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COMMUNITY RESPONSE TO EARTHQUAKE THREAT IN SOUTHERN CALIFORNIA

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PART FIVE
ACTION RESPONSE IN THE PUBLIC

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16. Abstract (Limit: 200 words)

This volume is part of a study investigating individual and community response to earthquake threat in southern California. The overall objective is to provide a basis for understanding community response to earthquake predictions released to the public. Part 5 presents findings on public action response dealing with the following: (1) views concerning the possibility and appropriateness of the action, including the disposition to collective rather than individual solutions to the problem of earthquake hazard; (2) expectations for government action and evaluations of government accomplishments; and (3) preparatory actions by individuals and households. To answer the question--Why have some people taken measures to prepare for future earthquakes while others have not?--, a model was developed to examine the relationship between sets of independent and intervening variables and personal preparedness for an earthquake.

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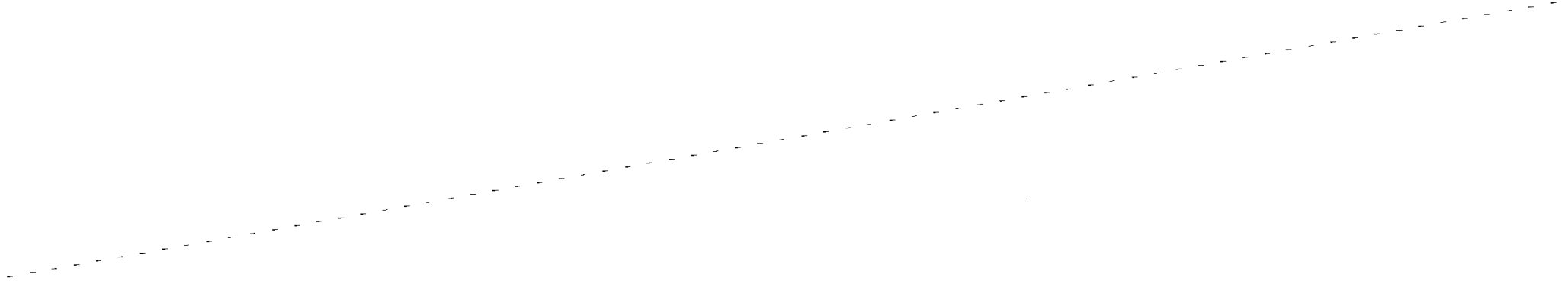

COMMUNITY RESPONSE TO EARTHQUAKE THREAT IN SOUTHERN CALIFORNIA

* * *

PART FIVE

ACTION RESPONSE IN THE PUBLIC

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THE REPORT

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Part Five was written primarily by Joanne Nigg, with contributions by Denise Paz and Ralph Turner. Gerald Goetsch and Jill Kiecolt contributed extensively in the statistical analysis.

PART FIVE

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CHAPTER ONE

WHAT CAN BE DONE?

Southern Californians are a diverse lot, including some people who are very aware and quite fearful of the earthquake danger and others who seem unaware and unconcerned. But most people are not entirely unaware and unconcerned, though very few are preoccupied with earthquakes. What, then, do they think can and should be done about earthquake hazards? To what extent are awareness and concern converted into demands for action?

We generally assume with good reason that awareness and concern are preconditions to action. Sometimes people act without vital concern over the subject of action because of the force of custom, the presence of social pressures, or the linkage of the issue to another about which they are concerned. But when we look at a community-wide sample rather than separate individuals, it is implausible that there would be a significant amount of action directed toward hazard reduction without a considerable amount of concern and awareness.

It is not so obvious that awareness and concern necessarily lead to action. We are abundantly aware of everyday situations in which awareness is not converted into action. We know that excessive concern can sometimes paralyze rather than mobilize. We know too that concern can be blocked from translation into action by the mere lack of any conceivable course of action to deal with the matter of concern. Part Five will deal with the disposition to convert awareness and concern into action.

There are two broad ways in which action dispositions can be related to awareness and concern. One way is by the magnification of awareness and concern until they exceed the threshhold above which action is instigated.

If this kind of relationship holds true, the same variables that are predictive of awareness and concern will predict action: only the intensity will be greater. Alternatively, a different set of variables may explain the translation of awareness and concern into action as compared to the variables that account for awareness and concern. If this alternative model is correct, no amount of simply increasing awareness and concern will produce action. The following chapters should help us choose between these two models.

The first chapter will deal with views concerning the possibility and appropriateness of action, including the disposition to collective rather than strictly individualistic solutions to the problem of earthquake hazard. The second chapter will deal with expectations for government action and evaluations of government accomplishments. And the third chapter will deal with preparatory actions by individuals and households.

Fatalism

The obvious first question is whether people think there is anything that can be done to reduce the hazard of earthquakes. People living on the brink of disaster, like soldiers in combat and residents of hurricane country, often develop fatalistic attitudes. If the course of any enemy bullet or the impact of a hurricane or earthquake is beyond the potential victim's control, there is no point in worrying or in wasting time and energy on protective measures. If fatalistic attitudes toward earthquakes are prevalent, we can expect very little support for hazard-reduction programs by governments and little interest in individual and family preparedness measures.

Four questions were used to measure fatalistic attitudes about earthquakes. The most frequently endorsed expression of fatalistic attitudes was the statement:

> I believe earthquakes are going to cause widespread loss of life and property whether we prepare for them or not.

Sixty one percent of the residents agreed with this statement, including eleven percent who agreed strongly.

Respondents divided about equally in agreeing or disagreeing with a second statement:

> If I make preparations for an earthquake, I am almost certain they will work.

About two percent did not answer or could not make up their minds, while 49 percent agreed and 49 percent disagreed. Very few felt sure enough to agree or disagree strongly.

More strongly worded statements of fatalism provoked more disagreement than agreement, though a large minority still clung to fatalistic views. When asked about the statement,

> There is nothing I can do about earthquakes, so I don't try to prepare for that kind of emergency,

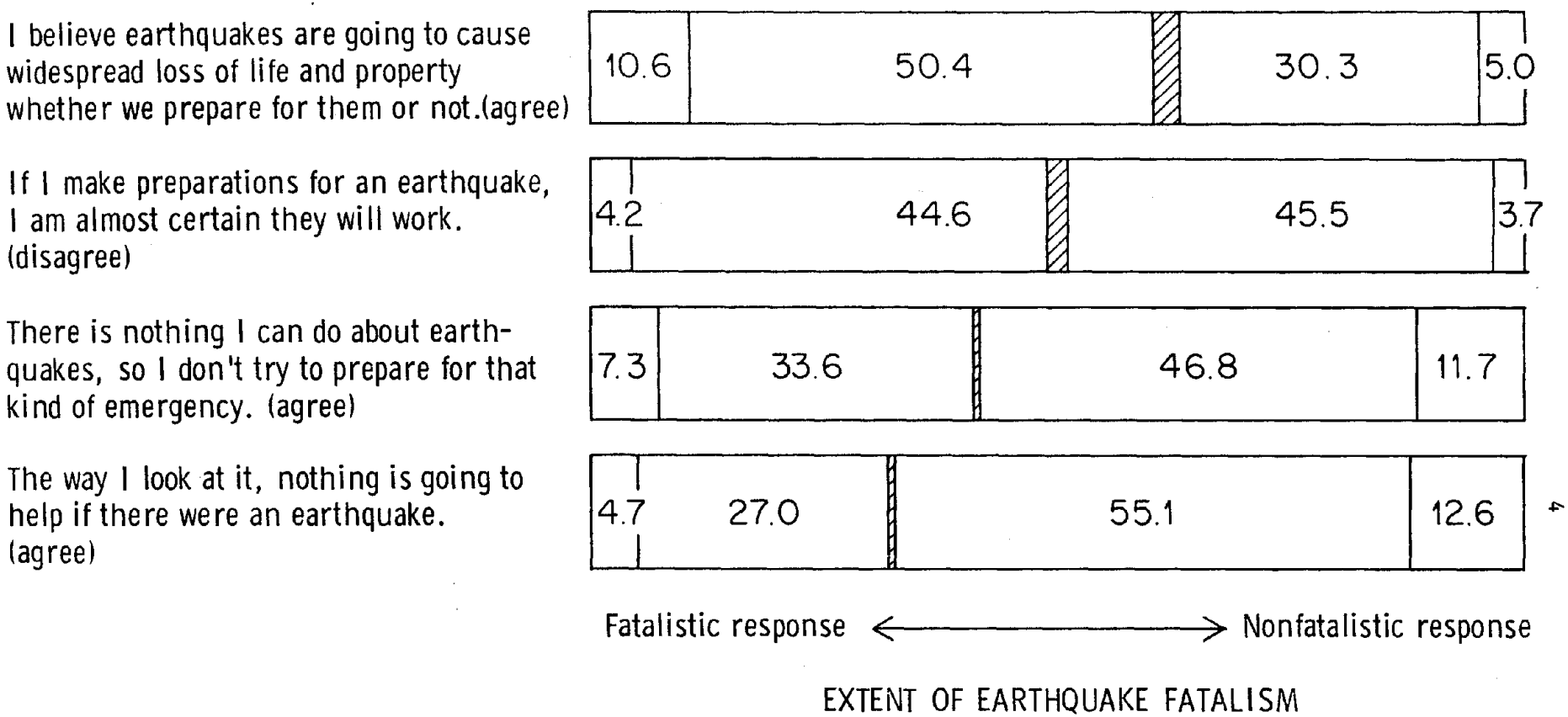
41 percent agreed, including 7 percent who agreed strongly. And even the expression of almost total helplessness,

> The way I look at it, nothing is going to help if there were an earthquake,

was endorsed by 32 percent of the people.

If we compare these statements (Figure 1), three out of five people are fatalistic about the general impact of an earthquake, but fewer are fatalistic when it comes to the possibility of taking steps to protect themselves. Between the most fatalistic and most hopeful are those people who say that earthquakes will inevitably kill and destroy, but that individuals can still take timely steps to improve their own survival chances. The majority are not hopeless about enhancing their own survival chances, but there appears to be widespread lack of confidence in the effectiveness of protective measures currently known to them.

While it is encouraging that more than a third of the poeple reject fatalism in even its most acceptable garb, the almost equally large minority



EXTENT OF EARTHQUAKE FATALISM

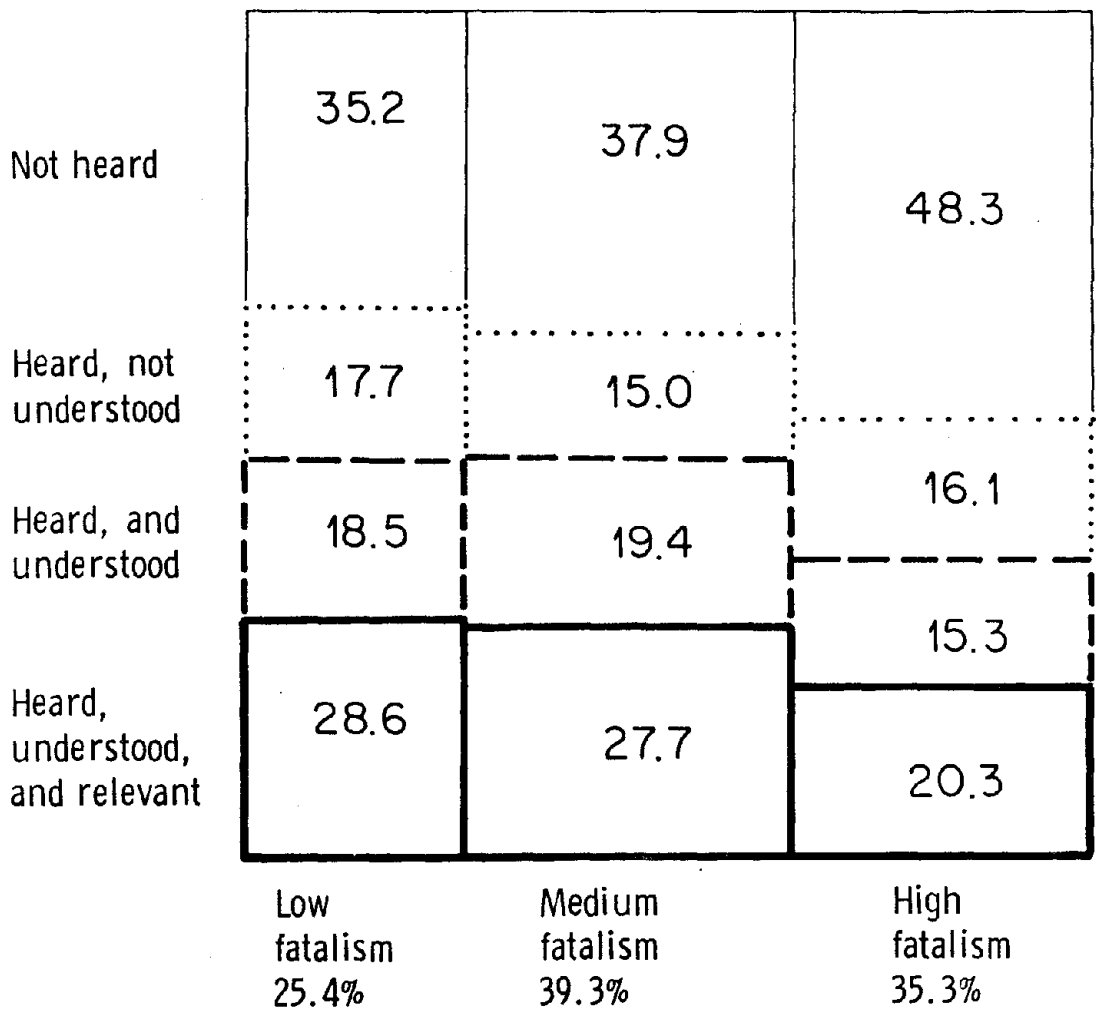
Responses from left to right are "strongly agree," "agree," "not answered or don't know," "disagree," and "strongly disagree"; or in reverse order, depending upon which is the more fatalistic answer, as indicated in parentheses following each questionnaire item.

FIGURE 1

who endorse the two statements justifying hopelessness and inaction may pose a serious impediment to achieving optimal earthquake preparedness throughout the community. When we add to the "hopeless" those who lack confidence in the effectiveness of the measures they might take, the foundation for concerted community action appears to be shaky.

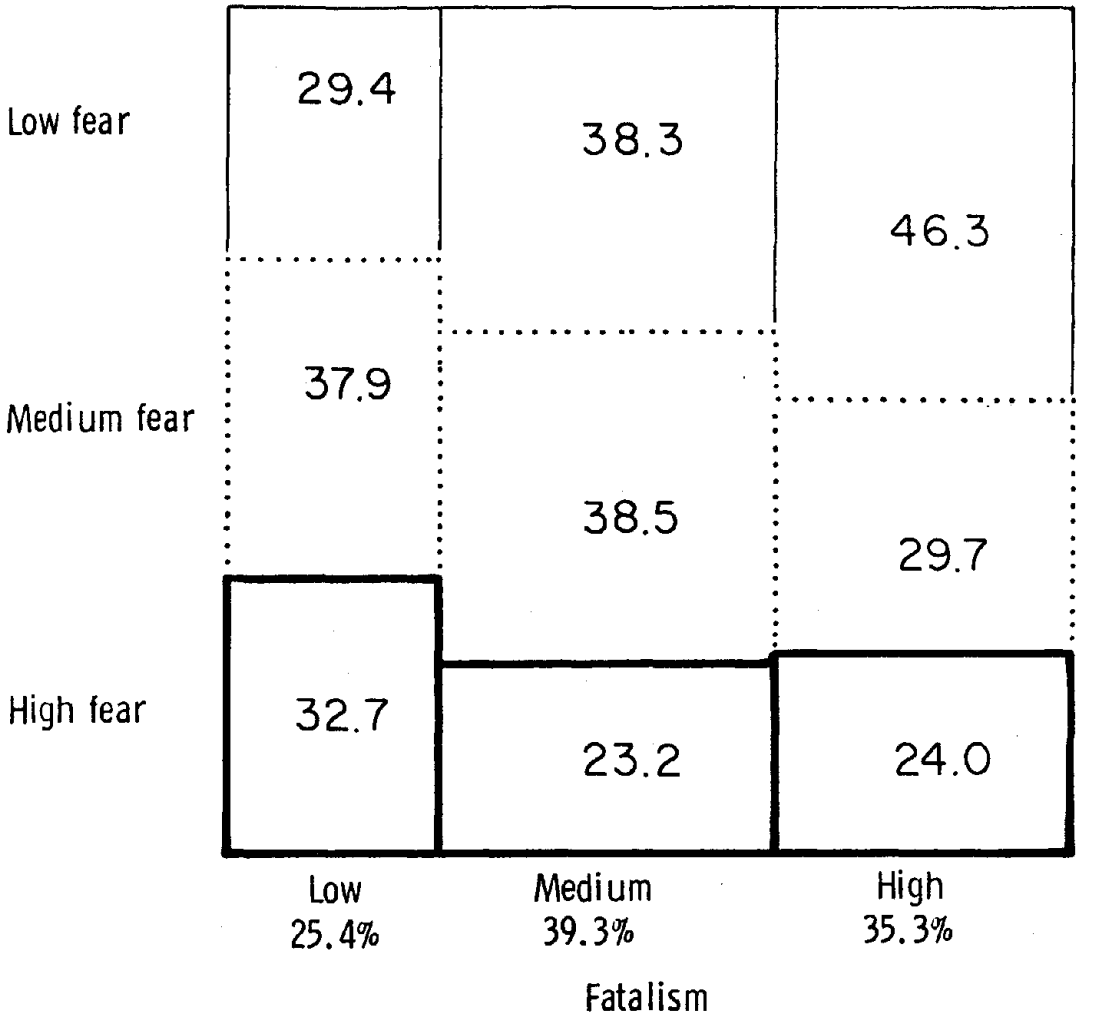
A thoroughly fatalistic or hopeless attitude should not only lead to inaction but to a lack of interest and concern. If there is nothing to be done about earthquakes, there is little reason to keep informed about the earthquake threat. Hence we should not be surprised to find that the more fatalistic respondents are less often aware of the Uplift and less often understand its significance. Whether fatalists should be more or less fearful and concerned is not obvious. On the one hand, a fatalist might feel there was no point in worrying since there was nothing to be done about the danger. On the other hand, a fatalist might be especially fearful and worried just because there was no way to cope with the danger.

In order to examine these possible relationships, we have assigned values ranging from one to four for answers to each of the four questions and summed them to produce an index of earthquake fatalism. On the basis of the index scores, respondents have then been divided into three approximately equal groups labelled "high fatalists," "medium fatalists," and "low fatalists." The relationships between fatalism and awareness of the Uplift and between fatalism and the fear and concern index are presented in Figure 2 and 3, respectively. As expected, fatalists are less likely than others to have heard of the Uplift. However, fatalists who have heard of the Uplift are probably no less likely than others to understand its significance and appreciate its relevance. Fatalists also express less fear and concern over the earthquake danger than nonfatalists. A psychiatrist might wish to explore the possibility that fatalism leads to denial of fear. But if we



AWARENESS OF UPLIFT BY EARTHQUAKE FATALISM

FIGURE 2



FEAR AND CONCERN BY EARTHQUAKE FATALISM

FIGURE 3

accept what people say at face value, fatalists apparently don't worry so much as other people because there is nothing they can do anyway.

One other item expresses an attitude often associated with fatalism. In situations of continuing threat and uncertainty, there are often people who develop feelings of personal invulnerability. Automobile commuters, aware of accidents involving other people, often assume that accidents only happen to other people. Although attitudes of invulnerability are more often implicit than explicit, we included one question to find out how many people would openly admit to a feeling of invulnerability from earthquakes. The statement was worded,

I don't believe an earthquake could really harm me.

Only 8.5 percent of the respondents agreed to this claim of invulnerability. Thus, we conclude that the widespread fatalism about earthquakes is not accompanied by a conscious sense of invulnerability. Since more than ninety percent of the people feel vulnerable to earthquakes, it may be possible to overcome fatalistic attitudes in many people by demonstrating that there are realistic and effective ways of lessening earthquake hazard to the community and to the individual.

