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 Kenky
Dai Jishin ni mottomo Kiken to Sareta Chiiki deno Ishiki
Chosa, Dai 12 - ho.
(Report on the Psychological Research for Countermeasur
Against Earthquake Disaster - The Residents of the Area
More Vulnerable to Earthquake, Vol. 12)

Author: Keibi Shinrigabu Kenkyukai (Guard Police Psychology Res
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-no. (Report on the Psychological Research for Countermeasure 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(%)	-	48.3(%)	-
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 Countermeasure 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%

c. They would phone a family member. 12.8%
d. They would go back or drive back to the company. 12.1%
e. 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:

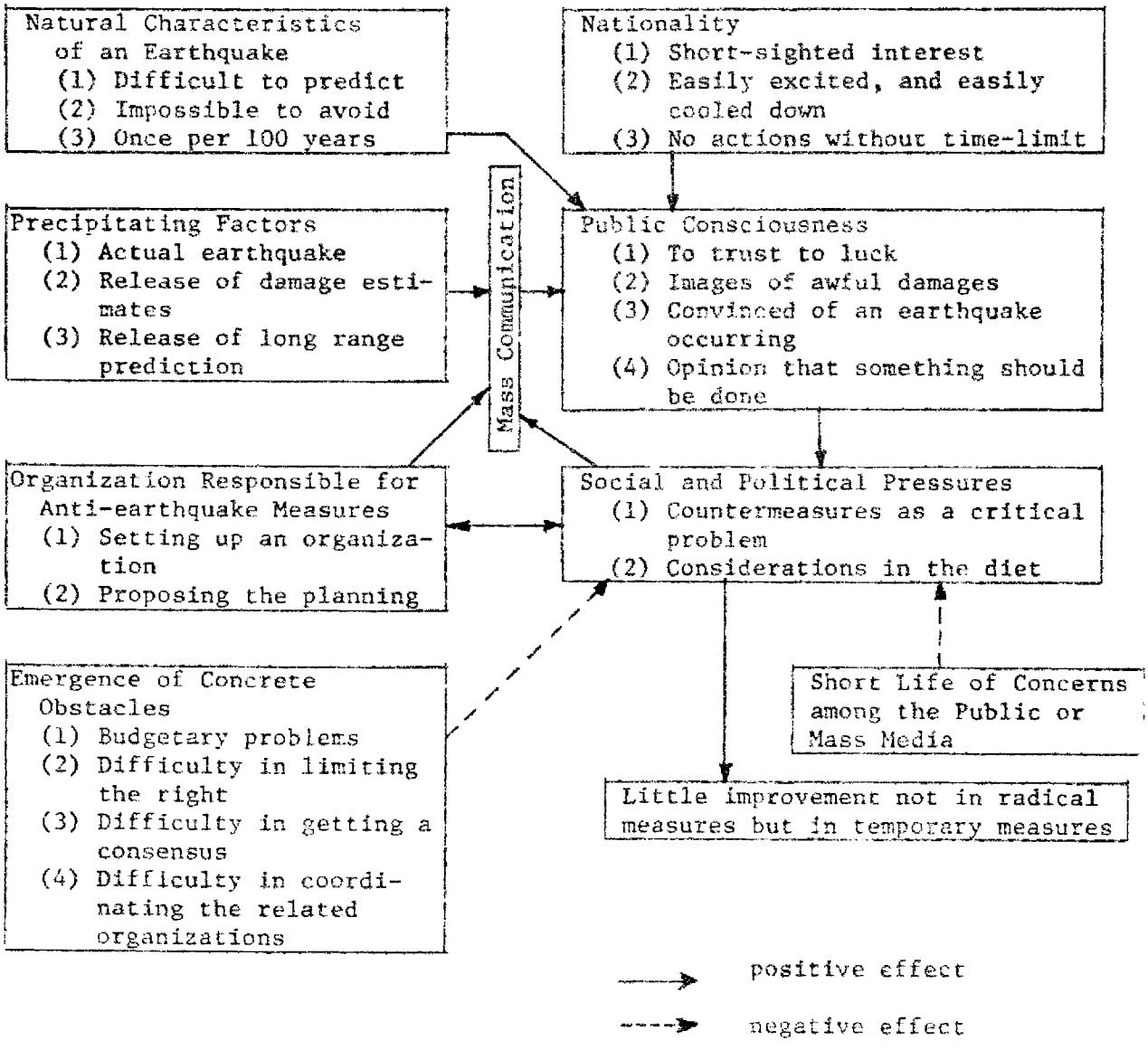
1. organizational obstacles
2. legal obstacles
3. budgetary obstacles
4. public opinion
5. technological obstacles

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."