REACTION TO AN UNINTENTIONAL PUBLIC ANNOUNCEMENT OF AN EARTHQUAKE WARNING: HIRATSUKA CITY, JAPAN, OCTOBER 1981

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1. INTRODUCTION

An earthquake warning was announced unintentionally in October 1981 over a public address system in Hiratsuka City, Japan, as a result of an unexpected malfunction of the system. The warning spoken by the Mayor on a tape recording, was broadcast from loud-speakers set up at various places in the city. Because of the time of day (late evening on Saturday in autumn), the information was heard directly by only 10–14% of the citizens. According to later investigations by sociologists, nearly half of the population who received the warning did not believe it. This was probably because the people knew that if it were genuine, either the situation would already have been discussed on TV and radio, or at least the warning would have been issued simultaneously by the mass media. More than 60% of the inhabitants who received the firsthand information paid special attention to TV and radio broadcasts thereafter. A certain number of people tried to check the information by telephone. Had the event occurred in the daytime, the number of people who took such action would have been far larger, and would probably have jammed the telephone system.

At 21.02 on Saturday, October 31, 1981, an emergency announcement by the mayor was broadcast to the public from a large number of loud-speakers installed at various places in Hiratsuka City and linked to a tape recorder located at the city office. The essential contents of the announcement were as follows: (1) an "earthquake warning statement" had already been issued by the Prime Minister, (2) the Mayor himself was speaking, (3) the city office was on the alert according

to the prescribed programme for preventing earthquake disaster, (4) each citizen was required to pay attention to later information coming through TV, radio, etc.., and (5) each household should extinguish fires, store water, prepare for evacuation and so on.

The above announcement was completely false and resulted from a malfunction of the broadcasting system. The city office cancelled the information about 20 minutes later through the same broadcasting system and using loud-speakers mounted on cars of the city office, police and fire-brigade.Consequently, within an hour a general state of calm had been restored among the population.

Hiratsuka is located some 60 km southwest of Tokyo, near the eastern border of the "area under intensified measures against earthquake disaster" according to the large-scale earthquake countermeasures act" enacted in 1978. Should the feared Tokai earthquake occur, it is anticipated that the city would be seriously affected. The location of the city is shown in Figure 1 which also shows the area under intensified measures against earthquake disaster, as well as the supposed source area of the expected Tokai earthquake of expected magnitude about 8. There is good reason to believe that the earthquake will occur sooner or later (e.g. Rikitake, 1977) and so the central, prefectural and municipal governments have been making all possible efforts to strengthen anti-earthquake measures in recent years, including the special legislation mentioned above.

The Hiratsuka City office, like other municipal authorities in the area subject to intensified measures against earthquake disaster, introduced the public address system for emergency use. A tape recording of the Mayor's voice giving an earthquake warning is always ready for use at the control centre. The exact reason for the malfunction of the system has not been fully explained. However, it was reported that a switch had been accidentally set in the wrong position, so that the system unexpectedly started to work after the time signal at nine o'clock in the evening.

Whilst it is regrettable that this false announcement occurred, and it is clear that better safeguards should be incorporated to prevent further accidental triggering of the system, this event in Hiratsuka City did provide an interesting experiment to test public reaction to the announcement of an earthquake prediction. This event was studied by several groups of sociologists