Community and Individual Orientations to the Earthquake Prospect

Some problems divide communities into individuals and households, each seeking a private solution without cooperation or compassion for others. Other problems unite communities, breaking down barriers and evoking compassion and altruism. Research has shown that a widely shared natural disaster usually has the latter effect. A disastrous tornado, hurricane, flood, or earthquake unifies the community for the duration of the emergency period. This orientation toward community welfare and collaborative solutions to problems makes what is probably an indispensable contribution to dealing effectively with the crisis brought on by the disaster.

A truly credible prediction of a destructive earthquake could create a community crisis. The National Research Council Panel on Public Policy Implications of Earthquake Prediction has already asked whether people would respond to a prediction with comparable altruism and community orientation, or whether the attitude would be one of each individual and household for themselves. Without altruism and a community orientation, the task of public leaders would be very difficult. We have seen dramatic instances of cooperative response to the visible threat posed by such disasters as fires and floods. But in these instances the threat was visible and the disaster agent could be dealt with directly, for example, by cooperative fire fighting or repairing levees. The earthquake threat is not visible and the disaster agent cannot be attacked directly. In light of these differences, we need more direct evidence on whether people think of the threat of an earthquake in cooperative or individualistic terms.

We shall attempt to find partial answers to two questions. First, do people generally think of the prospect of an impending earthquake as a private problem or a problem for community action? Second, what are the prospects for widespread altruistic response to an earthquake prediction?

With these questions in mind, our aim is to investigate what Warriner (1972) has referred to as "cooperative altruism," that is, an awareness that there are occasions of crisis and catastrophe which are common to many and which require cooperative endeavors to overcome. Much of the groundwork for altruism will have been laid if people are already aware of groups of people who are in greater danger than most of us, if they view these groups and their problems in personal rather than impersonal terms, if they believe that there is something that can be done for them, and if they feel that something ought to be done for them by persons outside of their immediate

circle of family and friends. But if these conditions do not prevail, it is difficult to see how a prediction could elicit an immediate outpouring of cooperative altruism.

Awareness of Especially Endangered Groups

The first step in answering these questions is to find out whether people are aware that some groups of people are in greater danger than others in case of an earthquake. Being aware of groups in special need is at least the first step toward cooperation to help them. Respondents were asked:

> If a damaging earthquake were expected in southern California, do you think any particular groups of people would be in greater danger than others, or do you feel the risk is about the same for everyone?

The great majority of survey respondents (62.%) replied that there were some groups in greater danger, about a third (34.6%) said the danger was the same for everyone, and 2.5 percent didn't know. This magnitude of awareness within the sample is a very important finding because a widespread awareness of potential disaster victims is the first requirement for the development of a multi-targeted expression of altruism.

The 912 respondents who believe that some groups would be endangered in the event of an earthquake have been called the socially aware. This group was then asked the follow-up question:

> Which groups of people do you feel would be in greater danger from a damaging earthquake?

The socially aware cited a total of 2007 mentions of specific groups whose members were considered "endangered" (Table 1). The specific groups have been classified under more general headings for analytic purposes. No assessment was made as to whether these groups were actually endangered in any objective sense; the respondents' perceptions of earthquake-related dangers were more important for the purpose of assessing their potentially altruistic response.

TABLE 1

GROUPS IDENTIFIED AS IN SPECIAL DANGER

Type of endangered group	All groups mentioned		Groups in which respondent is not a member	
Unsafe structures		36.0		35.5
Old/unsafe/pre-1934 buildings	19.1		18.4	
Apartments/high-rise	16.9		17.1	
Unsafe locations		24.9		24.7
Proximity to disaster agent (by fault, near epicenter)	8.6		7.9	
Flooding (below dams, near water)	6.8		6.9	
High density areas	4.8		4.9	
Hillside homes	4.7		5.0	
Personally and socially impaired		18.7		19.1
Elderly	9.9		10.0	
Disabled	7.3		7.5	
Poor	1.5		1.6	
Institutional settings		12.3		13.1
Children in schools	6.5		6.9	
People in hospitals/prisons/ group residential facility	5.8		6.2	
Other	8.1	8.1	7.6	7.6
Total	100.0	100.0	100.0	100.0
Total number of responses	2007		1830	

The issue of what to do about pre-1934 unreinforced masonry buildings (a topic which was widely discussed by the local media at the time the survey was being conducted) clearly made people aware that these structures constituted a potentially hazardous condition for those who lived in and used them. These references to older, multi-storied structures constituted the largest general response category (36.0 percent). References to ecological conditions and circumstances constituted the second largest general category, almost 25 percent of all mentions. Proximity to the potential disaster agent (either to a fault or to the quake's epicenter) and exposure to possible inundation (either for those living below dams or near large bodies of water) were the most numerous of such ecological mentions (8.6 and 6.8 percent, respectively). Reference to some type of impairment, physical or social, constituted the third largest category of mentions (18.7 percent). Of all specific endangered groups, the elderly were the third most frequently mentioned (9.9 percent), after the two structural groups. Groups in institutional settings, constituting the fourth general category of endangered groups (12.3 percent), included those who are institutionalized routinely (either temporarily, as are children in schools, or on an extended basis, as are those in prisons and nursing homes) and persons who are considered to be unable to respond appropriately on their own when a quake strikes. The category "Other," comprising 8.1 percent of all mentions, is a residual category in which other specifically mentioned groups received fewer than eight citations.

These general categories constitute two primary ways of referring to or identifying endangered groups. Structural and ecological responses--the type of dwelling resided in, or the proximity to hazardous conditions (constituting 60.9 percent of all mentions)--refer to <u>environmental factors</u> as sources of potential danger for the people exposed to them. Reference to

persons who are socially and/or physically impaired or who are in institutional settings (31.0 percent) emphasizes the personal attributes of members who suffer diminished capacity or ability to prepare for or respond to earthquake threat because of age (advanced or youthful), illness, restructed mobility, or poverty. Environmental references were used nearly twice as often as personal attributes in identifying endangered groups. The significance of this finding will be investigated in reference to the amelioration of endangering conditions (in the section below).

Since there are many more mentions of endangered groups than there are socially aware respondents, it is evident that multiple answers were given by some. Table 2 provides a breakdown of the total number of endangered groups mentioned by each respondent. Over 60 percent of the socially aware respondents (or 38.6 percent of the total sample) mentioned two or more endangered groups, and over 30 percent mentioned three or more such groups.

Before we examine the kinds of groups that people identified as subject to special risk, we must take note of the possibility that people mentioned groups to which they themselves belonged. If people were merely identifying their own groups, the replies might be interpreted as expressing a self-serving rather than an altruistic outlook. To be sure which kind of attitude was being expressed, we asked the respondents:

> You said that (....), (....), etc. are the groups of people who are in greater danger from a damaging earthquake. Do you consider yourself to be in any of these groups? (Yes or No) (If yes): Which ones?

The interviewer filled in the (....) spaces by repeating the names of groups the respondent had named. A total of 159 people (or about 18 percent of the socially aware) said they belonged to one of the groups they had mentioned. This leaves 51.8 percent of our entire sample who recognize that certain groups are

TABLE 2

NUMBER OF ENDANGERED GROUPS MENTIONED PER RESPONDENT

Number of Groups Mentioned	Frequency	Percent of Total Sample	Percent of "Socially Aware"
0	538	37.1%	----
1	353	24.3	38.7
2	267	18.4	29.3
3	164	11.3	18.0
4	66	4.6	7.2
5	31	2.1	3.4
6	16	1.1	1.7
7	8	.6	.9
8	6	.4	.7
9	1	.1	.1
Total	1450	100.0%	100.0[1]

[1] The percentages are based on the 912 respondents who answered that earthquake danger was greater for some groups than for others (i.e., the "socially aware").

in special danger, but do not include themselves in the threatened categories. Thus at least half the respondents have the social awareness that is a prerequisite to altruism.

Table 3 breaks down the number of groups in which each respondent claims membership. In general, membership in an endangered group does not seem to be particularly necessary in order to be aware of an endangered group, since the great majority of the socially aware (82 percent) do not claim membership in any of the endangered groups they mentioned. Of the remainder of the socially aware, 16 percent claimed membership in one group; and less than 2 percent claimed membership in two or more groups. Using the same general categories of endangered groups used in Table 2, Table 4 breaks down the specific groups in which respondents claimed membership. Table 5 indicates that respondents who claim membership in an endangered group account for only 2.4-10 percent of all mentions (deleting the residual category). Self-interest does not appear to be a prominent factor in social awareness, particularly in reference to the two categories concerned with personal attributes--institutionalization and physical or social impairment--which may hinder preparedness.

An argument could be made that awareness of an endangered group in which one is a member is not truly "social," but is rather an example of expressed self-interest. Table 6 presents a distribution of endangered group memberships claimed, by the number of total groups mentioned for each respondent. No measure of association could be used on these data since three of the cells in the table do not constitute possible responses (due to the contingent nature of the question's format). However, since the number of respondents claiming membership in one endangered group constituted a sufficiently

TABLE 3

NUMBER OF "SOCIALLY AWARE" RESPONDENTS WHO CLAIM MEMBERSHIP IN AN ENDANGERED GROUP OR GROUPS

Number of groups Respondent Claims Membership In	Frequency	Percent	Cumulative Percent
None	734	82.2	82.2
1	143	16.0	98.2
2	14	1.6	99.8
3	2	.2	100.0
Total	893[1]	100.0	

[1] 19 cases are missing answers to this part of the question.

TABLE 4

WHICH ENDANGERED GROUPS RESPONDENTS CLAIM MEMBERSHIP IN

Category of Endangered Groups	Frequency		Percent	
I. Structural References		72		40.7
1. Old/Unsafe/Pre-1934 Buildings	46		26.0	
2. Apartments/High-rise	26		14.7	
II. Ecological References		50		28.2
1. Proximity to Disaster Agent (by fault, near epicenter)	29		16.4	
2. Flooding (below dams, near water)	11		6.2	
3. High Density Areas	7		3.9	
4. Hillside Homes	3		1.7	
III. Physically/Socially Impaired		26		14.7
1. Elderly	16		9.0	
2. Disabled	9		5.1	
3. Poor	1		.6	
IV. Institutional Settings		6		3.4
1. Children in Schools	4		2.3	
2. People in Hospitals/Prisons/ Group Residential Facility	2		1.1	
V. Other		23		13.0
Total	177	177	100.0	100.0

TABLE 5

FREQUENCY OF MEMBERSHIP BY GENERAL CATEGORY OF THE ENDANGERED GROUP

Category of Endangered Group	Non-Membership Claimed N	%	Membership Claimed N	%	Total
I. Structural	650	90.0	72	10.0	722
II. Ecological	451	90.0	50	10.0	501
III. Impaired	349	93.1	26	6.9	375
IV. Institutionalized	240	97.6	6	2.4	246
V. Other	140	85.9	23	14.1	163

TABLE 6

NUMBER OF ENDANGERED GROUP MEMBERSHIPS CLAIMED ACCORDING TO THE NUMBER OF GROUPS MENTIONED

Number of Endangered Groups Respondent Mentions	Number of Endangered Groups in which a Respondent Claims Membership				
	0	1	2	3	Total
1	297	47	a	a	344
2	221	37	3	a	261
3	126	32	5		163
4	49	13	1	1	64
5	20	8	3		31
6	13	3			16
7	3	2	1	1	7
8	4	1	1		6
9	1				1
Total	734	143	14	2	893*

$\bar{x}_o = 2.1158$ $\bar{x} = 2.4406$

$s_o^2 = 1.726$ $s_1^2 = 2.1989$

[a] Indicates that cell is necessarily empty and cannot contain a possible response.

* 19 cases were deleted due to a lack of response to group membership question.

large sample which could be compared with respondents who claimed no membership, a t-test on the difference between the means of these two groups was done. Because of their small numbers (n = 16), respondents who claimed membership in two and three endangered groups were deleted from this analysis. The difference between the means of the two groups was found to be significant at the .01 level (t = -2.4348), and the null hypothesis ($H_o: M_1 - M_2 = 0$) was rejected. This finding indicates that if one claims membership in an endangered group, one is more likely to mention other endangered groups than if one claims no memberships. This finding casts a somewhat different light on the meaning of being a member of an endangered group. Instead of seeing membership as merely an expression of self-interest, we can see awareness of membership as potentially sensitizing people to other types of earthquake endangered groups.

With respect to interpreting these findings, it is important to keep in mind how these questions were asked. The answers were volunteered by the respondents without any help from the interviewers. If we had presented a check list of groups, most of the respondents would probably have checked many more of the groups as being especially vulnerable than the number they volunteered. For example, if asked, many more would probably have agreed that the disabled are especially vulnerable in an earthquake and many more would probably have expressed concern over hillside homes.

The information we have must be understood as indicating how people think spontaneously about earthquakes. Does the idea of an earthquake promptly bring to mind a concern for groups of people who are in especially great danger and in need of special attention from the community? If it does, what kinds of groups do people think of first, without prompting? We asked the

questions in this way, thinking that the more spontaneous and unprompted responses might provide a better clue to public attention and concern in case of a credible earthquake prediction than the replies to a check list.

The replies suggest that the frequent discussion of unsafe buildings and perhaps the tendency to depict earthquakes concretely by showing pictures of damaged and collapsed structures has sensitized the public to this aspect of earthquake vulnerability. By contrast, far fewer people think spontaneously of the quite realistic danger that one of the many dams in the Los Angeles metropolitan area--some of which are quite old--may collapse in an earthquake. And relatively few respondents think spontaneously of those people who are least able to help themselves in a crisis. This differential attention can not be explained by prior experience with disaster in southern California. During the 1971 San Fernando-Sylmar earthquake public attention was riveted for several days on the imminent danger that the Van Norman Dam would collapse, and thousands were evacuated as a consequence. Many residents must also remember the disastrous collapse of the Baldwin Hills Dam in 1963 which, while not caused by an earthquake, reminded people of how much of the community lay below dams. Furthermore, the damaged structure most often featured in accounts of the 1971 earthquake, where most of the deaths occurred, was the Veterans Administration Hospital. Yet only a small number of people mentioned the special vulnerability of the hospitalized.

As we try to understand the prevailing patterns of thought about earthquakes, we must conclude that while most people are sensitive to unequal risk from earthquakes, their concern is more impersonal than personal. They are not thinking so much of individuals who are bedridden at home or in

hospitals and need help in getting to safety as they are of buildings collapsing. Since altruism implies a rather personal concern, the prevalence of impersonal concern suggests that the foundation for a genuinely altruistic outpouring in case of a credible earthquake prediction has not yet been securely laid.

Perception of Meliorability

We have discovered that there is a fairly widespread awareness of or concern for potential earthquake victims (particularly for those exposed to environmentally hazardous conditions). But social awareness in itself does not provide us with sufficient information to identify the existence of a potentially altruistic sentiment toward these earthquake-endangered groups. We must determine whether respondents believe that anything can be done to mitigate these hazardous conditions or whether they believe, fatalistically, that nothing can be done to aid these groups before another damaging earthquake occurs. If this second view prevails, an almost negligible opportunity for altruism to develop exists, since an altruistic response is based on the belief that actions taken on behalf of others will provide relief for those less able to help themselves.

After each respondent had named the groups considered to be in special danger, the interviewer asked:

> If a damaging earthquake were expected, is there anything that should be done ahead of time for the (....)?

In asking the question, the interviewer named the first group mentioned by the respondent and then repeated the question for each of the groups the respondent had named.

Overwhelmingly, our respondents believe in the meliorability of earthquake related hazards for endangered groups; at least 75% of all respondents who

mentioned endangered groups believed that something can be done (Table 7). Respondents are particularly optimistic about the ability to reduce earthquake hazards for those who live in older buildings (90.9%), for those in areas of possible inundation (91.2%), for children in schools(92.3%), and for those who reside in hospitals, prisons, or other group care facilities (92.2%). The respondents were slightly less optimistic about the ability to take remedial actions on behalf of those who live in apartments and high-rise structures (79.9%) and those who are in close proximity to the disaster agent, a fault, or the quake's epicenter itself (75.6%). When the issue is posed in this manner (that is, in reference to specific endangering conditions), fatalistic attitudes are much less in evidence.

There are at least three plausible explanations for the contrast between this finding and the earlier finding on fatalistic attitudes. First, respondents were merely asked whether there was <u>something</u> that ought to be done for the elderly, for people living in dangerous buildings, or for whatever other groups they had mentioned. There was no suggestion that risk would thereby have been eliminated. The proposed steps could have been viewed as only a small encroachment on an otherwise inexorable fate. Second, the best way to overcome fatalistic attitudes may be to deal in specifics. When the attention is turned to specific groups and concrete actions, the possibility of dealing constructively with a problem of more manageable proportions may displace the disposition toward fatalism. Third, the social conscience that we acquire as members of society may keep us from being as fatalistic about the prospective misfortunes of others as we are about our own. There is some evidence in our data to support this third explanation. Respondents who identified themselves with the endangered groups were less likely to say that there is anything that ought to be done for members of these groups than

TABLE 7

CAN ANYTHING BE DONE TO REDUCE EARTHQUAKE HAZARDS ACCORDING TO SPECIFIC ENDANGERED GROUP MENTIONED

Category of Endangered Groups		N	%	N	%
I. Structural				Yes: 619	85.7%
				No: 102	14.1
				DK: 1	.2
Old Buildings	Yes:	348	90.0		
	No:	35	9.1		
Apartments/ High-rise	Yes:	271	79.9		
	No:	67	19.8		
	DK:	1	.3		
II. Ecological				Yes: 413	82.6
				No: 87	17.4
Proximity to a Disaster Agent[1]	Yes:	130	75.6		
	No:	42	24.4		
Flooding	Yes:	125	91.2		
	No:	12	8.8		
High Density Areas	Yes:	79	81.4		
	No:	18	18.6		
Hillside Homes	Yes:	79	84.0		
	No:	15	16.0		
III. Physical/Social Impairment				Yes: 332	88.5
				No: 42	11.2
				DK: 1	.3
Elderly	Yes:	176	88.4		
	No:	23	11.6		
Disabled	Yes:	130	89.0		
	No:	15	10.3		
	DK:	1	.7		
Poor	Yes:	26	86.7		
	No:	4	13.3		
IV. Institutionalized				Yes: 227	92.3
				No: 19	7.7
Children in Schools	Yes:	120	92.3		
	No:	10	7.7		
People in Hospitals/ Prisons/Group Facilities	Yes:	107	92.2		
	No:	9	7.8		
V. Other[1]				Yes: 116	71.6
				No: 46	28.4

[1] Two cases are missing data on this variable and have not been included in computation of percentages.

respondents who did not belong to the groups in question. This observation applies to the occupants of old unsafe buildings and all four groups of people in unsafe locations (For other endangered groups there is no difference.)

To determine whether a fatalistic attitude toward earthquake preparedness in general was related to beliefs about the meliorability of hazards for specific endangered groups, a cross tabulation was done between respondents' scores and on the fatalism index and their belief in the ability to take actions on behalf of an endangered group prior to the next earthquake. Table 8 indicates that a general fatalistic attitude toward preparedness is frequently paralleled by pessimism concerning the meliorability of hazards for endangered others. Especially for those who are jeopardized because of hazardous environmental conditions-- unsafe structures or locations-- general fatalism appears to be associated with a belief that nothing can be done to lessen the threat of those situations. However, for those who are endangered because of personal attributes, fatalism is not necessarily related to this pessimism. As was demonstrated in Table 7, there was generally a greater confidence in being able to aid these groups than those which were endangered because of environmental conditions. Perhaps those who are threatened because their present situation of jeopardy is beyond their personal control are viewed in a more sympathetic manner, irrespective of the viewer's own fatalistic belief about the usefulness of earthquake preparedness.

Again, a question is raised concerning the effect membership has on one's perceptions of meliorability. Is a member of an endangered group more likely than a non-member to believe that something can be done to decrease the amount of earthquake danger his or her group is exposed to?

