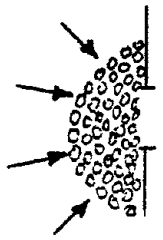
A. Purpose

1. To clarify the difference between group behavior in ordinary situations and in panic situations.
2. To clarify the characteristics of group behavior in panic situations.

B. Design; (A), (B), (C), (D)

C. Results

1. For the first purpose, nothing was clarified.
2. In panic situation, "arch actions" around exits were observed.
3. In panic situation, mice became more aggressive toward each other as time passed.



(Arch Actions)

I. Material:

Title: Research on Obstructive Factors to the Fire Fighting Activities in Underground Shopping Malls. (Jishinji Chikagai no Shobo Katsudo Sogai Yoin ni kansuru Kenkyu Hokokusho)

Author: Tokyo Shobo-Cho (Tokyo Fire Department)

Publisher and Year: Tokyo Shobo-Cho (Tokyo Fire Department), 1980

II. Study:

(1) Agent and/or Event

Type of Disaster: Hypothetical fire in an underground shopping mall

Date of Occurrence:

Location: Tokyo

Casualities and Damage:

(2) Method

Method in detail:

Questionnaire, delivered and collected by officials of Tokyo Fire Department
Sample size: 1,736 firemen at ten fire brigade stations in Tokyo
155 firemen in their first year

Date of Study:

III. Hypothesis and Findings.

I. Firemen have relatively strong anxiety about their fire-fighting activities in an underground mall.
   A. Percentages of reasons for anxiety are:
      1. Difficulty of communication 82.3%
      2. Limited knowledge about the geographical setting of an underground shopping mall 81.0%
      3. Limited knowledge about the nature of fire in an underground shopping mall 73.7%
      4. Inappropriateness of their equipment 72.6%
      5. Limited experiences in fighting against fire in an underground shopping mall 70.2%
      6. Vague anxiety about an underground shopping mall 65.9%
      7. Limited training or drills 61.4%
      8. Inappropriateness of the present fire-fighting system 54.5%

II. Sources of the anxiety can be classified into the following four factors:
   A. Limited knowledge about fire and appropriate responses to it in an underground shopping mall
   B. Inappropriate organizational system, including the difficulty of communication
   C. Inappropriate equipment
   D. Inappropriate individual ability due to limited training or drills, or experience in fighting fires in an underground shopping mall

III. Percentages of information and materials firemen wish to have in fighting against fires in an underground shopping mall:
   A. Appropriate information 70.9%
   B. Cooperation among themselves 58.4%
   C. High quality equipment 45.6%
   D. Effective leaders 30.2%
   E. More experience 24.4%

IV. Percentages of what firemen feel may be obstacles in fighting fires in an underground shopping mall:
   A. Smoke 23.8%
   B. Heat 11.7%
   C. Collapse 9.8%
   D. Falling objects 9.0%
   E. Darkness 6.3%

1. Firemen have relatively strong anxiety about their fire-fighting activities in an underground shopping mall. Percentages of reasons for anxiety are:
   a) difficulty of communication 82.3%
   b) limited knwoledge about the geographical setting of an underground shopping mall 81.0%
   c) limited knowledge about the nature of fire in an underground shopping mall 73.7%
   d) inappropriateness of their equipment 72.6%
   e) limited experiences in fighting against fire in an underground shopping mall 70.2%
   f) vague anxiety about an underground shopping mall 65.9%
   g) limited training or drills 61.4%
   h) inappropriateness of the present fire-fighting system 54.5%

2. Sources of the anxiety can be classified into the following four factors:
   a) limited knowledge about fire and appropriate responses to it in an underground shopping mall
   b) inappropriate organizational system, including the difficulty of communication
   c) inappropriate equipment
   d) inappropriate individual ability due to limited training or drills, or experience in fighting fires in an underground shopping mall

3. Percentages of information and materials firemen wish to have in fighting against fires in an underground shopping mall:
   a) appropriate information 70.9%
   b) cooperation among themselves 58.4%
   c) high quality equipment 45.6%
   d) effective leaders 30.2%
   e) more experience 24.4%

4. Percentages of what firemen feel may be obstacles in fighting fires in an underground shopping mall:
   a) smoke 23.8%
   b) heat 11.7%
   c) collapse 9.8%
   d) falling objects 9.0%
   e) darkness 6.3%

I. Material:

Title: Some Problems of the Damages of Residential Lans-Houses, and in its Repairing Process--After-Research on Disasters caused by the 1978 Miyagiken Oki Earthquake. (Takuchi Kaoku Higai to Sono Fukkyu Katei ni okeru Shomondai)

Author: Yasuda, Takashi and Yasuyuki Sato

Publisher and Year: The Study of Sociology (Shakaigaku Kenkyu) V-38, pp. 121-174, 1979 Tohoku Sociological Association

II. Study:

(1) Agent and/or Event

Type of Disaster: Earthquake

Date of Occurrence: June 12, 1978, 5:14 p.m.