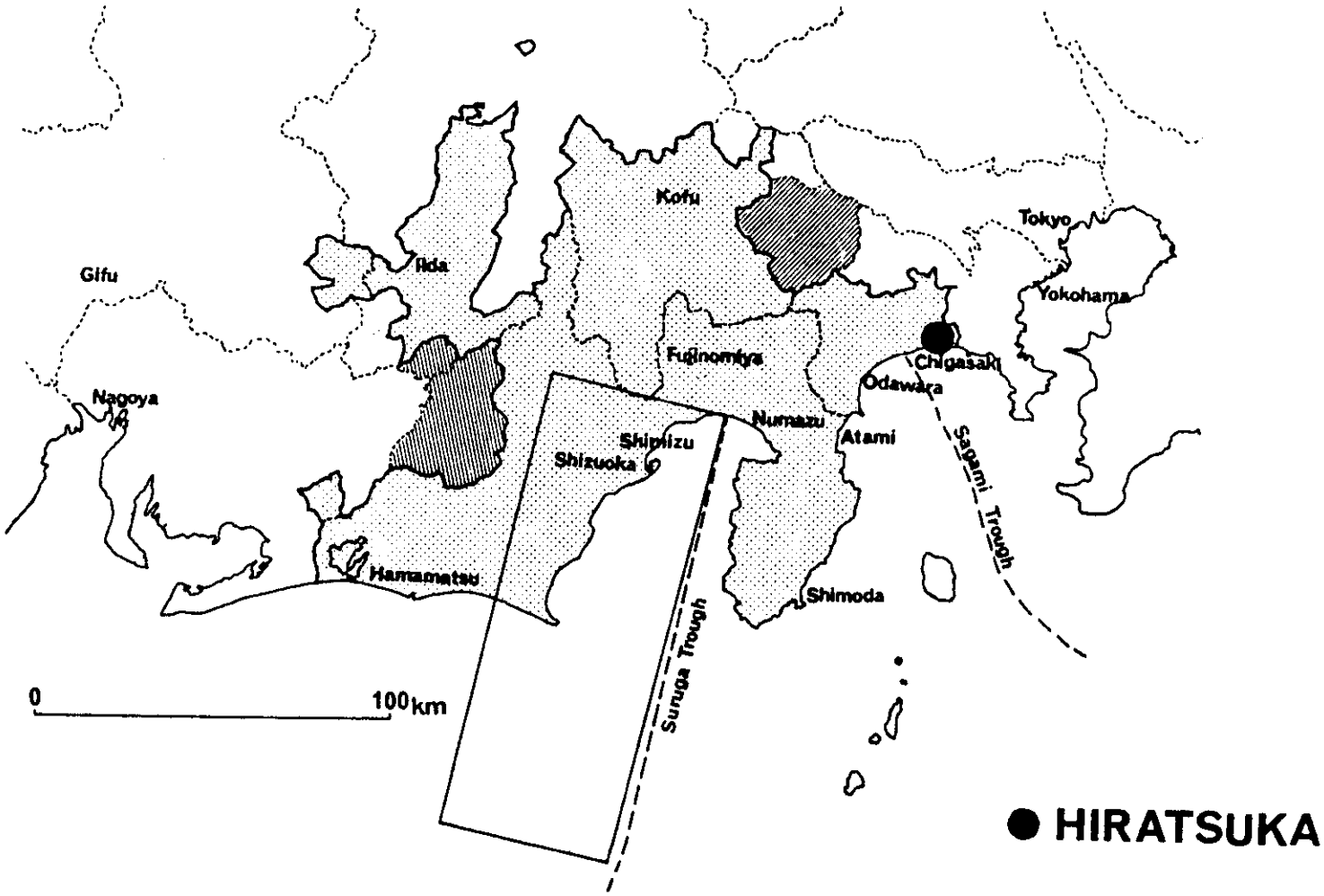


Fig.1

The shaded area shows the original area under intensified measures against earthquake disaster as designated in 1979. The hatched areas were added to the above area by the request of prefectural governors. The rectangular area is the projection of the expected fault plane for the anticipated Tokai earthquake. The solid circle indicates the location of Hiratsuka City.

who carried out surveys by interviews and questionnaires in order to evaluate the reaction to the alarm of citizens living in the area. Being a geophysicist, the writer had no reason to conduct an investigation of the Hiratsuka City case. What follows is therefore a summary of the work carried out by the sociologist groups.

2. HOW DID THE CITIZENS RECEIVE THE WARNING?

The group of the Institute of Journalism, University of Tokyo, led by Okabe (1981) conducted a survey by questionnaire of citizens' reactions to the false alarm. 2,400 men and women living in the city (of which the population is about 200,000) were chosen at random from the poll-book. Interviews with individual persons were made on November 19-29, about 20 days after the event. Of the questionnaires distributed, 1,803 were recovered, so that the response rate amounted to 75.1%.

Meanwhile, the Motivation Research Group of the Marketing Office, Dentsu Co., led by Abe (1982) of the Tokyo University of Foreign Studies conducted a survey of 453 men and women living in various parts of the city, chosen at random from the telephone book. These telephone calls were made between 19.00 and 21.00 hours on Saturday 14 November (i.e. at almost the same hour as the event and on the same day of the week). The results obtained by the Okabe and Abe groups are given below, and for convenience the two groups of reporters are denoted by O and A respectively.