The relationship between membership in an endangered group and belief in meliorability was tested for each of the endangered groups; the results are found in Table 9. (No overall relationship between these two variables

TABLE 8

DEGREE OF RELATIONSHIP BETWEEN SCORES ON THE FATALISM INDEX AND THE BELIEF IN MELIORABILITY OF EARTHQUAKE HAZARDS FOR SPECIFIC ENDANGERED GROUPS

Endangered Groups	x^2	p
I. Structural References		
Old/Unsafe/Pre-1934 Buildings	.0.283	.05
Apartments/High-rise	15.726	.001
II. Ecological References		
Proxmity to Disaster agent (by fault, near epicenter)	13.843	.01
Flooding (below dam, by water)	1.087	n.s.
High Density Areas	19.483	.001
Hillside homes	14.098	.01
III. Physically/Socially Impaired		
Elderly	14.294	.01
Disabled	7.673	n.s.
Poor	2.163	n.s.
IV. Institutional Settings		
Children in Schools	8.556	.05
People in Hospitals/ Prisons/ Group Residential Facilities	2.966	n.s.

[1]Each chi square table had 3 degrees of freedom

TABLE 9

SIGNIFICANCE OF MEMBERSHIP IN EACH ENDANGERED GROUP ON MELIORABILITY OF HAZARDS

Endangered Group	Test	P
I. Structural		
1. Old/Unsafe/Pre-1934 Buildings	Fisher's[1]	.05
2. Apartments/High-rise	Chi square[2]	n.s.
II. Ecological References		
1. Proximity to Disaster Agent (by fault, near epicenter)	Chi square	.005
2. Flooding (below dams, by water)	Chi square	.05
3. High Density Areas	Fisher's	.001
4. Hillside Homes	Fisher's	.05
III. Physically/Socially Impaired		
1. Elderly	Fisher's	n.s.
2. Disabled	Fisher's	n.s.
3. Poor	Fisher's	n.s.
IV. Institutional Settings		
1. Children in Schools	Fisher's	n.s.
2. People in Hospitals/Prisons/ Group Residential Facility	Fisher's	n.s.

[1] Fisher's exact test was used instead of a chi square test, since at least one expected cell frequency was less than five for these 2 x 2 tables.

[2] Yate's corrected chi square formula was used in these computations since continuity could not be assumed given that the tables had only one degree of freedom.

Type of awareness	Environmental conditions	Personal attributes
Number mentioned	High	Low
Perception of meliorability	Moderate	High

RELATIONSHIPS BETWEEN ENDANGERED GROUP CATEGORIES--
ENVIRONMENTAL CONDITIONS AND PERSONAL ATTRIBUTES--
NUMBER MENTIONED AND MELIORABILITY

FIGURE 4

could be explored since some respondents mentioned more than one endangered group, and their beliefs about meliorability could have varied.) The significant correlations indicate that the belief in meliorability of hazardous conditions is strongly related to not claiming membership in a particular type of endangered group. In other words, members of these groups were more likely to believe that nothing could be done to lessen the hazardous nature of their conditions than were non-members. Environmental conditions were particularly seen as unalterable by members, especially the ecologically hazardous areas. Claiming membership in an endangered group had no effect on the belief in meliorability which, as illustrated in Table 7, was extremely high.

Let us return to the significance of the environmental condition and personal attribute classifications of these endangered groups. Respondents had more positive feelings of remediability toward those categories where personal attributes defined the hazardous groups (that is, toward the socially or physically impaired and toward the institutionalized) than they had for groups who are endangered by environmental conditions. Although the overall differences between the general categorical percentages of remediability are not large, this finding is interesting when related to the respondents' frequency of categorical mentions (Table 1). The endangered groups which fell into the environmental category (that is, the structural and ecological references) were by far the most frequently cited potential victims; yet they were also the groups for whom more respondents believed nothing could be done. The less frequently cited groups (defined by personal attributes) received the highest "confidence vote" from the respondents that something could be done to mitigate hazards for them.

These two patterns (Figure 4) should be considered if mobilization of an altruistic response is to be facilitated. A potentially altruistic response may more easily be promoted for the groups in these personal attribute categories since a higher perception of meliorability already exists;

however, efforts should be made to broaden public awareness of such groups. For the widely recognized groups which are endangered because of their proximity to potentially hazardous environmental conditions, attempts could be made to familiarize the public with hazard-reduction measures and planning in order to change their perceptions of meliorability. However, these suggestions may require modification depending on who the respondent designates as the responsible agent for hazard-reduction actions.

Attribution of Responsibility for Remediability

A potentially altruistic response toward an earthquake prediction is partly dependent also upon who is seen as being responsible for mitigating the dangers for each group. It is doubtful that any altruistic response could develop if the socially aware believed that members of endangered groups were responsible for taking the necessary remedial action themselves.

Each respondent who said that something could be done for an endangered group prior to the next earthquake was asked who was responsible for doing something for each specific group mentioned. The respondents were not read any suggested response categories.

To compare the frequency of answers across group types, row frequencies were calculated for each endangered group and for the four analytic categories (Table 10).

The most consistent and impressive finding from these tables is the reliance on government. For every one of the groups, the majority of the respondents place responsibility on local, state, or federal government or some combination of government entities. About four out of five respondents hold government responsible for helping the impaired, while just over two thirds expect government to assume responsibility for each of the other categories.

TABLE 10

AGENTS RESPONSIBLE FOR ENDANGERED GROUPS

General Category	Responsible Agent								
	Own Respon-sibility	Family, Friends	Local Govt.	Local, State,& Federal	Indiv.& Govt.	Prop. Owners	Admin., Mgrs.	Other	Total
Unsafe structures	15.7	0	36.4	32.9	2.5	6.9	1.0	4.6	100.0
Unsafe locations	23.7	0	30.5	36.2	2.5	1.0	1.2	4.9	100.0
Personally and socially impaired	4.9	5.2	30.1	48.9	2.4	.3	3.0	5.2	100.0
Institutional settings	5.4	2.7	25.6	42.6	1.3	.4	15.7	6.3	100.0
Unsafe structures									
Old/unsafe/pre-1934 buildings	10.8	0	40.5	37.9	2.9	4.7	0	3.2	100.0
Apartments/high-rise	22.1	0	31.1	26.6	1.9	9.7	2.2	6.4	100.0
Unsafe locations									
Proximity to disaster agent (by fault, near epicenter)	23.1	0	27.7	37.7	1.5	.8	.8	8.4	100.0
Flooding (below dam, near water)	24.2	0	25.8	44.4	1.6	0	1.6	2.4	100.0
High density areas	11.8	0	46.1	27.6	5.3	4.0	2.6	2.6	100.0
Hillside homes	35.5	0	27.6	29.0	2.6	0	0	5.4	100.0
Personally and socially impaired									
Elderly	3.4	6.9	31.6	49.5	2.9	.6	1.7	3.4	100.0
Disabled	5.4	3.9	26.3	49.6	1.6	0	5.4	7.8	100.0
Poor	11.6	0	38.5	42.3	3.8	0	0	3.8	100.0
Institutional settings									
Children in schools	8.4	3.4	33.6	36.1	1.7	.8	10.1	5.9	100.0
People in hospitals/ prisons/ group residential facilities	1.9	1.9	16.3	50.0	.9	0	22.1	6.0	100.0

The tendency to hold government responsible is greatest in the case of the elderly, the poor, people who dwell in old unsafe buildings, and the disabled. Government is least often held responsible--though still by more than half the respondents--for people living in hillside homes and in apartments and high-rise buildings, and living near faults and other impact areas. The rate of government responsibility is also relatively low for people in institutional settings. But this observation is deceptive since the agents and managers who are held responsible by 16 percent of the respondents will in most instances be acting as agents of some government entity.

There is considerable disposition to hold people who dwell in hillside homes, in potential inundation areas, in proximity to a fault, or in high-rise and apartment buildings responsible for their own safety when an earthquake is expected. This sentiment is particularly strong for those who live in hillside homes, where residents themselves received the largest percentage of responses from those who had mentioned that endangered group. This finding suggests that an altruistic response may not emerge for people exposed to such hazards if an earthquake prediction is issued, since such a strong sentiment exists for the self-responsibility of such groups. A similar sentiment was expressed for Malibu residents whose homes were threatened during the recent rainstorms in southern California. Several Letters to the Editor in the Los Angeles Times (March 10, 1978) mentioned that the Malibu residents had "chosen" to live in such precarious cliffside dwellings or directly on the beach sands, thereby negating their right to have thousands of taxpayer dollars spent shoring up their homes.

For those who stated that group members are responsible for ameliorating their own conditions, the two structural groups received the most frequent mention (Table 11). When the groups were collapsed into categories (Table 12), however, both structural and ecological categories received

TABLE 11

RESPONSIBLE AGENTS FOR SPECIFIC ENDANGERED GROUPS

Endangered Groups	Responsible Agent: Own Responsibility	Friends/ Family	Local Govt.	Local/ State/ Federal	Indiv./ Govt.	Prop. Owners	Admin./ Mgrs.	Other
I. Structural References								
1. Old/Unsafe/Pre-1934 Buildings	16.8	0	27.6	21.5	27.7	33.3	0	13.9
2. Apartments/High-rise	26.8	0	16.5	11.8	13.9	54.2	10.7	21.5
II. Ecological References								
1. Proximity to Disaster Agent (by fault, near epicenter)	13.7	0	7.2	8.2	5.6	2.1	1.8	16.0
2. Flooding (below dam, by water)	13.7	0	6.4	9.1	5.6	0	3.6	3.7
3. High Density Areas	4.1	0	7.0	3.5	11.1	6.2	3.6	2.5
4. Hillside Homes	12.3	0	4.2	3.6	5.6	0	0	5.1
III. Physically/Socially Impaired								
1. Elderly	2.7	52.2	11.0	14.2	13.9	2.1	5.3	7.6
2. Disabled	3.2	21.7	6.7	10.6	5.6	0	12.5	12.7
3. Poor	1.4	0	2.0	1.8	2.7	0	0	1.2
IV. Institutional Settings								
1. Children in Schools	4.5	17.4	8.0	7.1	5.6	2.1	21.4	8.9
2. People in Hospitals/ Prisons/ Group Residential Facilities	.9	8.7	3.4	8.6	2.7	0	41.1	8.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 12

RESPONSIBLE AGENTS FOR GENERAL ANALYTIC CATEGORIES

Endangered Groups	Responsible Agent: Own Responsibility	Family/ Friends	Local Govt.	Local/ State/ Federal	Indiv./ Govt.	Prop. Owners	Admin./ Mgrs.	Other
Structural	43.6	0	44.2	33.3	41.7	87.5	10.7	35.5
Ecological	43.6	0	24.7	24.3	27.8	8.3	8.9	25.3
Impaired	7.3	73.9	19.7	26.7	22.2	2.1	17.9	21.5
Institutionalized	5.5	26.1	11.4	15.7	8.3	2.1	62.5	17.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

an equal percentage of the own responsibility responses. Those groups identified on the basis of environmental conditions clearly have been designated as responsible for ameliorating their own hazardous earthquake conditions.

Heider (1958:100-124) points out that attributions of personal responsibility vary with the relative contribution of environmental factors to a specific action outcome; that is, the more environmental factors are felt to influence the outcome, the less a person is held responsible. However, one may be held personally responsible, directly or indirectly, for any outcome that could have been foreseen even though that person did not personally cause the event or outcome. For Los Angeles county residents, it seems that even though environmental factors are identified as the potential hazards, there is still a tendency to see those endangered by such conditions as responsible for their own fates, possibly because they are seen as "selectively" exposing themselves to hazardous conditions.

However, it may be erroneous to conclude that an altruistic response may not develop for the members of structural groups. Respondents who mentioned property owners as responsible agents most frequently cited the structural groups (87.5 percent), particularly those living and working in apartments and high-rise buildings (54.2 percent). Although the number mentioning property owners is smaller than the number mentioning personal responsibility for structural groups (52 and 96 percent, respectively), those respondents may at least provide the impetus for the development of an altruistic response toward those people actually living in hazardous buildings.

By contrast, very few expect people in institutions, the elderly, and the disabled to look out for themselves. A few people do look to family and friends to protect the elderly, the disabled, and children in school; but the numbers are trivial compared to those who look to government. A few people expect property owners to take steps to protect residents in old unsafe build-

ings, high-rise and apartment buildings, and high density areas.

In spite of widespread feelings that people who have chosen to live in risky settings should therefore assume full responsibility for their own safety, the concept of public responsibility prevails. In general the sense of public responsibility is stronger toward people with diminished ability to protect themselves than toward people in vulnerable settings. The only exception to this generalization is the assumption of public responsibility for residents of old unsafe structures. No doubt the public attention given to the problem of old buildings has had a significant impact on the public conscience.

One further question concerning the designation of a responsible agent needs to be addressed: does membership in an endangered group affect who is seen as responsible for ameliorating the hazardous conditons affecting that group? A Chi square was computed for each endangered group to investigate this relationship. For each group, membership and attribution of responsibility were found to uncorrelated. This indicates that being a member of an endangered group did not have any effect on who was seen as being responsible for ameliorating earthquake hazards.

The Collective "Posture toward Altruism" in Los Angeles County

In order to illustrate how these perceptions of vulnerability, meliorability, and responsibility were distributed among the county population, a collective orientation typology was constructed for the socially aware. The number of endangered groups mentioned, whether the conditions causing the endangerment were ameliorable, and whether responsibility was attributed to the individual or to others were coded for each respondent.

By analyzing the distribution of our sample along these combined dimensions, we propose that a "posture toward altruism" can be discerned for

Los Angeles County residents. We believe that this concept constitutes a continuum along which a community's posture may be distributed, ranging from a belief that all remediable actions are the responsibility of the potential victims themselves to a belief that the community (either through formal or informal channels) has a collective responsibility for correcting those conditions.

As indicated in Table 13, over 85.0 percent of the socially aware were optimistic about the ability to remedy hazardous conditions; less than 13.0 percent were pessimists, believing that nothing could be done to help the endangered. Of the remainder of the socially aware (those who thought that the conditions were meliorable), the majority (66.3 percent) held a collective orientation; that is, they believed that earthquake-related problems should be solved through collective action. However, the dominant agent to whom this responsibility was attributed was the government.

The externalization of responsibility to an authority or expert was one cognitive factor that obviously inhibited the transition from altruistic (or help-oriented) sentiments for endangered others to participation in collectively oriented actions to aid these others, since no collective effort took place during our study. This reliance on the government for ameliorating earthquake hazards will be an important point of analysis in the next chapter.

On the basis of this entire battery of questions we must conclude that the theme of the public responsibility rather than individual responsibility is dominant. People do see the prospect of preparing for an earthquake as requiring collective rather than merely individual and family action. And they see government, especially local government, as the appropriate agency for collective response.

TABLE 13

TYPOLOGY INDICATING BELIEF IN COLLECTIVE

MELIORABILITY OF ENDANGERED GROUPS

Category	Number	Percent
Those who think nothing can be done	115	12.6
Something can be done	779	85.4
Totally Individuals' responsibility "Individualists"	90	9.9
Mostly Individuals' responsibility "Individually Biased"	84	9.9
Mostly Others' responsibility "Collectively Biased"	56	6.1
Totally Others' responsibility Limited Social Awareness (Mentioned One or Two Groups) "Collectively Oriented"	385	42.2
Totally Others' Responsibility Broad Social Awareness (3-8 Groups) "Collectively Oriented"	164	18.0
Missing Cases[1]	18	2.0
Total	912	100.0

[1]Missing cases resulted from "don't know" responses or errors by the interviewers.

Altruism is made possible by several underlying conditions. First there must be an awareness of people in special need. The majority of respondents acknowledged such an awareness. Second, groups in special need must be seen in personal rather than impersonal terms. Here the support for altruism is less satisfactory, since the preponderant view is more impersonal than personal. Finally, there must be a sense that something can be done to help those in need and that there is a public responsibility to do so. In this latter respect the support for altruism is quite strong.

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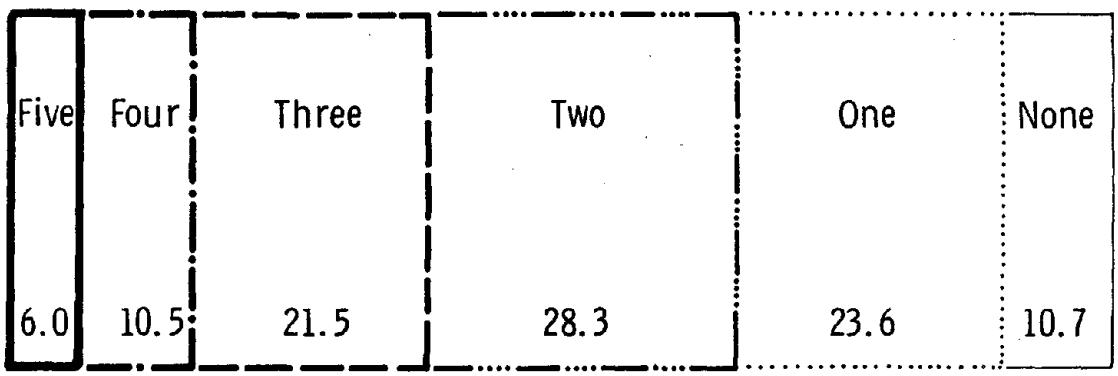
CHAPTER TWO

WHAT SHOULD THE GOVERNMENT BE DOING TO PREPARE?

From the preceding chapter we learned that while there is considerable fatalism about earthquake hazards, many people believe that there are steps that can and should be taken on behalf of those who are especially endangered by earthquakes. In addition we learned that people look overwhelmingly toward government to take these steps. This pattern is consistent with the view reported in Part Four, that government should play a major part in the public announcement of predictions. Do people have any specific ideas about what government should be doing? Are they willing to have public money spent on reducing earthquake hazard? What do they think of current government efforts to deal with earthquake hazard? These are the questions we shall approach in this chapter.

Suggestions for Government Action

If people look to government at all levels to deal with earthquake hazard, it should be useful to know whether people have any preconceptions about what public officials should be doing. Sometimes public officials feel that the public attitude toward a community problem is that government should do something! Having no idea of what can be done, people may nevertheless clamor for officials to figure something out and then do it. While a demanding but uninformed public leaves officials free to select the programs they consider most prudent, it also places an inordinate burden of unaided decision-making on their shoulders. On the other hand, if people have reason-



SUGGESTIONS FOR GOVERNMENT ACTION

FIGURE 1

ably concrete ideas about what government could be doing, we can justifiably infer that there is genuine public interest and concern. The prospect for public involvement in shaping and executing government policies and programs is much brighter.

In order to determine whether people have given any thought to the nature of possible government actions to reduce the hazard of earthquakes, interviewers asked the following question of all the people in our sample:

> Given the fact that earthquakes do occur in southern California, what do you think are the most important things government agencies should be doing now to prepare for future earthquakes?

Interviewers were instructed to record answers verbatim, and to record up to five answers per interview. Figure 1 indicates the number of suggestions people were able to make.

It appears from the evidence that most people are concerned and have given some thought to what government agencies should be doing. Only one in every ten has nothing to suggest. Two thirds of the people have two or more suggestions to offer, and more than a third have at least three suggestions. This distribution of suggested governmental actions did not subsequently change when the question was repeated for a new sample of respondents in July, 1977, six months later. Although the mean of the follow-up index's distribution was slightly lower than that in early 1977 (2.07 and 2.17, respectively), a t-test indicated that this difference was not statistically significant.