Location: Miyagi Prefecture, Japan

Casualties and Damage:

Killed: 28; Injured: 10,247
Completely destroyed houses: 1,279 Land slides: 167
Partially destroyed houses: 132,594 Fires: 12
Flooded houses: 5
Destroyed portion of roads: 1,037

(2) Method

Method in detail: See the attached

Date of Study:

III. Hypothesis and Findings.

I. Method

A. Questionnaire delivered by mail and collected by researchers

B. Sample: 1,414 households which had a certain degree of damage in five severely damaged areas

C. Date of Study: December 8-11, 1978

	Totally collapsed	Half collapsed	Partially collapsed
Residences in hill area developed before 1964 (Area 1)	18.8% (79)	53.4% (224)	27.9% (117)
Residential areas developed in the late 50s and the first half of 60s Area 2)	15.5 (31)	41.3 (83)	43.3 (87)
Shopping districts which include residences developed before World War II (Area 3)	24.8 (47)	35.8 (68)	39.7 (75)
Mixed areas of small factories and residences (Area 4)	16.7 (31)	43.8 (81)	39.4 (73)
Farming villages (Area 5)	24.9 (104)	51.9 (217)	23.2 (97)
Total	20.6 (292)	47.6 (673)	31.8 (449)

The figures inparentheses show the actual number of cases.

〈Years after it was built〉

	(less than 5)	(5-10)	(11-15)	(16-20)	(more than 20)
Area 1	11.4%	27.4%	27.1%	21.4%	12.6%
Area 2	7.5	10.4	23.9	20.4	37.8
Area 3	6.8	6.3	6.8	14.7	62.1
Area 4	8.1	18.4	29.7	22.2	21.6
Area 5	13.9	15.3	20.6	11.2	37.6
(Total)	10.5	17.4	22.3	17.5	31.4
	(149)	(248)	(316)	(247)	(444)

II. Results

A. Status Quo of Recovery

	(Total)	(Area 1)	(Area 2)	(Area 3)	(Area 4)	(Area 5
completely recovered	37.8%	32.4%	48.8%	35.3%	41.6%	35.4
under construction	24.1	19.0	19.9	22.6	18.9	33.0
beginning to be repaired	6.0	7.1	3.5	4.7	5.4	6.7
stopped repairing	15.9	9.8	17.4	17.4	20.0	17.9
nothing done	15.5	26.7	9.0	17.9	13.5	6.2
other	0.6	1.4	0.5	0.5	0	0.2

1. Reasons they stopped repairing
   a) trouble with a construction company 35.1%
   b) a shortage of money 21.6%
   c) not urgent 20.4%

B. Whether or not people paid attention to anti-earthquake measures of a house when they bought it
   1. Did not pay attention 85.8%

C. Reasons they chose their houses
   1. Reasonable price 17.0%
   2. Convenient to work place 15.1%
   3. Good natural enviornment 12.9%

D. Whether or not they asked the original builder to repair earthquake damage
   1. Same builder 20.0%
   2. Different builder 70.0%

E. Why they asked a different builder
   1. Because they could start quicker 33.6%
   2. Because they would be better than the original builder 16.8%
   3. Because the original builder could not be reached 16.5%
   4. Because the original builder introduced them to the other builder 15.1%

F. Relationship of owner's occupation to the change of builder
   1. People who judged the new builder would be better than the original one for certain reasons
      a) teachers or engineers 29.4%
      b) managers of business firms 22.1%
      c) workers for public services such as police, fire fighers, or so on 25.0%
      d) skilled workers 19.4%
   2. People who had trouble with the original builder
      a) salesmen 25.0%
      b) teachers or engineers 13.6%
      c) managers of business firms 10.0%