2.1 Percentage of the inhabitants reached by the broadcast

Only 13.7% (223 in number) of the citizens interviewed heard the broadcast directly according to O, while the rate was only 10.4% (47 in number) for A. The remaining interviewees reported either that the contents of the broadcast could not be understood even through they heard the voice from the speakers or that they did not heard anything at all. The reason why a large percentage of citizens failed to hear the broadcast may be attributed to the facts that: (1) the windows of most houses were closed because it was fairly late in the evening of an autumn day, (2) the TV was on in most households, and because of the noise from it, no outside sounds could be heard, (3) voices from several different speakers were heard with small arrival time differences at a given place, so that it was hard to understand the broadcast and (4) the broadcast system had been routinely

used for administrative public announcements almost every day, so that no special attention was paid to it by local inhabitants.

However, quite a few people were informed of the earthquake warning either by family members (38.5%) or by neighbours (26.5%) according to O. About half of this information was communicated by telephone.

2.2 Did the inhabitants believe the earthquake warning?

The percentage of people who, according to O, believed, doubted and did not believe the earthquake warning, are summarized in Figure 2 which also indicates those who obtained first-hand and second-hand information. Results of the survey by A, which was conducted separately for men and women, are shown in Figure 3. It is interesting to note that about 40% or more of those questioned did not believe the information. If we add to this the percentage which doubted the information, there remained only about 20% of the inhabitants who believed the earthquake warning conveyed to them.

According to the large-scale earthquake countermeasures act, the normal routine would be for the Prime Minister to issue an earthquake warning statement on the basis of the conclusion of the "Prediction Council for the area under intensified measures against earthquake disaster". The Council, consisting of 6 university professors living in the Tokyo area, would meet when a geophysical anomaly exceeding the prescribed level had been observed. An announcement that the Council is in session should be released to the mass media 30 minutes after the Council has been called to meet. The length of time required by the Council to meet and communicate its conclusions on the need to issue an earthquake warning statement would be appreciable. Hence it is most improbable that an early warning statement could be issued prior to a news release through the mass media that Prediction Council had been summoned to meet. The fact that 80% of the inhabitants of Hiratsuka City doubted or did not believe the accidental announcement may indicate that many citizens understand the procedure for issuing an earthquake warning statement.

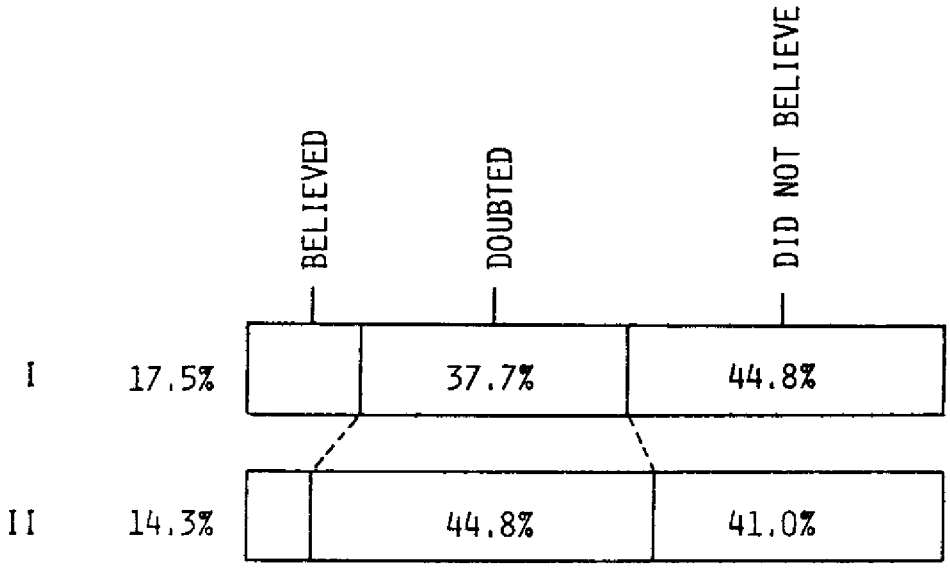


Fig.2

The percentages of citizens who believed, doubted and did not believe the earthquake warning. The number of people belonging to the group 1 amounts to 223 and they personally heard the city public address system, while the people of group II, 105 in total number, were informed of the warning by someone else (Okabe et al., 1981).