No effort has been made to evaluate the merits of specific suggestions. Some of them are relatively impractical, and many are fairly vague or general. But very few were unreasonable or irrelevant. Only five persons suggested shifting responsibility through prayer. We can safely conclude that most of the people have some ideas about the steps that might be taken or the general

TABLE 1

SUGGESTIONS FOR GOVERNMENT ACTION

Measures suggested	Percent of all suggestions	
Structural Safety		35.8
Make safer buildings, earthquake-proof buildings	9.0	
Enforce building codes	6.7	
Improve building codes	5.7	
Upgrade old buildings	5.6	
Provide loans to upgrade or rebuild	3.2	
Destroy old or unsafe buildings	2.2	
Prohibit building on faults	.9	
Other suggestions concerning buildings	1.1	
Upgrade dam safety	1.0	
Improve safety of high way construction	.4	
Education		26.2
General reference to public education	22.9	
Conduct drills in public buildings	2.3	
Other specific educational measures	.6	
Other educational suggestions	.4	
Plan for Emergency Care and Relief		25.7
Establish more emergency shelters	6.0	
Establish centers with emergency supplies	5.5	
Develop an effective civil defense program	3.6	
Improve the general emergency plan	3.3	
Provide for emergency medical care	3.1	
Develop an evacuation plan	2.8	
Develop emergency communication systems	1.0	
Other emergency care and relief	.4	
Improve Scientific Research and Technology, including Prediction		7.6
More scientific research needed (unspecified)	3.1	
Refine prediction techniques	2.7	
Subsidize groups to improve scientific research or prediction	1.7	
Control earthquakes scientificially	.1	
Upgrade Utilities	2.0	2.0
Collective and Voluntary Action		.8
Organize people, work as a community	.5	
Organize care for groups in special need	.3	
Regulate Announcement of Earthquake Predictions		.7
Monitor or control release of predictions	.3	
Announce all predictions	.2	
Reduce sensationalism concerning predictions	.2	
Other suggestions		1.2
Make earthquake insurance available and affordable	.2	
Other financial suggestions	.2	
Pray	.1	
Other	.7	
Total number of suggestions	3146	
Total	100.0	100.0

directions for government action.

Most of the suggestions can be grouped under three headings (Table 1). The most frequent references were to structural improvements (upgrading and enforcing building codes, reinforcing or destroying unsafe buildings, making dams and freeways safer), comprising a third of all specific suggestions. References to the need for educating the public about earthquake safety and predictions and conducting earthquake drills in public buildings followed closely (26.2%). "Educating people" was by far the most frequently suggested (22.9%) specific preparedness item. The third major category of response (25.7%) involved achieving a state of emergency preparedness and readiness to handle problems after the disaster strikes--insuring the adequacy and availability of shelters and supplies, medical care, evacuation plans, and good communication systems.

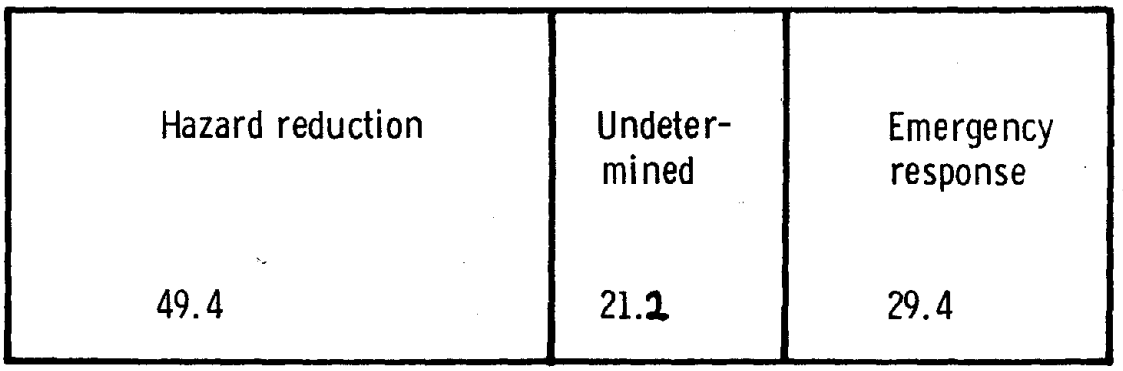
Because some readers may be interested in the public support for specific programs, we have reproduced a fairly detailed list of the suggestions made. The detailed list of suggestions reveals a prevailing emphasis on immediately and obviously practical steps. Steps that are only indirectly practical are much less popular. For example, increased support for scientific research on earthquakes makes up only 4.8 percent of the responses, and the improvement of earthquake prediction only 3.5 percent. In light of continuing study of the desirability and feasibility of government subsidized earthquake insurance, it is also striking that only seven people suggested that government agencies should make earthquake insurance available.

Hazard reduction and emergency preparedness. A recurring issue in disaster preparedness is the distribution of effort and resources between hazard reduction and emergency response. The distinction is between preparations to minimize disruption, damage, and casualties when an earthquake

strikes, and preparations that enable us to deal promptly and effectively with disruption, damage, and casualties after the earthquake. Emergency planning includes such steps as preparing a community emergency plan, storing food and medical supplies, and establishing emergency communication systems to be used in case regular communications are disrupted by the quake. Hazard reduction includes such steps as stricter enforcement of building safety codes and educational programs to teach people how to make their homes safer in the event of an earthquake.

Emergency response is more dramatic and its effects are more obvious and immediate than hazard reduction. Saving the lives of the injured, putting out fires, getting snarled traffic moving, and reuniting families after an earthquake are more exciting and heroic than inspecting buildings for safety, ordering unsafe dams drained, and helping householders to locate and remove objects that might fall and injure them in a quake. Consequently, there has been fear in some quarters that the public may not appreciate the need for hazard-reducing programs as fully as they do the importance of emergency preparedness. Coupled with the fact that police and fire officials often play a more significant role than planning and building safety officials in local disaster preparedness planning, this fear leads many to hold out little hope for developing the hazard reduction component in a balanced community response to earthquake prediction.

A careful effort has been made to classify each of the suggestions made by our respondents into hazard reduction and emergency modes of response. If the benefits of the proposed action will be realized in a reduction of disruption, damage, and casualties when the quake strikes, the action is classified under the hazard-reduction mode of response. If the benefits are to be realized after the quake has struck in dealing more effectively



PROPOSED MODE OF ACTION

FIGURE 2

with the resulting disruption, damage, and casualties, the suggested action is classified as emergency-response mode. A goodly proportion of the suggestions could not be confidently classified in one mode or the other, so they are placed in an undetermined category. Figure 2 shows the relative frequency of the two modes and the unclassifiable responses.

Contrary to the fear just mentioned, considerably more of the suggestions fall into the hazard reduction mode than into the emergency mode. It is reassuring to realize the extent of potential public support for hazard reduction programs. While we cannot be certain how much support will be forthcoming in actual situations, we can draw two important conclusions from this finding. First, there is widespread public understanding of the need to prepare for earthquakes through programs aimed at reducing the hazard of earthquakes as well as through improving emergency response capability. Second, when people think of earthquake planning, they think of reducing the earthquake hazard more often than they do of upgrading an emergency response capability.

At the risk of repeating information already contained in the comprehensive table of suggestions for government action, we have listed separately the principal suggestions for hazard reduction and for emergency response in Table 2. Proposals for education are prominent in both modes of response; but the bulk of the hazard reduction proposals are aimed at enhancing building safety. Clearly the primary importance of building safety for communities in earthquake country is well and widely understood in Los Angeles County. Stockpiling needed supplies and perfecting evacuation plans constitute most of the emergency response planning.

One question which these findings raises, particularly with respect to the importance attributed to hazard-reduction, focuses on the respondents'

TABLE 2

SUGGESTIONS FOR GOVERNMENT ACTION BY HAZARD REDUCTION AND EMERGENCY RESPONSE MODES

Measures suggested	Percent of suggestions by response mode
Hazard Reduction Mode	
Structural safety	65.6
Education	15.7
Improve scientific research and technology, including prediction	9.7
Plan for emergency care and relief	5.2
Regulate announcement of earthquake predictions	.9
Collective and voluntary action	.2
Other hazard reduction	.8
Total	100.0
Total number of hazard reduction suggestions	1020
Emergency Response Mode	
Plan for emergency care and relief	74.3
Education	12.2
Structural safety	7.0
Upgrade utilities	3.1
Collective and voluntary action	2.0
Improve scientific research and technology, including prediction	.5
Regulate announcement of earthquake predictions	.2
Other emergency response	.7
Total	100.0
Total number of emergency response suggestions	925

TABLE 3

RELATIONSHIPS BETWEEN PERSONAL ENDANGERMENT AND A BROAD AWARENESS OF PREPAREDNESS MEASURES THE GOVERNMENT SHOULD PRESENTLY BE TAKING

Personal endangerment indicator	gamma	tau C	p <
Awareness of the Uplift	.186	.138	.001
Number of destructive earthquake predictions taken seriously	.248	.105	.001
Number of endangered groups to which one claims membership	.153	.031	.005

perceptions of personal or immediate endangerment. Are those respondents who are more aware of the steps that government should be taking now to prepare for a coming quake more likely to believe they are in greater danger than those who offered fewer governmental preparedness actions? Does this knowledge of governmental planning needs stem from the self-interests of those who think they will benefit from such planning?

Three measures (already discussed earlier in this report) were used to investigate this question: awareness of the southern California Uplift, the number of predictions of destructive magnitude quakes that the respondent heard and took seriously, and the number of endangered groups in which one claimed to be a member. In each case, there was a moderately strong and significant relationship between a broad awareness of preparedness measures that the government should be taking and a sense of immediate or personel endangerment (Table 3). Those for whom the Uplift was more relevant and those who had heard and took seriously predictions of coming damaging earthquakes--the immediately endangered--were more likely to be aware of greater numbers of still-needed governmental preparedness actions. Similarly, those who claimed to be members of endangered groups--the personally endangered--were also likely to show a greater concern about the lack of agency preparations.

Perceptions of immediate or personal threat, then, may have resulted in a greater demand for the government to take substantial preparedness actions in early 1977 due to the recent heightening of community concern about earthquake threat in general.

In order to investigate the effects of heightened community concern in early 1977 on preparedness mode suggestions, a comparison was made between the survey in early 1977 and the survey in mid-1977. As seen in Table 4, the relative frequency of emergency response suggestions was very stable.

TABLE 4

PREPAREDNESS MODES IN EARLY AND MID 1977

Mode	Number		Percent	
	Early 1977	Mid 1977	Early 1977	Mid 1977
Hazard reduction	1555	453	49.4	39.6
Emergency response	925	334	29.4	29.2
Undetermined	666	357	21.2	31.2
Total	3146	1144	100.0	100.0

However, the relative frequency of clear-cut hazard reduction suggestions declined substantially in mid-1977.

In order to find out whether this decline was significant, a hazard reduction index was constructed by summing the number of such suggestions each respondent gave. In mid-1977, the mean number of hazard reduction suggestions had declined from 1.07 to .81, the major reason being the increased number of respondents who made no such suggestions in the later survey (Table 5). This shift was significant ($t = 5.61$, $p < .001$), indicating that a greater number of people had not specified a time referent with respect to their preparedness suggestions.

One conclusion which could be drawn from this finding is that during times of heightened community concern, people are much more specific about the need to take hazard reduction measures now to reduce the potentially fatal effects of a destructive magnitude earthquake. However, once this sense of community threat or concern subsides, suggestions become less specific and the need for immediate hazard reduction may be slightly dampened. This does not necessarily mean that there is less support for preparedness action being taken during times of threat neutrality, however. Rather, it may indicate that as community concern becomes less urgent, the spontaneous awareness of hazardous conditions that need to be alleviated by pre-planning may also decline, even though the awareness remains high that there are still actions needed. These observations will be examined later in connection with a comprehensive review of changing awareness and action over a 21-month period (Part Nine).

TABLE 5

HAZARD REDUCTION INDEX IN EARLY AND MID 1977

Index score	Number		Percent	
	Early 1977	Mid 1977	Early 1977	Mid 1977
0	467	250	32.2	45.4
1	560	191	38.6	34.7
2	308	80	21.3	14.5
3	83	25	5.7	4.5
4	28	4	1.9	.7
5	4	1	.3	.2
Total	1450	551	100.0	100.0

The Supporters of Collective Action

Who are these people who support collectively taking action now in order to prepare for, or reduce the hazards from, a future damaging earthquake? Two of the indices discussed in this part of the report could be used as indicators of support for collective action--belief in the collective meliorability of earthquake hazards (upon which the community posture toward altruism is based) and the index of suggestions for governmental action. The collective meliorability index is the more general indicator since there were several agents to whom responsibility for taking action was attributed, including combinations of governmental bodies. Models were constructed to predict the types of people who would support these actions.

Belief in the collective meliorability of earthquake hazards. This dependent variable is the basis for the community posture toward altruism described in the last chapter. Because one component of this variable is an awareness of endangered groups, it was assumed that certain demographic variables would be important predictors of an altruistic posture. Women are anticipated to have a greater concern for others. Households with school age children may be more aware of hazards associated with institutionalized people. Lower income households, ethnic minority group members, and people in lower skilled occupations may be more aware of the problems of impairment, that is, being unable to plan for future contingencies.

Past experience with earthquakes or other natural disasters was thought to be a particularly relevant cluster of variables for the development of a belief in the collective meliorability of hazards. If a person had sustained personal loss or injury from a destructive earthquake in the past, that person should want something done to safeguard other potentially endangered persons

from a similar experience. Also, if people have had experiences with other natural disasters, particularly hurricanes and tornadoes, they may be well aware of actions that can be taken by communities to protect their residents and how effective collective planning can be. For these reasons, variables indicating extent of experience in other types of disasters, extent of prior earthquake experience, and degree of damage or injury sustained in previous earthquakes were included in the model.

Living in environmentally hazardous areas should also constitute an important set of variables related to a concern for others who were also endangered. Included in this cluster were variables indicating the respondent's subjection to structural hazards (of home or the workplace) and living in hazardous zones within Los Angeles County, namely, areas prone to inundation from collapsed dams, areas with high concentrations of pre-1934 buildings, and the area most heavily damaged by the 1971 San Fernando quake. We advanced the hypothesis that the more of these objective conditions respondents were exposed to, the greater the likelihood of their being aware of similarly endangered groups.

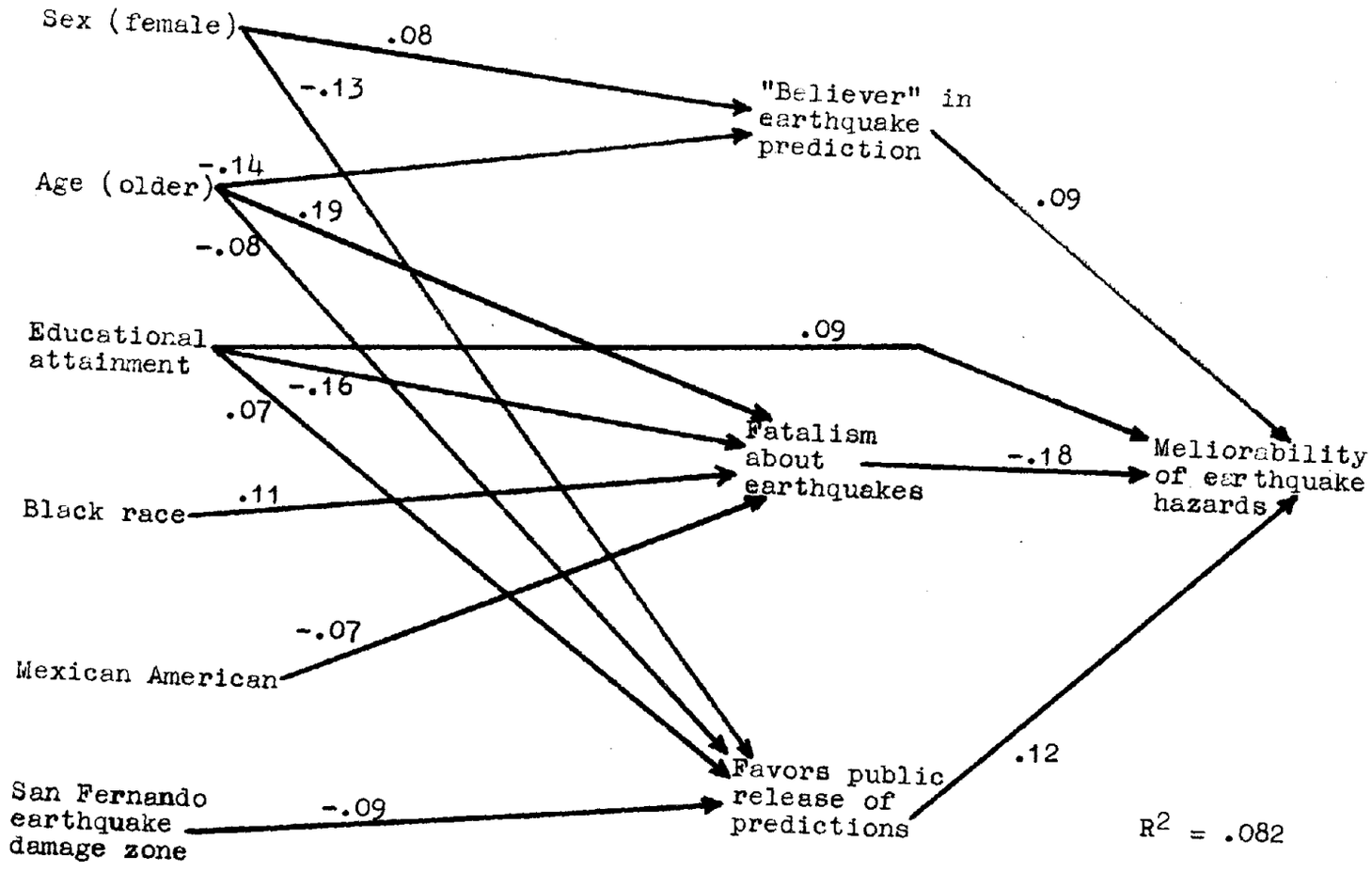
For altruistic norms to emerge in a metropolitan area like Los Angeles, not only the availability of factual information but the dissemination of information through interpersonal networks would have to attain quite a high level. For it would be through communication channels that people would become aware of endangered others and of possible solutions to their problems. Because such a large number of respondents have a collective action orientation, we believed that communication variables would be quite important in this model. Measures of communication included the number of formal media sources from which the respondent had heard earthquake information, the number of newspapers read, the number of group meetings attended where earthquake

topics had been discussed, and the number of earthquake issues the respondent had discussed with others during the past year.

Because of the analysis already discussed, it was predicted that a general tendency to be fatalistic would be negatively correlated with the posture toward altruism. Several variables measuring disposition toward science and toward earthquake prediction were included on the assumption that they would be positively correlated to taking action before the next quake. Trust in scientists, favorability toward science, belief that scientists can or will in the future successfully predict quakes, the belief that the respondent knows why earthquakes occur, and the belief that predictions should be issued far in advance of the expected event were the specific variables. Also, it was hypothesized that a positive evaluation of the job the government had been doing would be related to this collective orientation, especially since so many people attributed the responsibility for taking these actions to the government.

Figure 3 presents the final, parsimonious multiple regression model for belief in the collective meliorability of earthquake hazards. The amount of variance explained by the model was low (R^2 = .082), indicating, perhaps, that situational variables not measured by our survey instrument were most important in shaping optimism over collective solutions to earthquake problems.

However, there were some surprises in the final model. Neither past experience nor the extent or type of communication was found to significant. All of these variables were deleted from the final version of the model because none was significantly correlated with the dependent or intervening variables. The only background variable that was directly related to collective meliorability (after all of the other variables had been entered) was education; better educated people were more likely to have such an orienta-



MODEL FOR BELIEF IN COLLECTIVE MELIORABILITY OF EARTHQUAKE HAZARDS

Figure 3

tion. The only attitudinal variable, fatalism, was related to the dependent variable in the anticipated direction; people who were strongly fatalistic about taking earthquake preparedness measures are more likely to be the socially unaware or the pessimists who were discussed in Chapter One. People who had a fatalistic attitude were more likely to be older, have lower educational attainment, and be Black. Mexican Americans, on the other hand, were significantly less likely to be fatalistic after other variables were controlled.

Only two other mediating variables, both referring specifically to earthquake prediction, were found to be significant. People who believed in both scientific and nonscientific prediction and people who wanted predictions released to the public well in advance of the expected event were likely to have collective meliorability orientations. Younger people and women were more likely to be believers in both scientific and nonscientific prediction. People who were more favorable toward the issuance of predictions tended to be younger, male, and better educated. Those who live in the San Fernando damage area, however, were less favorable toward issuing predictions well in advance of the anticipated quake.

From this model, it appears that individual attributes and the orientation variables (particularly those relating to predictors and issuing predictions) were the primary variables in explaining a belief in collective meliorability.