G. Emergency evacuation
   1. People who voluntarily evacuated (201) 14.9%
   2. People who evacuated in accordance with an order (48) 3.4%
   3. People who did not evacuate. (1,156) 81.8%
   4. Where they evacuated
      a) their parent's house or relative's house 30.6%
      b) another house on their own land 25.6%
      c) apartment or rented house 24.4%
      d) temporary houses for evacuees built by the city government 5.8%
   5. Duration of evacuation
      a) 1-3 months 15.1%
      b) 3-6 months 20.5%
      c) 6 months 39.5%
      d) less than 1 month 24.9%

H. How they raised money for repairing earthquake damage
   1. Own savings 47.4%
   2. Loans from governmental banking facilities 21.5%

3. Loans from commercial banks, farmer's unions, or mutual benefit association 20.4%
4. Emergency loans from the prefectural or the city government 4.4%
5. Private loans from relatives or friends 3.2%

I. Major troubles in repairing process
1. Difficulties in negotiating with builders 18.5%
2. Difficulties in meeting financing conditions 23.0%
3. Insufficient amount of loan from governmental banking facilities 7.8%
4. Complicated procedures to get loans from governmental banking facilities 9.8%

J. Damages and Earthquake Insurance
1. Generally speaking, earthquake insurance did not play an important role in recovering process.
2. The ratio of the insured 6.0%
3. Major types of their earthquake insurance
   a) earthquake insurance as a part of fire insurance 31.6%
   b) house repair insurance of mutual benefit association or farmer's union 16.7%
   c) comprehensive house insurance 6.4%
   d) other 2.7%
4. Payment of insurance money by insurance company
   a) no money was paid 60.6%
   b) the amount of insurance moeny paid by insurance companies
      (1) less than ¥500,000 (U.S. $2,174) 59.9%
      (2) ¥500,000 - ¥1,000,000 (U.S. $4,348) 19.4%
      (3) ¥1,000,000 - ¥2,000,000 (U.S. $8,696) 14.4%
5. The ratio of unpaid claims according to the type of insurance.
   a) The unpaid claims were found more in the ordinary insurance of private insurance companies rather than in insurance of mutual benefit associations or farmer's unions.
   b) The percentages show the ratio of unpaid claims.
      (1) fire insurance 87.2%
      (2) comprehensive house insurance 81.1%
      (3) comprehensive store insurance 100.0%
      (4) insurance of farmer's union 5.1%
      (5) insurance of mutual benefit insurance 12.5%

K. Case description of three neighborhood movements
1. Tsurugaya Risaisha no Kai (Sufferers' Association of Tsurugaya area)
   a) A letter to the readers column of a newspaper from one sufferer motivated them to become organized. Although the organization had 150 members, it did not have any committeemen. Since the impacted area was developed by the city government, many city government personnel lived in the area. However, no city personnel became members of the organization. Three demands of the organization on the city government were
      (1)The city government should take the responsibility of compensating for the loss.

(2) The city government should adopt some remedial measures to stop housing lots from sliding away.
(3) The city government should re-investigate the degree of damages in the area since they underestimated it.

b) The city government's answers to each demand were
(1) (not mentioned in this article)
(2) There is no possibility of further lot slides.
(3) They will compile damage estiamtes again.

2. Kitaneichinenbo Risaisha no Kai (Sufferers' Association of Kitaneichinenbo area)
a) The organization was established in July, 1978 with 70 members including one chairman and five committee members. The member's fee was 1000 yen (US.S. $4.40). The impacted area developed by the prefectural housing corporation. Although the organization was very active in 1978 demanding that the corporation compensate for the loss, the organization is stagnant at the present time. No committee meeting or conference has taken place since the chairman was appointed to be a committeeman of the prefectural board of education. This shows how the role of a leader is important for an organization.

3. Midorigaoka Risaisha no Kai (Sufferers' Association of Midorigaoka area)
a) The organization was organized by a city council member on July 9, 1978. The organization has one president, two vice presidents, one head official, six committeemen, and 960 members. The organization is highly integrated and very active in demanding the prefectural or city government to compensate for the loss, as well as doing their own research on the degree of damages. The association obtained the voluntary help of lawyers and 46 members of the movement organization took legal proceedings against the developer of the area, the city government, the prefectural and the national governments in claiming damages on June 11, 1979. Two major problems are:
(1) Since the organizer was a member of a certain political party, the political party intervened-in the movement. Some members of the organization expressed a strong reaction against this intervention, and changed the operations to a self-governing system.
(2) There are conflicts among members' interests, especially regarding the repairing process of roads in the area or the amount of temporary tax for repairing the roads.