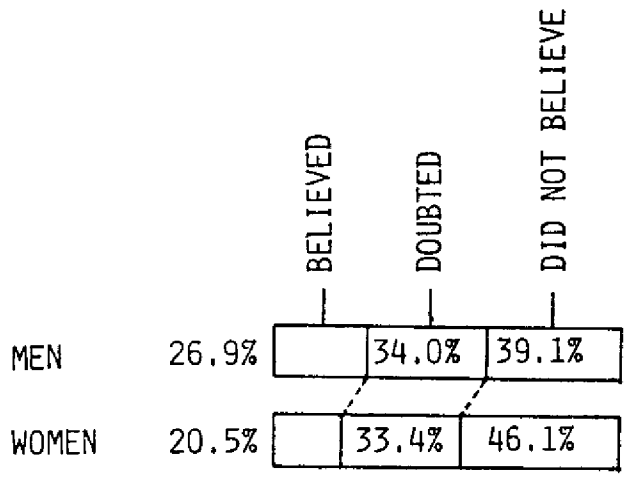


Fig.3

The percentage of citizens who believed, doubted and did not believe as classified by the sex of samples. The sample set consists of 238 men and 215 women (Abe, 1982).

In the case of survey A, the credibility of the information is categorized according to the age of the person interviewed. When the person believes that the information is completely true, 2 points are scored. When a person thinks that the information is more or less true, one point is given. When a person feels doubtful, the score is zero. When a person does not believe, points -1 and -2 are given, according to the degree of disbelief. An index of credibility of the information is thus estimated by calculating the average values for each age range, i.e., 20's, 30's, 40's, 50's and more than 60. Figure 4 shows the change in such an index with the age ranges. It is interesting to note that the younger generation, which has little responsibility for family maintenance, social duty and the like shows a stronger tendency to disbelieve the information. It should also be pointed out that the younger generation has not experienced a disastrous earthquake such as the 1923 Kanto earthquake which killed more than 140,000 people.

On receiving the warning, only very few people (according to the survey by O) thought that the predicted Tokai earthquake was about to strike, as can be seen in Figure 5. About half of those asked did not think that the earthquake would hit and only 28% felt anxious because of the information. According to the survey by A, most younger people did not feel uneasy. But the degree of uneasiness was greater for people of 40-50 years in age.

3. WHAT DID THE CITIZENS DO?

According to the survey by O, 77.1% (253 in number) of local people who acquired either the first-hand or second-hand information about the earthquake warning statement, took some action. The remaining 22.9% (75 in number) did nothing. The various types of action taken by the citizens are shown in a summarized form in Figure 6. It is apparent that the percentage of people who paid increased attention to TV and radio broadcasting, is extremely high. Because mass communication by TV and radio is highly developed in Japan, it is quite natural that the people should seek further information from the media.

A certain number of people tried to check the information either by telephoning an official organization such as the city office, police and fire-brigade, or by calling family members, relatives and friends. The tendency to double check