Suggestions for government action. The index of suggestions for government action, discussed earlier in the chapter, can be interpreted as measuring the extent to which the respondent feels that there is a need for government agencies to take preparedness actions, and the extent to which the

respondent has specific ideas about what those actions should be. Unlike the collective meliorability index, which measures the degree to which earthquake hazards could be lessened and whether those solutions should be taken by various others on behalf of the endangered, the government action index measures the number of ideas respondents have about what measures need to be taken by government agencies. Similar clusters of past experience, demographic, and environmental vulnerability variables were entered into this model with two exceptions. Household income was included in the cluster of demographic variables. It was hypothesized that higher income people may oppose further government spending to take these additional measures. Also, the community attachment index was included on the assumption that people who were more integrated in their local communities should know more about the actions already taken by the government and want to see more things done to safeguard their communities.

The cluster of communication variables, again assumed to be crucial for knowledge about specific preparedness suggestions, was included as described for the preceding model.

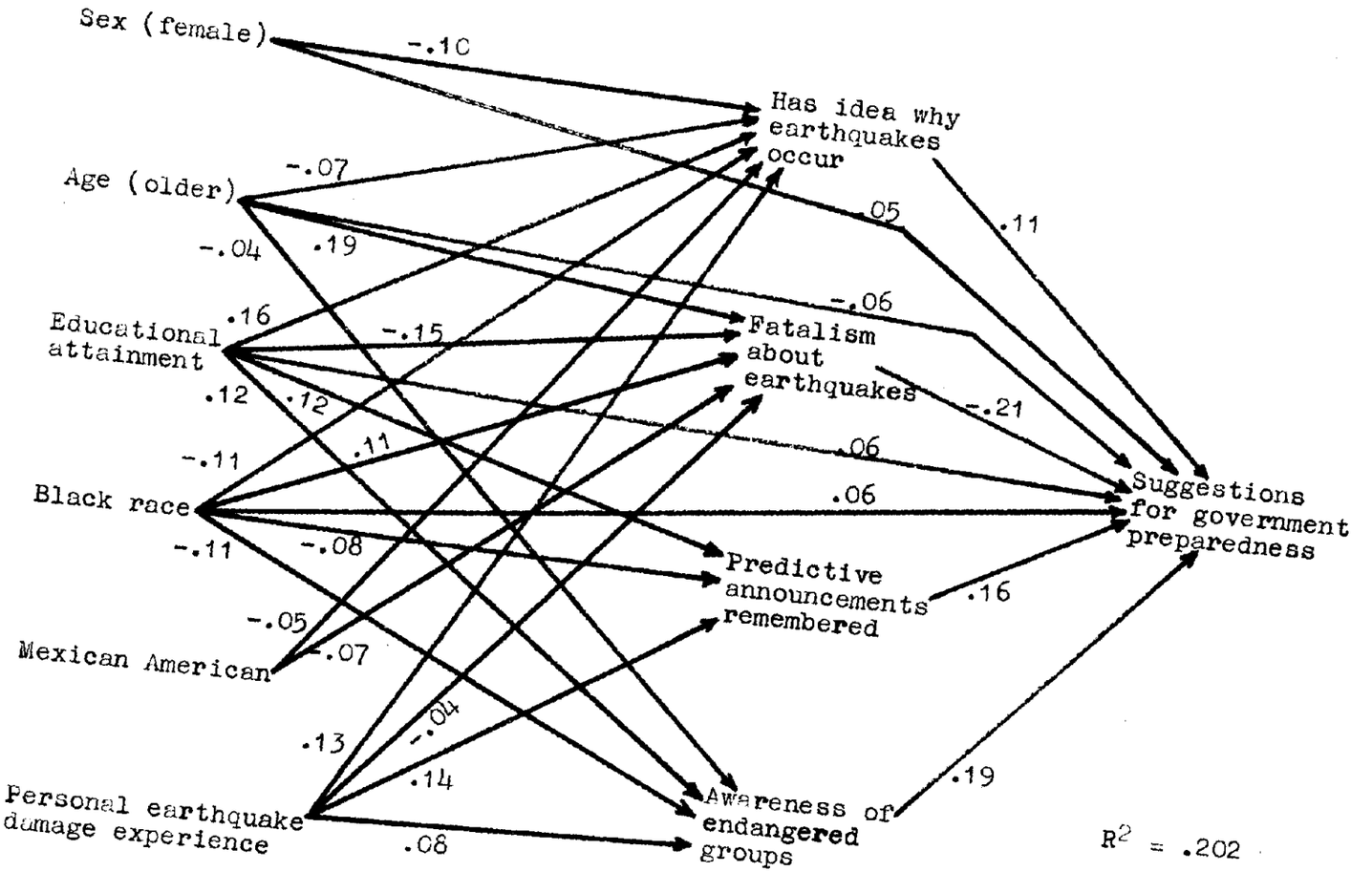
Three additional variables were added to the orientation cluster. Because of the hypothesis that a higher level of fear would cause people to support the government's efforts to correct hazardous conditions, the fear index was included. Also, people who have heard more earthquake predictions may perceive a more threatening situation, increasing their belief that more actions should be taken now before a predicted quake occurs. For this reason, the index of the predictions heard was included.

One of the components of the collective meliorability index was also added to the orientation cluster, namely, the number of endangered groups the respondents mentioned. If one can specifically identify groups that are in

greater danger from an earthquake, one may also have more specific ideas about what steps can be taken to aid those groups, particularly since beliefs about the meliorability of those conditions were so optimistic (see Chapter One).

Figure 4 presents the final model explaining the number of suggestions for government action. This model explains substantially more variance than the model for collective meliorability (R^2 = .202). Again, the communication variables were not found to be important; and fatalism, the strongest intervening variable in the model (as it was in the collective meliorability model), was correlated with the dependent variable negatively. The same demographic profile of those who are fatalistic with respect to earthquake preparedness exists in both models since the same set of demographic variables emerged as significant--age, sex, education, and minority group membership--with approximately the same beta weights. With respect to support for government actions, however, education was not the only variable to have a direct effect on the dependent variable. Besides the better educated being supportive of the government taking a greater number of actions, so too were younger people, females, and Blacks. Income and community attachment, however, did not add significantly to the explanatory power of the model and were deleted.

Neither the past experience nor the environmental vulnerability clusters were found to be important background variables in the model. However, having personally sustained damage or injury from a past quake or having friends or family with such experiences was related significantly to all of the intervening variables. Surprisingly, people who have had this kind of personal experience with earthquake disaster are <u>less</u> likely to be fatalistic about the usefulness of being prepared then people who have not been personally implicated in earthquake damage or injury.



MODEL FOR NUMBER OF SUGGESTIONS FOR GOVERNMENT PREPAREDNESS

Figure 4

If respondents felt they understood why earthquakes occurred (regardless of whether they gave a physical or non-physical explanation of causality), they were more likely to support further government action than those who admitted they had no idea why earthquakes occurred. Perhaps if one can specify the causes of quakes, one feels more optimistic about being able to do something to lessen quakes' effects. Those who gave some explanation for the occurrence of earthquake events were likely to have sustained damage or injury during a past quake, to be younger, to be better educated, to be male, and not to be either Black or Mexican American.

As anticipated, remembering more predictive announcements led to greater support for government actions. Knowledge of several announcements was more common for people who had sustained damage, for the better educated, and for those who were not Black. Fear, however, was not related to this dependent variable in any significant way, indicating that fear of earthquakes neither promoted nor inhibited suggestions for action.

Awareness of endangered groups was the second best predictor of suggestions for government actions in the model. Obviously, knowledge about specific endangering conditions is related to an opinion about specific measures that can be taken by the government. A higher level of awareness of endangered groups is more likely for those having damaging past earthquake experiences, for younger people, for the better educated, and for non-Blacks.

It should be noted that a consistent pattern has emerged among the variables in the model. For the significant relationships in the regression, the background variables (with the exception of being Black and aged) correlate positively with all of the intervening variables, except fatalism. Age and being self-identified as Black correlate negatively with the intervening variables, except for fatalism where the correlation is positive.

The direction of the relationships between all of the other background variables and fatalism is exactly opposite in the direction of the relationship with the other three variables.

The final composition of both of these models indicates the importance of fatalism and the orientation variables for the development of a collective action orientation. That none of the communication variables emerged as significant in either model was quite surprising particularly since prediction knowledge was found to be clearly associated with active communication channels (see Part Four, Chapter Six).

Structural Safety Issues

Since structural safety measures were mentioned so prominently as areas of concern for the government, particularly for hazard-reduction planning, we shall take a closer look at specific structural issues which were raised at different times during our study. Our main interest in this analysis is to suggest ways in which governmental planning and preparedness can be most effective.

Building safety. Since the 1971 San Fernando earthquake, an effort has been made to produce new legislation which would remedy the hazards created by the unreinforced masonry buildings in Los Angeles. A 1973 call for a Seismic Safety Ordinance to deal with pre-1934 unreinforced masonry buildings was followed by public hearings in 1975 and 1976 as the Los Angeles City Council wrestled with the problem of building safety. By the end of 1976 the Council debated an ordinance that would require the posting of warning signs outside of unsafe buildings until they were brought up to standard. Following tumultuous public hearings, the City Council on January 25, 1977, instituted a two-year survey of buildings, declining to require upgrading or posting

of buildings during the interim. Similar proposals were explored in other county municipalities.

Public opinion was mobilized in the debate on this issue and expressed through public hearings, letters to public officials and newspapers, editorials, and through spokesman for various interest groups. There has been relatively little information, however, on views held by the public at large.

Our first set of interviews were conducted in early 1977, just as the Seismic Ordinance was coming up for a vote before the Los Angeles City Council. That this issue attained some attention in the community is well documented by responses to two of our survey questions. The largest category of earthquake endangered groups mentioned by respondents were those living in unsafe structures, especially in old or pre-1933 buildings (Chapter One). Also the single most frequently mentioned area for which the government should be planning now involved structural safety, primarily for older or unsafe buildings.

Both of the questions that elicited these findings, however, were open-ended, making it difficult to generalize to the entire population since building safety references would have come only from those to whom they were salient or known. That old buildings received so many spontaneous mentions to both open-ended questions pointed out the need to investigate this issue more fully. Building safety issues were clearly salient concerns to many of our respondents.

In the first follow-up wave of our study conducted in July-August, 1977 (six months after the household interviews which elicited the surprisingly high number of building safety mentions), a question was asked to find out what should be done about buildings that engineers thought were likely to collapse in a strong earthquake. Some of these respondents had been inter-

TABLE 6

WHAT TO DO ABOUT UNSAFE BUILDINGS

Course of Action	Percent
These buildings should all be closed down until they can be reinforced for safety.	41.4
These buildings should not be closed down, but they should be posted with signs warning people of danger in case of an earthquake.	47.2
These buildings should not be closed down or posted unless the owners want to do so.	4.3
Other (answer volunteered by respondent)--Don't close down buildings but repair them.	2.1
Other, don't know, and not answered.	5.3
Total	100.0
Total number	977

viewed previously on the subject of the earthquake threat, but not specifically on this issue, while some were interviewed for the first time. Since there were no significant differences in the answers given by the two groups, we combined them in reporting the findings.

Respondents were asked what should be done about buildings that engineers say are likely to collapse in a strong earthquake.

> Quite a few people live and work in buildings that engineers say are likely to collapse in a strong earthquake. Which <u>one</u> of the following statements do you <u>most</u> agree with?

The answers from which people chose are reproduced in Table 6. In light of the articulate and often effective resistance marshalled against even the moderate "posting" legislation proposed in the Seismic Ordinance, it is striking that a mere four percent of our sample would grant discretion to building owners. Just over two percent volunteered their own more palatable alternative--don't close down the buildings but repair them. But nearly nine out of ten people favored either posting the buildings or closing them down.

People often view a concrete situation that affects them personally quite differently from the way they view the same situation in the abstract. In order to shed more light on the paradox of unmobilized public support for action to correct unsafe structures in light of effectively mobilized opposition to defeat the Seismic ordinance, we included a more specific series of questions on old buildings in the wave of telephone interviews conducted in January, 1978. This wave consisted of three distinct samples, namely, 516 respondents who had not been interviewed previously, 461 respondents who were being reinterivewed for the first time after being included in the basic field survey a year earlier, and 390 respondents who were being reinterviewed after being interviewed for the first time in the telephone interview wave

in August, 1977. Since the three samples did not differ significantly in their answers to any of the questions included in this analysis, they were consolidated into a single sample of 1367 persons.

The first set of questions in the series was worded as follows:

> There are many <u>older</u>, multi-storied buildings in Los Angeles built before 1934. Do you think that you:
> a. Live in such a building? (Yes, No)
> b. Work in such a building? (Yes, No)
> c. Attend church in such a building? (Yes, No)
> d. Attend movies in such a building? (Yes, No)
> e. Shop or spend any large amount of time in such a building? (Yes, No)

We avoided explicit reference to earthquake hazard in phrasing these questions, assuming that many people might resist acknowledging openly that buildings they frequented or lived in were potentially hazardous in an earthquake. From the first column of figures in Table 7, we see that old and potentially unsafe movie theaters are used by the largest number of respondents and old churches least often. But even with movie theaters, only one person in seven answers positively. When all five types of buildings are considered three people out of every ten frequent at least one type of potentially hazardous building, though most of them use only one of the five types.

Two more sets of questions followed:

> Building inspectors consider that some of these older buildings would be unsafe during an earthquake. Several southern California communities are considering putting warning signs on those unsafe buildings so people will know which ones may be hazardous if an earthquake occurs. Do you think these warning signs should be posted on:
> a. Apartment buildings that are considered unsafe? (Yes, No)
> b. Buildings where people work that are considered unsafe? (Yes, No)
> c. Churches that are considered unsafe? (Yes, No)
> d. Theaters that are considered unsafe? (Yes, No)
> e. Stores that are considered unsafe? (Yes, No)
>
> Several local governments are considering passing a law requiring occupants of an unsafe building to move if the building isn't strengthened within eighteen months. Do you think the law should apply to:
> a. Apartment buildings (Yes, No)
> b. Buildings where people work? (Yes, No)
> c. Churches? (Yes, No)
> d. Theaters? (Yes, No)
> e. Stores? (Yes, No)

TABLE 7

USE AND POLICY FOR POTENTIALLY UNSAFE BUILDINGS

Buildings	Percent who use personally	Percent who favor posting warning signs	Percent who favor strengthen or vacate law
Type of building:			
Movie theaters	14.3	89.7	82.4
Shop or spend large amount of time/Stores	6.2	88.7	82.0
Buildings where people work	6.9	89.0	81.3
Churches	5.6	87.8	78.5
Live in such a building/ Apartment buildings	7.8	86.8	74.0
Number of types of buildings:			
None	70.9	8.8	15.1
One	20.1	0.9	1.8
Two	6.6	1.2	2.0
Three	2.0	1.5	2.9
Four	0.3	3.7	7.7
Five	0.1	83.9	70.5
Total	100.0	100.0	100.0
Total number	1367	1367	1367

Replies to these two questions are summarized in the two right hand columns of Table 7.

With these questions specifically addressed to the issues then before the Los Angeles City Council, the evidence of overwhelming public support for action to reduce the hazard of unsafe structures is reaffirmed. The high rate of support for posting warning signs varies little by type of building. Apartments and churches are most often exempted and movie theaters least often. Enforcement of the strengthen-or-vacate law is favored by somewhat fewer persons than the posting of warning signs, and support varies more by type of building. But the rates of support are still quite high. As before, more people make exceptions for apartments and churches and fewer people would exempt movie theaters. But even for apartment buildings, three fourths of all respondents say the law should be applied.

It is also worth noting that people are relatively polarized on these questions. Those who favor posting warning signs or applying the strengthen-or-vacate law generally favor doing so in all cases. Those who dissent tend to oppose these actions in all cases. The polarization of views may be an important clue to the strength of minority opposition to these policies, since a polarized minority is more susceptible to mobilization than a minority who differ only in degree from the majority.

Since the upgrading of structures can be costly, and people overwhelmingly favor such steps, our investigation would be incomplete if we did not ask who should pay for upgrading. The series of questions was completed by asking:

> Whose responsibility do you think it is to pay for strengthening these buildings? (Open-ended response).

Answers were recorded in great detail and so as to allow for multiple answers. But since there was little apparent rationale in the distinctions among various

levels of government and detailed types of private owners, we collapsed the replies principally into three broad categories. A slight majority of respondents placed the responsibility squarely on the shoulders of owners or occupants of buildings (Table 8). In nearly all instances the reference was to owners rather than occupants. Less than a quarter of the respondents placed the responsibility entirely on government. And 18 percent felt the responsibility should be divided between government and owners (or in a few instances, occupants). Government was held responsible for some or all of the costs of strengthening unsafe buildings by 40 percent of the respondents.

The conclusion must be that there is much less public consensus on who pays the costs of upgrading unsafe buildings than on the necessity for doing so. The majority lean toward requiring the owner to make the needed improvements. But substantial numbers want government to assume some or all of the costs. The absence of consensus on this critical question may provide another explanation for the lack of success in mobilizing the majority who favor corrective action to strengthen or vacate unsafe structures.

Since relatively few people believe they use or live in old unsafe buildings and most people favor posting signs on such buildings and requiring that they be brought up to acceptable standards of safety or vacated, an obvious question is whether people who use these buildings or live in them are more or less disposed to support such moves. We are not now speaking of ownership, which might have an especially powerful effect on how people conceive their self-interest. But users can be torn between the inconvenience of being displaced if buildings are vacated or the unsettling effect of being constantly reminded of their peril if buildings are posted and the prospect of reducing the personal risk they run by frequenting unsafe buildings. In case of churches the congregation would also have to foot the bill for

TABLE 8

WHO SHOULD PAY FOR STRENGTHENING BUILDINGS

Responsible for paying	Percent
Owners & Occupants	51.4
Owners/Occupants and Government	18.1
Government	21.9
Other	2.0
Don't Know	5.9
Not answered	0.7
Total	100.0
Total number	1367

upgrading or replacing the structure. For example, the largest group of citizens to appear at a City Council meeting during the debate over the Seismic Ordinance were people who lived in the area with the heaviest concentration of these older buildings. They and the councilman who represented their district charged that the ordinance would result in a loss of low cost housing and jobs in an area of the city which already had both of these major problems. They did not want to see the ordinance adopted.

The following steps were taken in seeking an answer to this question. First, people who say they live in old, potentially unsafe buildings were compared with those who say they do not, according to whether they favor or oppose posting unsafe apartments and requiring that the apartments be strengthened or vacated. Similar comparisons were made for the four other kinds of buildings: e.g., people who say they worship in old churches were compared with those who do not in their views of what should be done about unsafe churches. None of the resulting ten comparisons was statistically significant. People who use or live in old multi-storied structures are neither less nor more disposed to favor posting warning signs on the buildings, nor to favor requiring that unsafe buildings be upgraded or vacated.

In order to be sure that we did not overlook a small effect that aggregated into a significant total effect when people used more than one type of potentially unsafe building, a further step was taken. We looked for correlation between the number of types of unsafe buildings a person used (from none to five) and the number of types of buildings the person wanted posted with warning signs. A correlation was similarly sought between number of types of unsafe buildings used and number of types of buildings that should be subject to the strengthen-or-vacate law. Since most people favored posting all five types of buildings and favored applying the strengthen-

or-vacate law to all types of buildings, these two variables were simply dichotomized. In neither case was there a significant relationship.

A similar analysis was conducted to determine whether being a user of old, multi-storied buildings affected people's opinions about who should pay the costs of upgrading. Use of each type of building was first separately correlated with the respondent's view of who should pay. Then the number of types of unsafe buildings used (from none to five) was correlated with the view of who should pay. Again there were no significant relationships.

There appears to be a weak tendency for people who want to apply the strengthen-or-vacate law to all types of unsafe buildings to hold government responsible for paying the costs. This finding is consistent with the assumption that feeling government can or should pay the bill goes with a disposition to require actions that might otherwise be prohibitively expensive for building owners. Because the relationship only reaches the five percent confidence level, it should be viewed as suggestive rather than established.

