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 Communicati 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 Firdings.

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

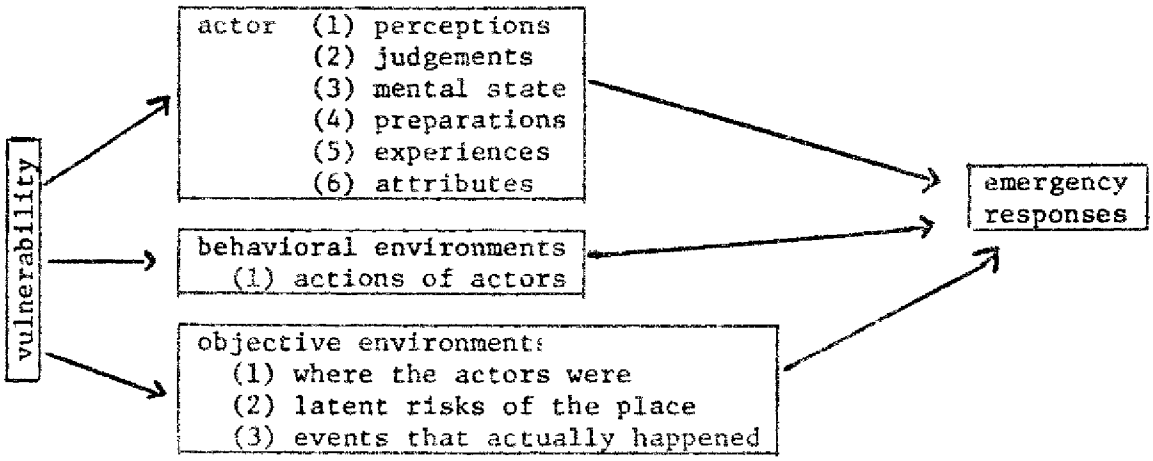
Summaries

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.

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)

Title:

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.