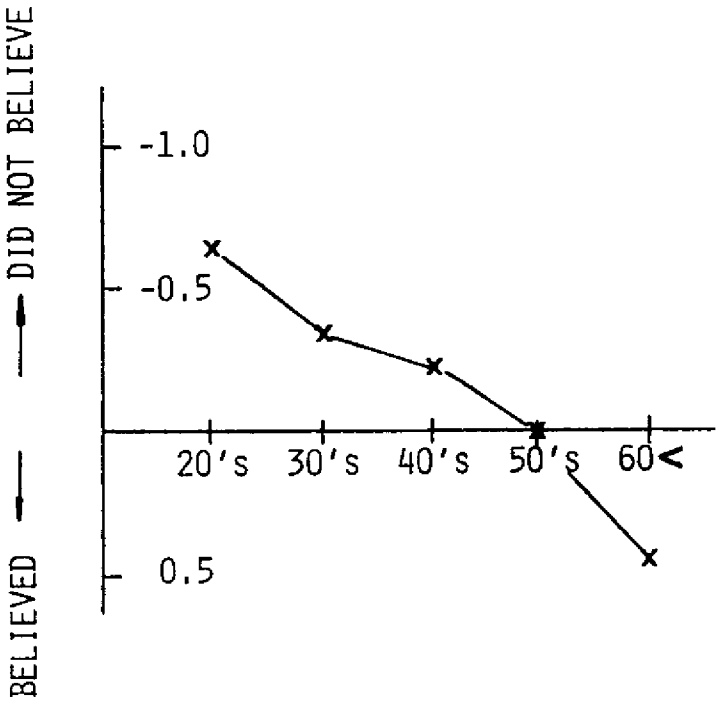
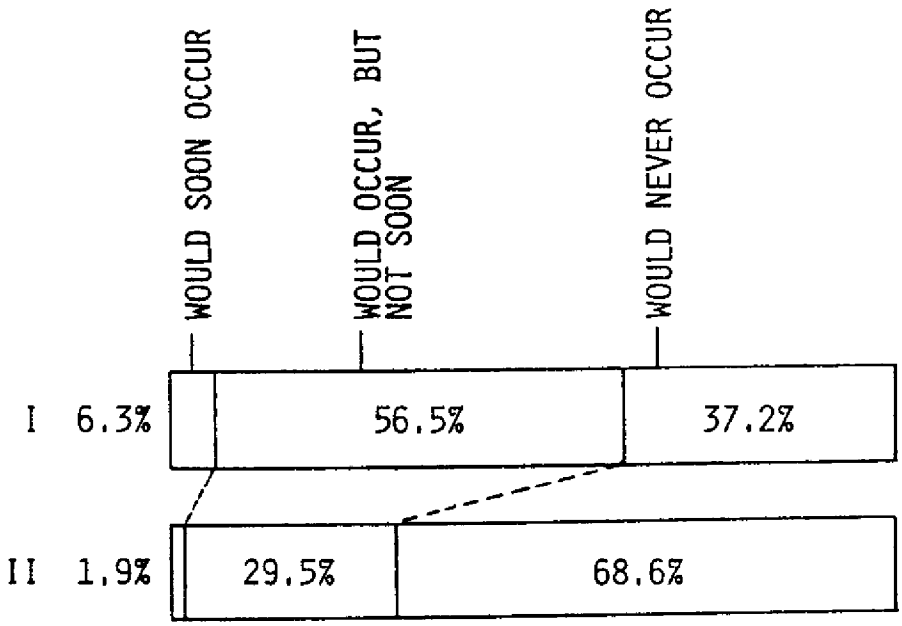


Fig.4

Changes in the index showing the extent to which earthquake warning was believed as defined in the text, with the age range of the samples (Abe, 1982).



I: SAMPLES WITH FIRSTHAND INFORMATION

II: SAMPLES WITH SECONDHAND INFORMATION

Fig.5

The percentage of citizens who thought that the feared Tokai earthquake would strike soon but not immediately and would not occur during the current crisis. The samples are the same as those for Fig.2 (Okabe et al., 1981).