The general conclusion to this phase of the analysis is that whether people do or do not use old, multi-storied buildings does not affect their views of whether hazard-reducing action should be legally imposed on the owners or of how the costs of strengthening unsafe buildings should be divided between owners and government. Possibly respondents did not recognize that pre-1934 multi-storied buildings are very often judged unsafe, though other evidence from the investigation makes this interpretation doubtful. Or perhaps the positive and negative incentives balance each other out. To one person the inconvenience of having to give up using a building or even contribute to the cost of strengthening it is salient, while to another person the sense of greater personal safety in case corrective action were taken is salient.

These findings probably give a more faithful account of how people feel on the broad policy issues than does the extent of mobilized opposition and support during a crisis. In principle the public looks to government officials to take decisive action to deal with earthquake hazard. The "disinterested public" favors prompt action to post unsafe structures and require owners to reinforce or vacate them within a reasonable period of time.

Dam safety. Dam safety was an issue which attracted less attention during our study than did the issue of old buildings, despite the Teton Dam failure in Idaho and the continuing controversy over construction of the Auburn Dam above Sacramento. Perhaps because of the lower amount of media coverage given to dam safety and because the coverage that was given focused largely on non-local matters (although there are more than 100 dams in Los Angeles County), there was less agreement among our respondents about what to do with dams that might be unsafe in a major earthquake.

During the January, 1978 survey, respondents were asked:

> Inspection has shown that a few of the dams in southern California might be unsafe in a major earthquake. Yet, at the same time, we need all the water we can get because of the drought. As I read the following statements, please tell me which one you most agree with.

The statements read to the respondents are reproduced in Table 9.

Only one in eight favored draining the dams immediately, though another 6.5 percent volunteered their own proposal to drain and repair the dams now. Just over a third favored the compromise proposal to lower the water level rather than drain the dams. Altogether just over half (55.3%) favored some kind of immediate action. In contrast, nearly a quarter were willing that we "take our chances on an earthquake and keep on using these dams for water storage." One seventh would put their faith in earthquake prediction and continue using the dams until a damaging earthquake is predicted.

TABLE 9

WHAT TO DO ABOUT UNSAFE DAMS

Course of action	Percent
Unsafe dams should be drained immediately to prevent the possibility of flooding.	12.4
Unsafe dams should have their water levels reduced immediately to lessen any damage that may occur.	36.4
Unsafe dams should be used for water storage until a damaging earthquake is predicted.	13.9
We should take our chance with an earthquake and keep on using these dams for water storage.	23.5
Other (answer volunteered by respondent)--Dams should be drained and repaired now.	6.5
Other, don't know, and not answered.	7.3
Total	100.0
Total number	977

It should be remembered that southern California was in the second year of a severe drought when this question was asked. We can only guess whether there would have been less resistance to draining the water from unsafe dams after the drought was broken by the heaviest sustained rainfall on record here.

Residing near known faults. In one of the few examples of collective response to earthquake safety legislation which took place in southern California during our study, residents of the city of Ventura resisted state efforts to establish an Alquist-Priolo Special Study Zone along a fault that ran through their community. (This case study will be elaborated on in Part Eight.) The establishment of such a zone would restrict certain kinds of construction within the zone and, before property located in the zone could be sold, owners would be required to disclose the potential earthquake hazards to prospective buyers. The local residents charged that such restrictions would lower their property values, believing that people would hesitate to buy the property.

Although it was out of the scope of our study to determine whether real estate in already-established Special Study Zones had depreciated in relation to property values in non-zones areas, we decided to ask our respondents in the January, 1978 survey whether they would buy a house, knowing that it was near an active fault.

> A state law was passed in 1973 requiring communities to identify areas with active earthquake faults and to notify property owners that their land and buildings are in these areas.
>
> If you found a home located in one of these areas that you wanted to buy, would you: definitely buy it anyway, probably buy it, probably not buy it, or definitely not buy it?

As seen in Table 10, over 25 percent of our respondents indicated that they would purchase a house they liked even though they knew it was near an active fault. But almost 47 percent said they would definitely not purchase a house

TABLE 10

WILLINGNESS TO PURCHASE A HOUSE NEAR AN ACTIVE FAULT

Willingness	Number	Percent
Definitely buy	28	5.6
Probably buy	97	19.6
Probably not buy	136	27.4
Definitely not buy	231	46.6
Other	4	.8
Total	496	100.0

under this condition.

Although this finding seems to confirm, in part, the fears of the Ventura residents, it does not seem consistent with the behavior of people who have purchased homes in Special Study Zones. In Los Angeles County, which has some already-established Special Study Zones, there has been no apparent slowdown in either the construction or purchase of new homes (the majority of which cost over $90,000) or the resale of older homes (which usually sell for over $100,000) located within these zones. If realtors are complying with the law by informing prospective buyers that the house lies within a Special Study Zone, this does not seem to have deterred buyers or reduced asking prices. The northern end of the San Fernando Valley, site of the 1971 quake and location of established Special Study Zones, is one of the most rapidly developing areas in the city of Los Angeles.

Perhaps one explanation for this apparent discrepancy between our survey findings and actual purchasing patterns may be found if we consider whether the respondents feel they are increasing their risk from an earthquake hazard by purchasing a home in a Special Study Zone. If people believe that they already live in close proximity to faults, the decision to buy another home near a fault may not be particularly frightening.

One of our survey questions asked respondents to determine how close they lived to an earthquake fault.

> Do you happen to know if there is an earthquake fault within one mile of this property (referring to the respondent's home)? Would you say there definitely is, there probably is, there probably is not, or there definitely is not?

By collapsing the first two categories and the last two categories, we can compare those who believe they already live near a fault (N = 99) with those who do not (N = 181). As seen in Table 11, the likelihood of purchasing a home near a fault is significantly related ($X^2 = 24.27$, 3 df, $p < .01$)

TABLE 11

RELATIONSHIP BETWEEN PRESENTLY LIVING NEAR AN EARTHQUAKE FAULT AND WILLINGNESS TO PURCHASE A HOME NEAR A FAULT

Willingness to purchase a house near a fault	Currently living near a fault		Total	
	Yes	No	Percent	Number
Definitely buy it	72.2	27.8	100.0	13
Probably buy it	51.8	48.2	100.0	56
Probably not buy it	32.9	67.1	100.0	85
Definitely not buy it	24.0	76.0	100.0	121

to whether respondents already believe they are living near faults. As the perception of living now in a fault area increases, so does the willingness to buy in a Special Study Zone.

But there were also a substantial number of respondents (N = 212) who didn't know whether they currently lived near a fault. For these people who were unsure of their proximity to a potential hazard, there was a tendency to be more resistent to the idea of purchasing a new home near a known fault; 76 percent said they probably or definitely wouldn't buy such a home.

Clearly, perceptions of current residential proximity to an earthquake fault are an important determinant of buying a home in a known Special Study Zone.

Location of public utilities. The question of where new public utility facilities should be located in California has been raised recently with respect to earthquake safety. Early in 1976 (and again in mid-1979), opponents of nuclear power plants pointed to the Diablo Canyon facility's proximity to an active offshore fault. Since the furor over nuclear plants temporarily subsided after the defeat of Proposition 15 (the so-called anti-nuclear initiative) in June, 1976, our respondents were not interviewed concerning their opinions about the nuclear plant issue.

However, by mid-1978, a controversy was developing in southern California concerning the construction of a liquid natural gas (LNG) storage facility at Point Conception, a site north of Los Angeles which some claimed was unsafe because of its proximity to active offshore earthquake faults.

In order to find out whether our respondents felt that earthquake safety was a greater priority than having an available supply of natural gas for energy consumption, we asked:

TABLE 12

OPINIONS ON WHETHER TO BUILD A LIQUID NATURAL GAS STORAGE FACILITY AT POINT CONCEPTION

Opinion on Building Storage Facility	Number	Percent
Definitely not build	290	52.7
Use until prediction is made	85	15.5
Build now	149	27.1
Other	5	.9
Don't know	21	3.8
Total	550	100.0

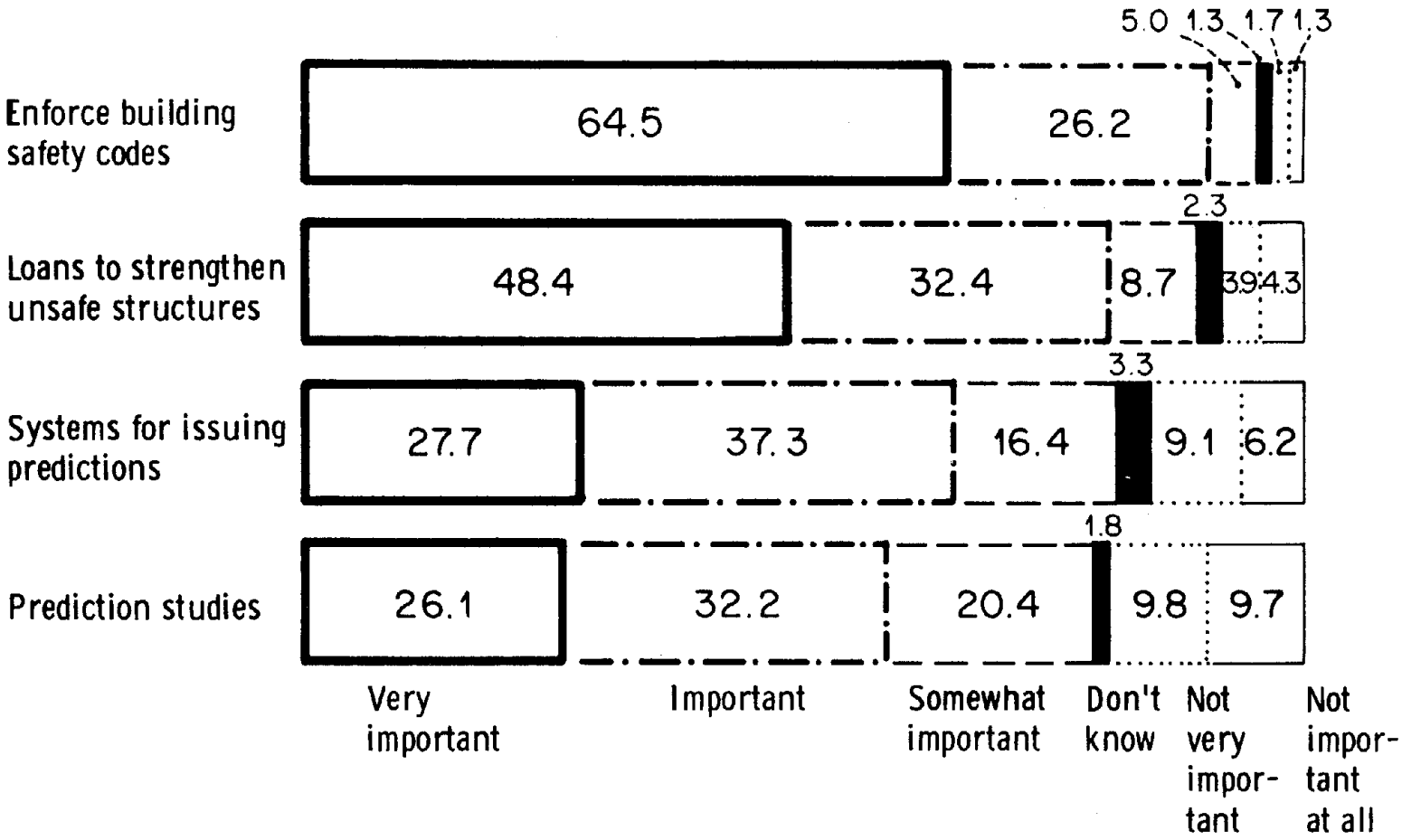
> Recently there has been some debate over whether to locate a liquid natural gas (or LNG) terminal at Point Concepcion, about 40 miles south of Santa Barbara. That site may be dangerous because of active earthquake faults nearby. Yet at the same time, California needs a continuing supply of natural gas. As I read the following statements, tell me which you most agree with: a liquid natural gas terminal should definitely not be built where the possibility of a damaging earthquake exists, a liquid natural gas terminal could be built near small faults and used until a damaging earthquake is predicted, or we should take our chances with an earthquake and use the Point Concepcion site for gas storage now.

Perhaps because of the growing concern over energy problems in the United States, responses to this question almost evenly divided our sample into those who definitely didn't want the plant built and those who did (Table 12). As with the question on dam safety, we find two substantially polarized groups--those who oppose construction near a fault (52.7 percent) and those who are willing to risk a potential disaster for an adequate supply of natural gas (27.1 percent)--and a sizeable minority group (15.5 percent) that is willing to put its faith in the ability of scientists to predict an earthquake, allowing the storage facilities to be used until a warning is issued.

Although policy makers and regulatory agencies will hear damands for increased self-sufficiency in energy matters (particularly if mid-East oil problems continue), they should also be aware that, according to these findings, there is considerable public demand for caution with respect to earthquake hazards and new utility plant construction.

Investment for Hazard Reduction

One of the difficulties in converting public support for hazard reduction activities in principle into support for specific programs is the cost of the programs. Although there seems to be public sentiment for the government to take action to reduce hazards, it could be meaningless unless people are also committed to spending money for these actions. In an effort to subject the public attitude to a more severe test, we asked a set of four questions in



IMPORTANCE OF INVESTING LARGE AMOUNTS OF MONEY

FIGURE 5

which the cost of selected hazard reduction activities was emphasized. Respondents were asked the following general questions:

> Please look at this card and tell me how important you think it is for the government to reduce the possible hazards of earthquakes by investing large amounts of money into:

The question was asked four times, with the following completions:

A. Prediction studies?
B. Enforcement of building safety codes and building repairs?
C. Establishing new systems for issuing scientific earthquake predictions?
D. Loans to rebuild or reinforce unsafe structures before an earthquake?

Respondents could choose among the answers: "Very important," "Important," "Somewhat Important," "Not Very Important," and "Not Important At All." The results are summarized in Figure 5.

The respondents answered overwhelmingly in the affirmative for all four of the specified investment areas. For each proposal, 80 percent or more said that substantial investment was at least "somewhat important." Even for the least popular item, more than a quarter of the respondents thought investing large amounts of money was very important.

In order to make a generalized assessment of favorability toward governmental investment in earthquake hazard-reduction, a composite government investment index was constructed consisting of a respondent's answer to all specific investment items. Responses to the four items were recoded in such a way that the index ranged from 1, indicating that the respondent answered "not important at all" to all four items, to 17, indicating that the respondent thought all four items were "very important" areas for investment. If a respondent had missing values on two or more of the items, that case was deleted from the computation of results; 18 respondents were deleted in this manner. If a respondent had a missing value (i.e., a "Don't know" or "No answer" designation) on only one item, that item was recoded to receive a value representing the midpoint of possible item scale values on that item;

TABLE 13

DISTRIBUTION OF INDEX SCORES CONCERNING IMPORTANCE OF GOVERNMENTAL INVESTMENT IN EARTHQUAKE HAZARD-REDUCTION

Importance	Index Score	Frequency	Percent	Cumulative Percent
Very Important	17	199	13.9	13.9
	16	128	8.9	22.8
	15	183	12.8	35.6
	14	169	11.8	47.4
	13	220	15.4	62.8
	12	130	9.1	71.9
	11	136	9.5	81.4
	10	85	5.9	87.3
	9	56	3.9	91.2
	8	41	2.9	94.1
	7	25	1.7	95.8
	6	18	1.3	97.1
	5	20	1.4	98.5
	4	7	.5	99.0
	3	5	.3	99.3
Not Important	2	1	.1	99.4
At All	1	9	.6	100.0
Total		1432*	100.0	

*Eighteen cases not included because of two or more missing values.

77 respondents received such midpoint scores. The index has relatively high internal validity (Crombach's = .7097), indicating a tendency for respondents who favor one type of expenditure to favor the others also. Table 13 gives the distribution of index scores. The index scores fall heavily toward the upper (or "very important") end of the range of values, with almost 14 percent of the respondents stating that all four preparedness areas were "very important" for investment purposes. Almost 50 percent of the respondents have scores in the top 25 percent of the index range (i.e., above 14), and 90 percent of the respondents had scores above the midpoint of the index range (i.e., about 9).

This widespread belief that pre-earthquake hazard-reduction planning constitutes an important area for investment is surprising when compared with pronouncements by most disaster planning agency spokespersons, who maintain that the only time the public is interested in doing anything about disaster or hazard-reduction planning is right after an area has experienced a major catastrophe. This perceived lack of public interest in planning is frequently cited by government agencies responsible for public welfare and safety as the reason they are unable to marshall sufficient local backing to initiate or carry out the more costly hazard-reduction preparations needed. Frequently we have been told that the effects of the San Fernando quake are too far in the past and have been largely forgotten by the general public, who are not worried about preparing for the next quake. This agency perception of an apathetic public may have to be modified in light of our finding that there is a general public sentiment to invest in hazard-reduction preparation now.

A closer look at Figure 5 indicates that we may have tapped two qualitatively different areas of hazard-reduction planning. Investment in areas of structural safety were considered particularly important by the respondents,

with 64.5 percent and 48.4 percent, respectively, giving evaluations of "very important;" while investment in prediction studies and earthquake warning systems received fewer "very important" replies, 27.7 percent and 26.1 percent, respectively.

In order to analyze these two dimensions separately, the composite government investment index was broken down into two separate indices--a structural improvement index and a prediction and warning system index. The items were recoded so that each index ranged from 1, indicating that both component items were considered "not important at all," to 9, indicating that both were considered "very important" areas for governmental investment. If any index item was coded "Don't Know" or "No Answer," the respondent was deleted from the computations for that index; no recoding to midpoint values was done. Ninety-five cases were deleted from both indexes in this manner. Table 14 presents the distribution of both of these indices.

Over 40 percent of our sample gave both of the structural improvement items "very important" designations (scores of 9), while less than 20 percent did so for the two prediction warning systems. Two-thirds of the respondents received scores of 8 or 9 on the structural improvement index, compared to only one-third who did so on the prediction studies scale.

Because so few people felt that expenditures for structural improvement were unimportant, it hardly seemed profitable to search for correlates of this index. But the greater dispersion of views concerning prediction studies and prediction warning systems made it practical to examine the correlates of this index. Clusters of background and intervening variables, similar to those in the suggestions for government action model, were entered into the regression. Since the dependent variable, the score on the prediction and warning system index, was thought to be heavily influenced by beliefs

TABLE 14

INDICES ON TWO DIMENSIONS OF GOVERNMENT INVESTMENT:
PREDICTIONS STUDIES AND STRUCTURAL IMPROVEMENT

Index Scores		Prediction Studies			Structural Improvement		
		Number	Percent	Cumul. Percent	Number	Percent	Cumul. Percent
Not Important At All	1	54	4.0	100.0	11	.8	100.0
	2	35	2.6	96.0	3	.2	99.2
	3	67	4.9	93.4	16	1.2	99.0
	4	98	7.2	88.5	33	2.4	97.8
	5	175	12.9	81.3	63	4.7	95.4
	6	172	12.7	68.4	80	5.9	90.7
	7	313	23.1	55.7	260	19.2	84.8
	8	192	14.1	32.6	304	22.4	65.6
Very Important	9	249	18.4	18.4	585	43.2	43.2
Total		1355*	100.0		1355	100.0	

*95 cases are deleted because they were missing one or more evaluate responses.