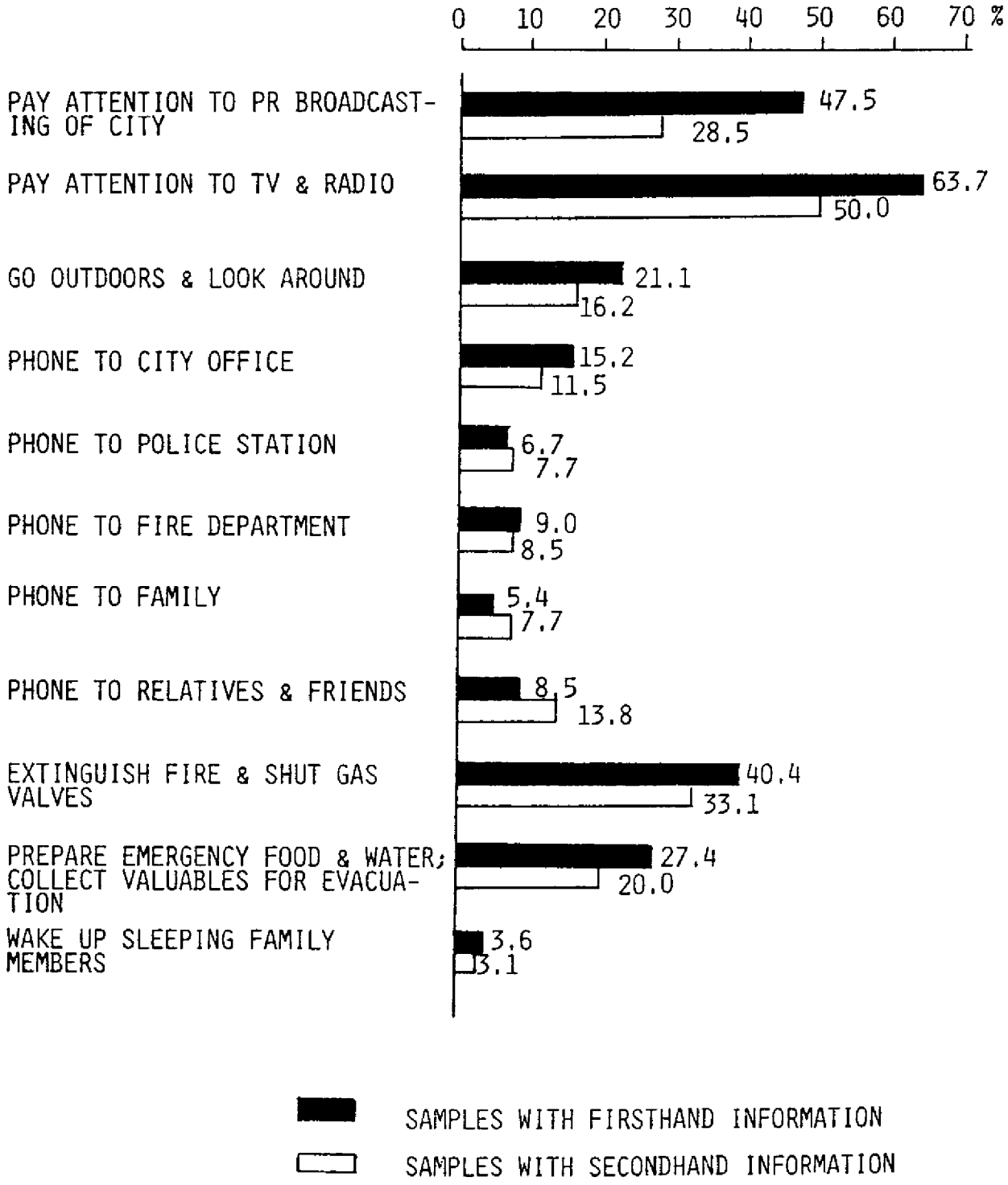


Fig.6

Main reactions of the citizens after they had received the warning. The samples are almost the same as those for Fig.2 and 5. (Okabe et al., 1981).

information is usual during an emergency when people are not quite sure about their situation. It is also a normal reaction to convey the information to family members and close friends . Even though this caused heavy use of the telephone, no blockage of the system was reported. This is probably because the event happened fairly late in the evening when most people are at home with their families. If an earthquake warning were to be broadcast during the daytime when the social activity is high, it could be anticipated that the telephone system would fail just as it did the case of the aftershock information for the 1978 Izu-Oshima Kinkai earthquake (Rikitake, 1982).

4. CONCLUDING REMARKS

Judging from the survey results of O and A, it may be concluded that most citizens in Hiratsuka City behaved calmly when they received the information. The fact that only 20% of the local people believed the earthquake warning statement may be due to the fact that they knew that such an emergency announcement would be issued after much preparatory debate on TV and radio.

The absence of a more dramatic reaction from the majority of the inhabitants was prabably due in part to the fact that most of them were at home with their families. Stores, banks and administrative offices were all closed at the hour of the false announcement. Nevertheless, a fair number of people took action to check the information by telephone. Were such an event to take place in the daytime, telephone communications could certainly be expected to become over-saturated.

The fact that such important information as an earthquake warning statement was made public by accidental triggering of the city's public address system merits serious attention. It is essential that the importance of earthquake warning statements should be understood by administrative officials at various levels.

In conclusion, the writer is grateful to Professors Okabe and Abe as well as their co-workers. The writer took the liberty of quoting freely from their work.

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DISCUSSION

Prof. Roberts asked for a clarification of how the media could be influential in causing widespread disbelief in the warning message. Prof. Rikitake said that the media would under normal circumstances already have reported the earlier meeting of the Prediction Evaluation Committee if one had actually been held.