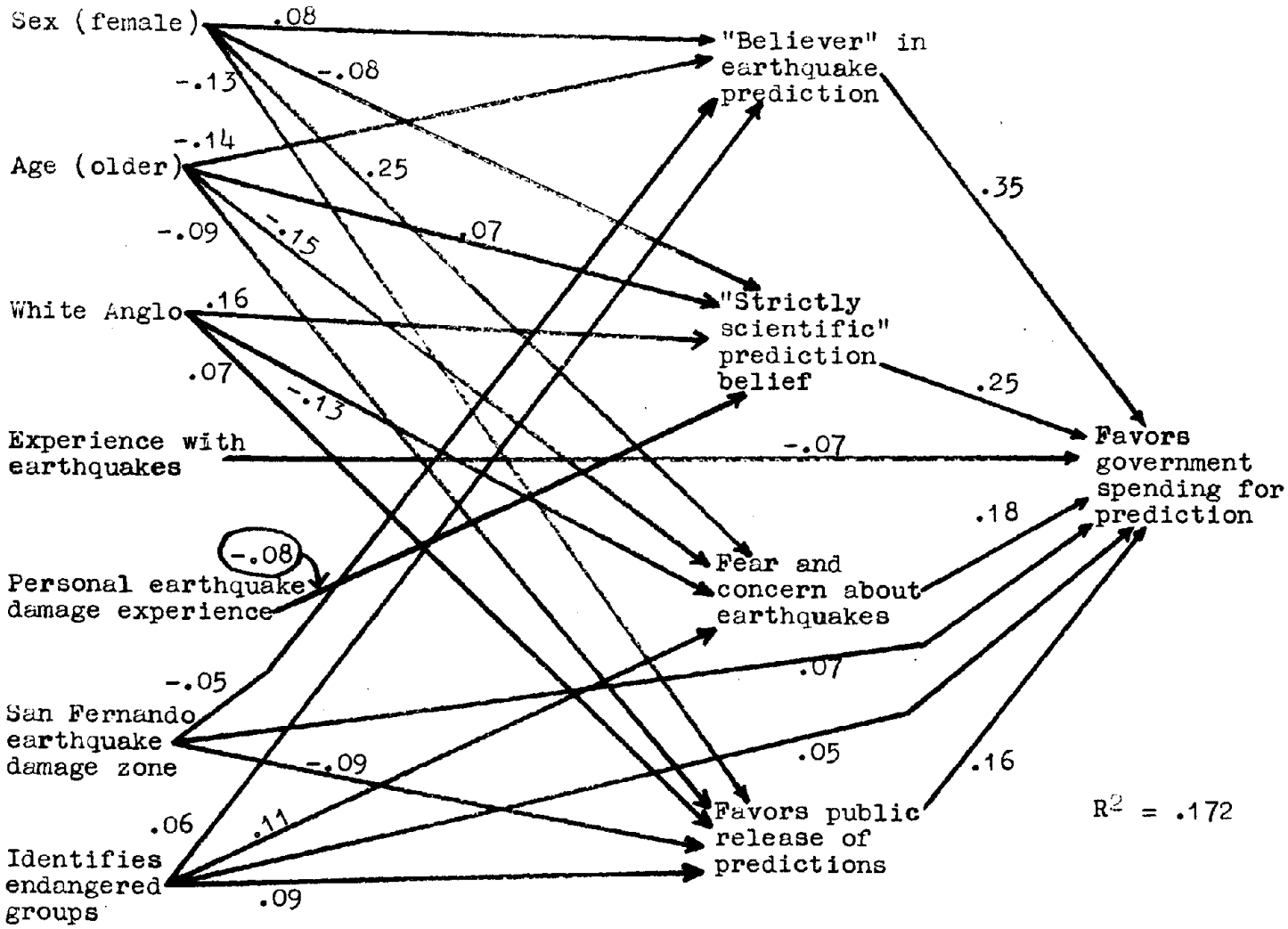
about and attitudes toward prediction and science, it was hypothesized that the orientation variables would be quite important in this model.

The final model (Figure 6) was moderately successful in explaining the overall variance (R^2 = .172). As anticipated, the orientation variables were important; and, again, none of the communication variables was retained because of non-significant relationships with the dependent variable.

Two variables indicating a belief in types of predictors were very important in explaining support for governmental financing of prediction studies and warning systems. Both those who believed in the ability of scientists only and those who accepted the credibility of both scientific and nonscientific prediction supported this type of investment. The <u>believers</u> in both scientific and nonscientific prediction were even more likely to support investment, belying the widespread belief that only the well-educated or those with a scientific background would be the chief supporters of this type of research.

Different profiles of these prediction believers emerged from the model. Those who believed only in scientific prediction were more likely to be male, Anglo, older, and to have experienced less (or no) damage or injury from previous earthquakes--the stereotype of the personally uninvolved yet academically interested observer of the scientific process. Those who are more eclectic and accepting of both science and nonscience are more likely to be female, younger, not living in the area damaged by the San Fernando quake, and aware of more groups that would be endangered in the event a damaging earthquake struck.

Those who favor the early release of predictions, even for low probability events, are also likely to favor governmental investment in prediction research. Those who favor this early release are likely to be male, Anglo, younger, not reside in the San Fernando quake's damage area, and be aware of more endangered groups.



MODEL FOR ADVOCACY OF GOVERNMENT SPENDING
FOR EARTHQUAKE PREDICTION AND WARNING SYSTEMS

Figure 6

These three intervening orientation variables are all indicators of a positive attitude toward government investment in prediction studies. Since the three have quite different profiles of the types of people who would have this outlook, we could anticipate that a broad and quite diversified base of supporters exists for funding prediction research.

One very interesting finding in the model pertains to the effect of fear on the support for investment. High scores on the fear of earthquake index were positively related to wanting to see large amounts of money spent on prediction research. Some researchers have hypothesized that high levels of fear would result in a denial of threat or a refusal to acknowledge the need to take action. For our dependent variable, however, a higher level of fear was positively related to support for taking further action. Those who are likely to acknowledge having a higher degree of fear are women, non-whites, younger people, and those who are aware of endangered others. Again, there appears to be a broad base from which support for prediction funding can be drawn.

Priority of Investment

One question frequently asked by those concerned about public support for earthquake preparedness planning is the relative importance of earthquake expenditures compared with other areas which vie for government financing. Although residents of southern California may believe that too little is spent on earthquake planning, they may be unwilling to see other programs and services cut to provide this additional funding. In order to determine what ranking earthquake preparedness had with respect to other funding alternatives, the survey in November and December of 1978 included a question to ascertain expenditure priorities.

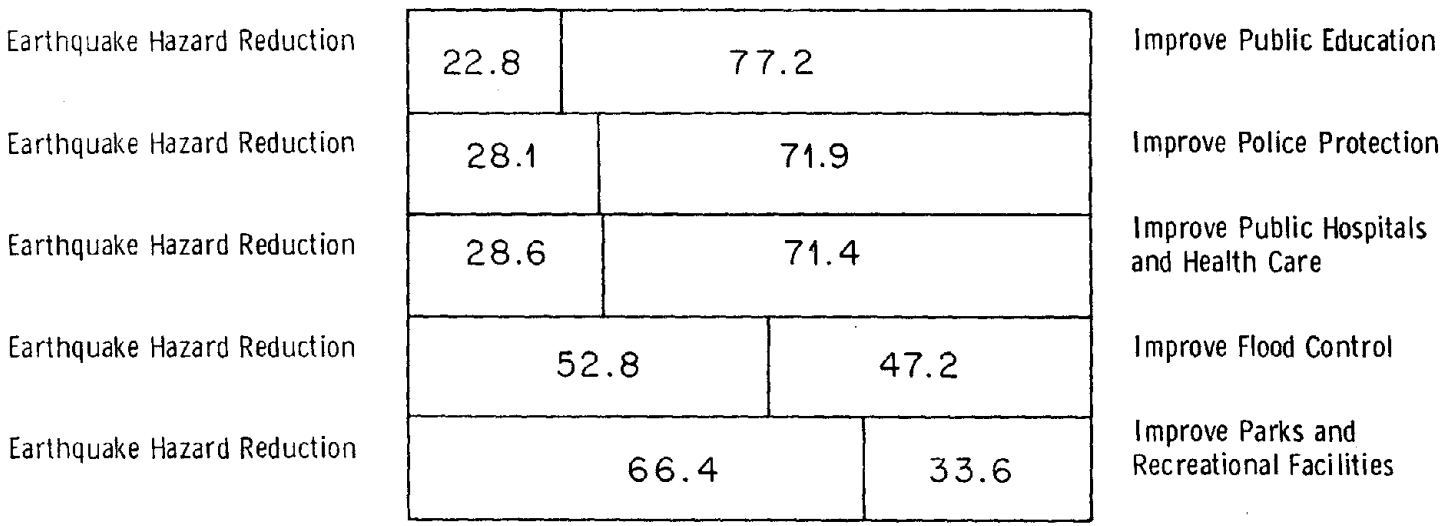

Earthquake Hazard Reduction
22.8
77.2
Improve Public Education
Earthquake Hazard Reduction
28.1
71.9
Improve Police Protection
Earthquake Hazard Reduction
28.6
71.4
Improve Public Hospitals and Health Care
Earthquake Hazard Reduction
52.8
47.2
Improve Flood Control
Earthquake Hazard Reduction
66.4
33.6
Improve Parks and Recreational Facilities
PRIORITIES FOR SPENDING GOVERNMENT SURPLUS

FIGURE 7

Suppose local government officials had additional funds to spend on some important project. Would you rather see the additional money spent on:

A. Improving earthquake preparedness or on improving flood control?
B. Increasing earthquake preparedness or on expanding park and recreational facilities?
C. On better earthquake preparedness or on better police protection?
D. On improving earthquake preparedness or on improving public education?
E. On better earthquake preparedness or on better public hospital facilities?

As demonstrated in Figure 7, funding for earthquake preparedness is a strongly favored alternative in comparison to funding for parks and recreation and is only slightly favored over flood control. But earthquake preparedness is ranked far below expenditures for improving police and hospital services and especially for better public education.

How is a general concern for financing earthquake preparedness related to the ranking of earthquake priority areas for funding? Is there a segment of the population that would support increased funding; and, if so, how substantial is this group?

In order to investigate this question, an earthquake priority index was constructed by summing the number of times a respondent selected earthquake preparedness as the area which should receive additional funding. Table 15 presents the distribution of scores on this index. Although 18 percent ranked earthquake preparedness as less important than any other alternative, almost 28 percent ranked it as more deserving of funding than three or more of the alternatives.

When relationships between this index and the other indices on earthquake funding are compared, we find a high degree of association. The relationship between the composite government investment index (discussed above) and the earthquake priority index is moderately strong (gamma = .258) and significant (tau = .203, $p < .001$), indicating that those who believe it is important to spend large amounts of money on structural improvements for buildings

TABLE 15

EARTHQUAKE PRIORITY INDEX

Number of choices favoring earthquake preparedness	Number	Percent
None	102	18.6
One	131	23.8
Two	165	30.0
Three	80	14.6
Four	49	8.9
Five (all choices)	23	4.1
Total	550	100.0

and on developing prediction and warning systems also more frequently designate earthquake preparedness as a priority area for additional funding. Similarly, there is a moderately strong (gamma = .307) and significant (tau = .202, $p < .001$) relationship between the adequacy of the amount of money spent on earthquake preparedness in general (discussed above in relation to Proposition 13) and the priority index score, indicating that those who think too little is being spent are likely to mention earthquake preparedness as a priority area for funding more often.

What else can we say about the people who ascribe high priority to earthquake preparedness? Analysis of some of our intervening awareness variables showed that two were particularly well correlated with the earthquake priority index. First, the greater the number of predictions the respondent heard and took seriously, the more likely the respondent was to have a higher score on the priority index (gamma = .204; tau = .134, $p < .001$). Second, the more convinced the respondent was that a damaging earthquake would occur in southern California within the next year, the higher the score on the priority index (gamma = .104; tau = .071, $p < .01$) was likely to be.

In both instances, it is the respondent's perception that the community, though not necessarily the respondent personally, is threatened in the near future by an earthquake that was associated with a higher degree of priority being given to earthquake preparedness funding. None of the variables that measured personal endangerment was related significantly to the priority index. This finding may indicate a "cosmopolitan" effect for earthquake planning and financing. Individuals who see the greater Los Angeles area as their "community" may give priority to additional funding for preparedness if they believe that the threat to the larger community is high.

Evaluation of Official Handling of Earthquake Preparedness

We have established that there is widespread public support for government action, that most people have some ideas about what government should be doing, that there is an understanding of the need for hazard reduction as well as emergency response planning, and that people are willing to have government funds spent for hazard reduction. But are they satisfied with what their government officials have done already?

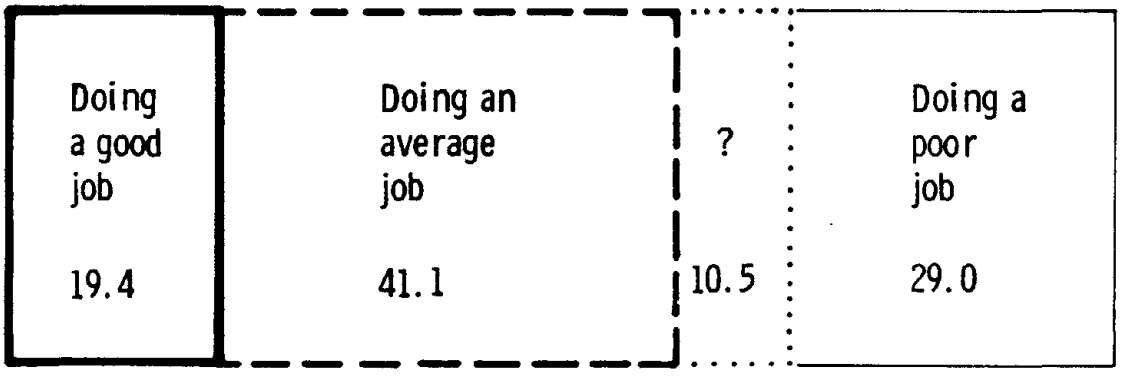
Respondents were asked the following question:

> In dealing with earthquake preparedness problems, would you say public officials are doing a: Good job, Average, or a Poor job?

As indicated in Figure 8, the largest number accepted the noncommital answer, "doing an average job." A sizable ten percent were unable to answer. But of the nearly 50 percent who took a stand, a considerably larger number said that officials were doing a poor job than said they were doing a good job. Only one in five of the total sample was willing to state that public officials are doing a good job.

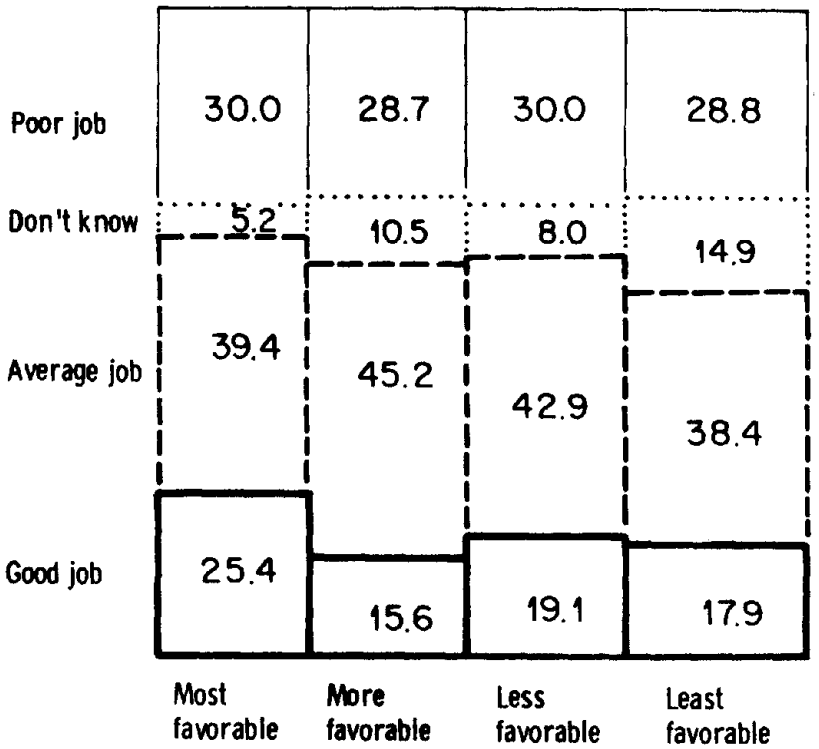
This finding should be viewed in connection with the finding in Part Four, Chapter Five, that more than four of every five respondents would like to hear more about what public officials are doing to prepare for an earthquake. Although we could not explore the grounds for public dissatisfaction with government preparations, it is plausible that the negative judgment reflects a sense that too little is being done.

Some help in understanding this finding could come from observing the kinds of people who make positive and negative evaluations. A finding that those who are strongest in supporting government activity are least favorable in their evaluations of official accomplishments would lend credence to the interpretation that government officials appear to be doing too little.



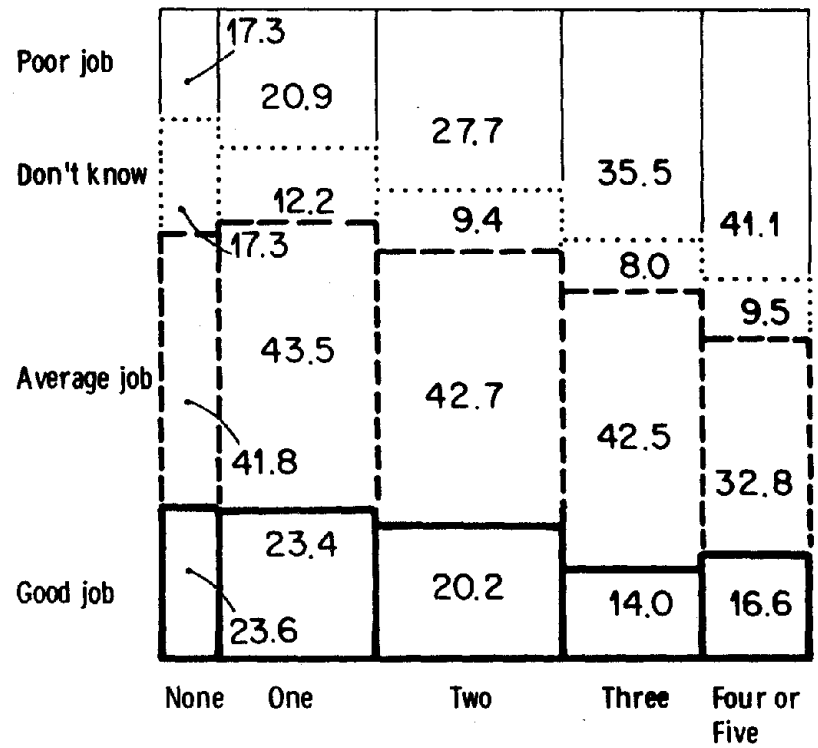
HOW ARE PUBLIC OFFICIALS DEALING WITH EARTHQUAKE PREPAREDNESS ?

FIGURE 8



EVALUATION OF GOVERNMENT EARTHQUAKE PREPAREDNESS
BY ATTITUDE TOWARD GOVERNMENT SPENDING
FOR HAZARD REDUCTION

FIGURE 9



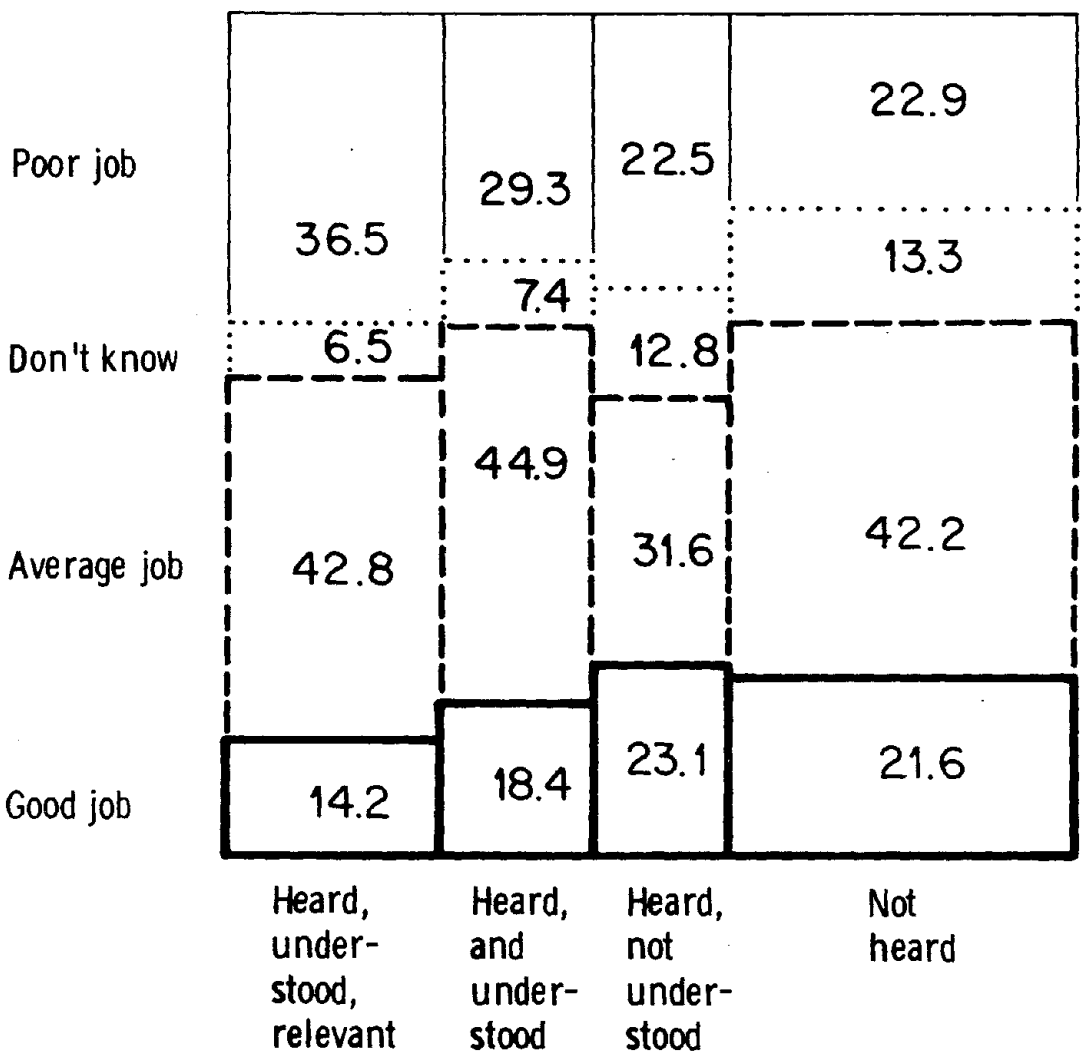
EVALUATION OF GOVERNMENT EARTHQUAKE PREPAREDNESS
BY NUMBERS OF SUGGESTIONS FOR GOVERNMENT ACTION

FIGURE 10

A finding that respondents who are most aware of the earthquake threat and have most ideas on what government should be doing make the least favorable evaluations of official progress would lend significance to the public uneasiness.

Figure 10 shows a weak tendency for people with fewer ideas about what should be done to have more favorable views of what government is doing, while Figure 9 shows little if any relationship between attitudes toward spending for hazard reduction and evaluation of government action. Compared with people who have no ideas, twice as many of the people who have three or more ideas for government action say that public officials are doing a poor job in dealing with earthquake preparedness problems. This finding could mean that people who believe it is important to do something about the earthquake danger are dissatisfied with apparent government inaction. If the interpretation were correct we should expect an equally clear relationship between attitude toward government spending and evaluation of government action. Since there is not a consistent relationship between attitude toward government spending and evaluation of government, this interpretation is not very plausible.

Instead, the underlying relationship is probably between knowledge or awareness of earthquake hazard and unfavorable evaluation. Figure 11 does indeed show that people who understand and appreciate the relevance of the southern California Uplift have a poorer opinion of the accomplishments of public officials than people with less appreciation of the Uplift. This finding, coupled with the finding on number of suggestions for government action, suggests that it is not so much a blind demand to do something (or spend money) that leads to dissatisfaction with government progress. Rather, it is an awareness and appreciation of the earthquake hazard as reflected in understanding the significance of the Uplift and having thought about what might be done that leads to disappointment with government progress in dealing



EVALUATION OF GOVERNMENT EARTHQUAKE PREPAREDNESS BY AWARENESS OF THE UPLIFT

FIGURE 11

with the earthquake hazard.

Since the more alert and informed citizens have the least favorable view of government progress, there is reason to be concerned about the generally lukewarm appraisal of official action for earthquake preparedness. We cannot be sure that the same attitudes prevail at the present time. For example, some of the more informed citizens may have been reassured by delivery of the Task Force Report on Earthquake Prediction to the Mayor of Los Angeles. But his report is more a promise than a plan, and other public actions are equally lacking in dramatic impact. The status of government response in relation to popular expectations should be a matter of continuing concern.

Although this evaluation of the government's handling of earthquake planning is not especially positive, it should be put into perspective. One way of doing this was to find out how respondents evaluated preparedness efforts taken by themselves and the rest of the community, as well as by officials and agencies. To investigate these comparative evaluations, respondents, in the early 1978 survey, were asked:

> How well prepared do you feel you are to deal with a future damaging earthquake? Are you very well prepared, somewhat prepared, fairly unprepared, or totally unprepared?

Two similarly-worded questions were also asked about the preparedness of the general public and public officials and government agencies.

Table 16 shows that while respondents feel they are better prepared than the general public (43.5 percent believe they are at least somewhat prepared but only 17.9 percent accord a comparable level of preparedness to the general public), an even larger percent believe that the government is better prepared. This difference in perception of preparedness among the three categories is statistically significant ($X^2 = 543.99$, 8df, $p < .001$). Two out of five people still think that the government is not especially well

TABLE 16

PERCEPTIONS OF PREPAREDNESS: SELF, PUBLIC AND GOVERNMENT

Degree of Preparedness	Percentage		
	Public	Self	Officials&Agencies
Very well prepared	0.5	6.6	9.7
Somewhat prepared	17.4	36.9	46.0
Fairly unprepared	45.7	28.5	26.3
Totally unprepared	34.1	27.6	13.4
Don't know or no answer	2.3	.4	4.6
Total	100.0	100.0	100.0
Total number	1367	1367	1367

prepared. But compared to the "general public," three times as many respondents think government officials and agencies are either somewhat or well prepared. And the respondents rate government preparedness above their own. With this perspective in mind--that the government is perceived to be better prepared than are individuals and their households--let us turn to an examination of the specific preparedness measures individuals have taken.

CHAPTER THREE

WHAT HAVE PEOPLE DONE FOR THEMSELVES?

Many people are willing or even anxious to see public action taken to reduce earthquake hazards. But what have they done for themselves? Has the concern that was expressed through support for government action led people to do what they could to protect themselves and their families?

As a basis for answering this question we prepared a check list of suggestions that are frequently made to individuals and householders. The list is not exhaustive. It had to be kept to manageable length, and it had to be limited to steps that could be communicated easily in the interview. But the list of sixteen measures is diversified and representative enough to indicate the extent of personal preparation reliably. In addition, people were given opportunities to name other supplies that they had on hand for the possible emergency and to mention any other preparations they had made that were not on the list of sixteen. The number of respondents who had anything to add was quite small and the steps were varied, so these replies have been disregarded in the ensuing analysis.

Even with a check list there is no simple way to classify people as prepared or unprepared for an earthquake. One difficulty is that most of the suggested measures for earthquake preparedness are steps that people often take for other reasons. The normally resourceful and prudent person would probably have a battery-operated radio and a flashlight in working condition, regardless of the earthquake threat. We have tried to deal with this problem by asking people whether each suggested action was taken because of a future

earthquake or for other reasons. Even this solution is not altogether satisfactory, since people often cannot discriminate precisely among the reasons for a given action. Furthermore, we have evidence to suggest that the phrase "because of a future earthquake" was sometimes interpreted too narrowly. The amount of action stimulated by the earthquake threat may have been underestimated a little in our data.

Another difficulty with assessing preparation for an earthquake is the respondent's desire to appear admirable in the interviewer's eyes. Respondents may claim to have made preparations that they have not actually made. It is principally the responsibility of the interviewer to counter this tendency by the relationship he or she established with the respondent. But we also employed one device to make it easier for respondents to admit they had not taken particular steps. Besides telling us what steps they had taken, respondents were invited to tell us what steps they planned to take. We do not accept literally the respondents' declarations of measures they plan to take. But we felt it would sometimes be easier for respondents to admit the many preparations they had not taken if they were given the opportunity to say at the same time that they still planned to take them.

The list of answers was printed on a card that the interviewer handed to the respondent. The actual working of the leading question was as follows:

> I am going to read you a list of preparation suggestions that have been made by various agencies and groups that are concerned with earthquake preparedness. (HAND CARD) As I read each of the following, please tell me if you <u>have done</u> any of these things either because of a future earthquake or for some other reasons, whether you plan to do any of these things because of a future earthquake or for some other reasons, or whether you <u>don't plan to do any of these</u>.

As a general observation, most of the people readily admitted not having taken most of the suggested steps. Whatever ingratiation effect there was could not have been overly distorting.

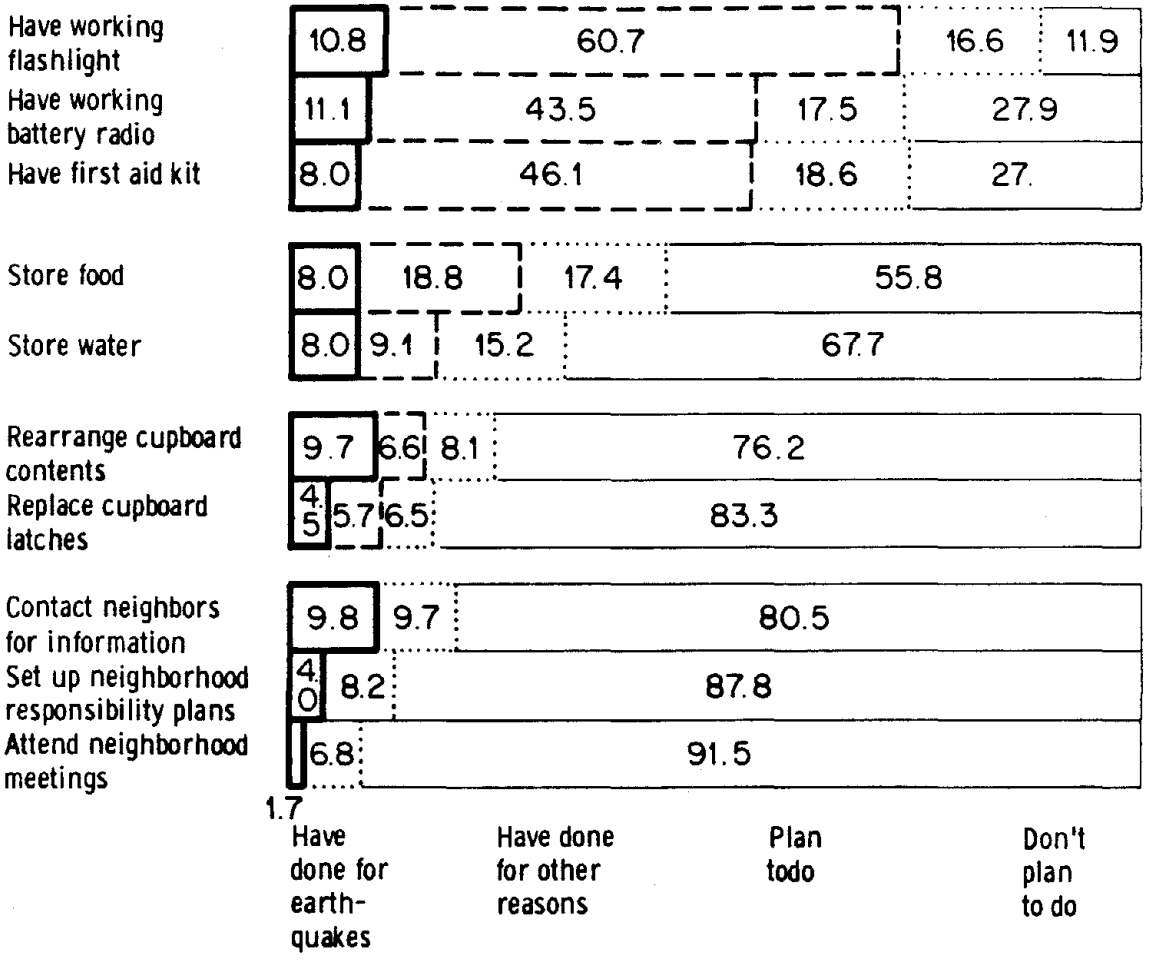
We look first at ten basic steps that anyone could have taken, regardless of family status and home ownership. The items have been grouped into closely related clusters, as verified by the statistical procedure of factor analysis (Figure 1).

The majority of the people say that they have working flashlights, battery-operated radios, and first aid kits. Most people have these items irrespective of the earthquake threat, though about one person in ten attributes possession of these items to the prospect of an earthquake. Although the majority have made these simple preparations, more than a quarter of the people would be without emergency light and 45 percent would have no way to follow emergency broadcasts in case electric service were disrupted in an earthquake. Similarly, 46 percent would be without first aid supplies.

Since water supply and the local distribution of food items are likely to be interrupted in a severe earthquake, people are often encouraged to maintain emergency supplies of water and canned and dehydrated food. Many fewer people have taken these two steps. But if they have done so, the prospect of an earthquake is more likely to have been the reason. An uninterrupted water supply seems to be taken more generally for granted than continued food distribution. Twice as many people have stored food in anticipation of an earthquake as have stored water.

The danger of objects falling from shelves and breaking or injuring people below is of concern in an earthquake. The frequent suggestions to rearrange the contents of cupboards so as to minimize the risk of breakage, and to install or replace secure latches on cupboard doors have been even less widely followed than the suggestions to store food and water.

Finally, neighborhood cooperation has been proposed as an aid to individual families in preparing for an earthquake. The simple step of soliciting



PERSONAL EARTHQUAKE PREPARATIONS

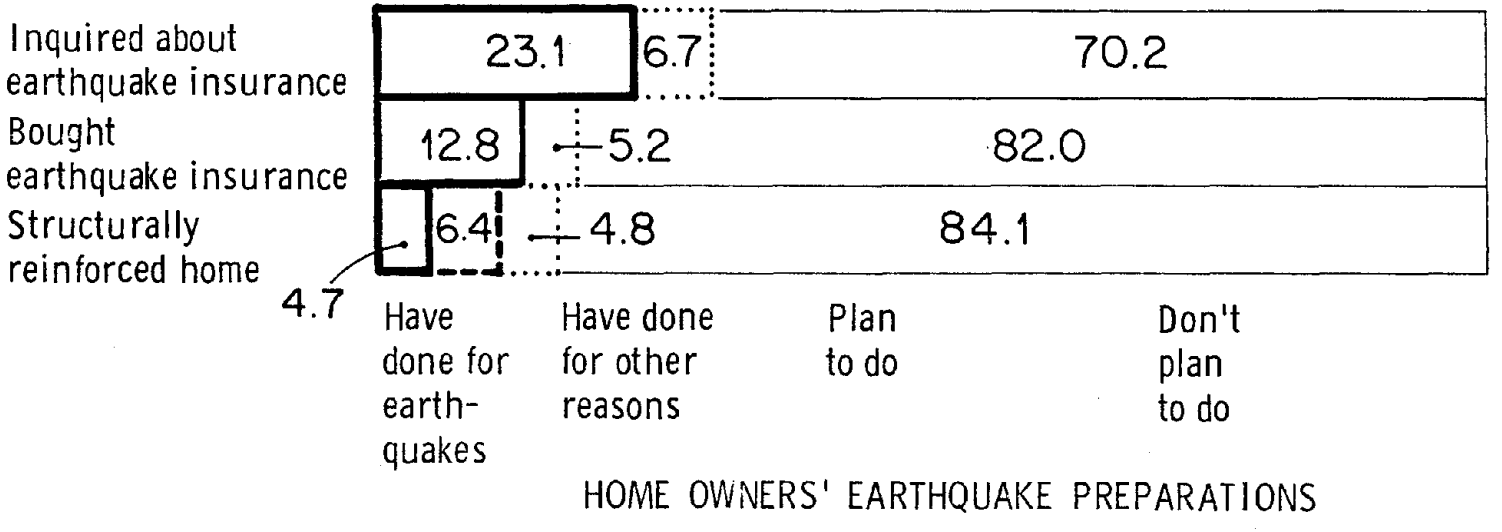
FIGURE 1

information and ideas from neighbors and friends is acknowledged by less than one in ten of our respondents. Only one in twenty-five has participated in setting up neighborhood responsibility plans for children, the elderly, and others who require special care. And only one person in fifty-nine has attended a neighborhood or block meeting about earthquakes.

From this review we are forced to conclude that most households are unprepared for an earthquake, and that the prospect of an earthquake has stimulated relatively little preparatory action.

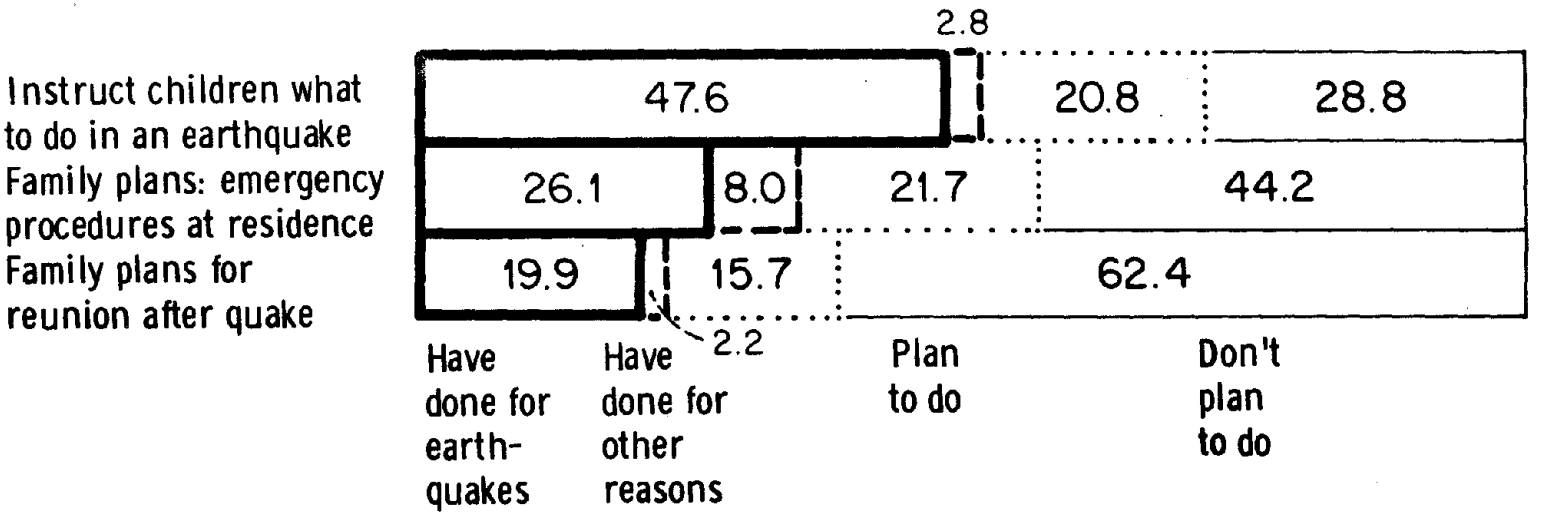
Three more items on the list presented to respondents applied primarily to homeowner-occupied dwellings rather than rented homes. Out of our total sample, 689 (47.5 percent) lived in owner-occupied households. In just under a quarter of these households inquiries have been made about earthquake insurance (Figure 2). Only about half of these inquiries led to the purchase of earthquake insurance. The figure, 12.8 percent, probably exaggerates the number of homes covered by earthquake insurance. Respondents in some instances may not have known what householder's insurance coverage was in effect, and may not have distinguished between earthquake and other forms of insurance. A few people said that their homes had been structurally reinforced in some way for earthquake reasons.

Since the ratio of benefit to cost for earthquake insurance is different for different homes and different locations, and since many buildings do not require structural reinforcement, the failure to take these two steps does not necessarily mean that the homeowner is unprepared or lacking in forethought. On the other hand, without at least making inquiries about earthquake insurance, the householder could hardly weigh the possible benefits against the costs so as to make an intelligent decision to purchase or not to purchase insurance. In three out of every four households, so far as the respondent knew, these



HOME OWNERS' EARTHQUAKE PREPARATIONS

FIGURE 2



EARTHQUAKE PREPARATIONS FOR HOUSEHOLDS WITH CHILDREN

FIGURE 3

inquiries had not been made.

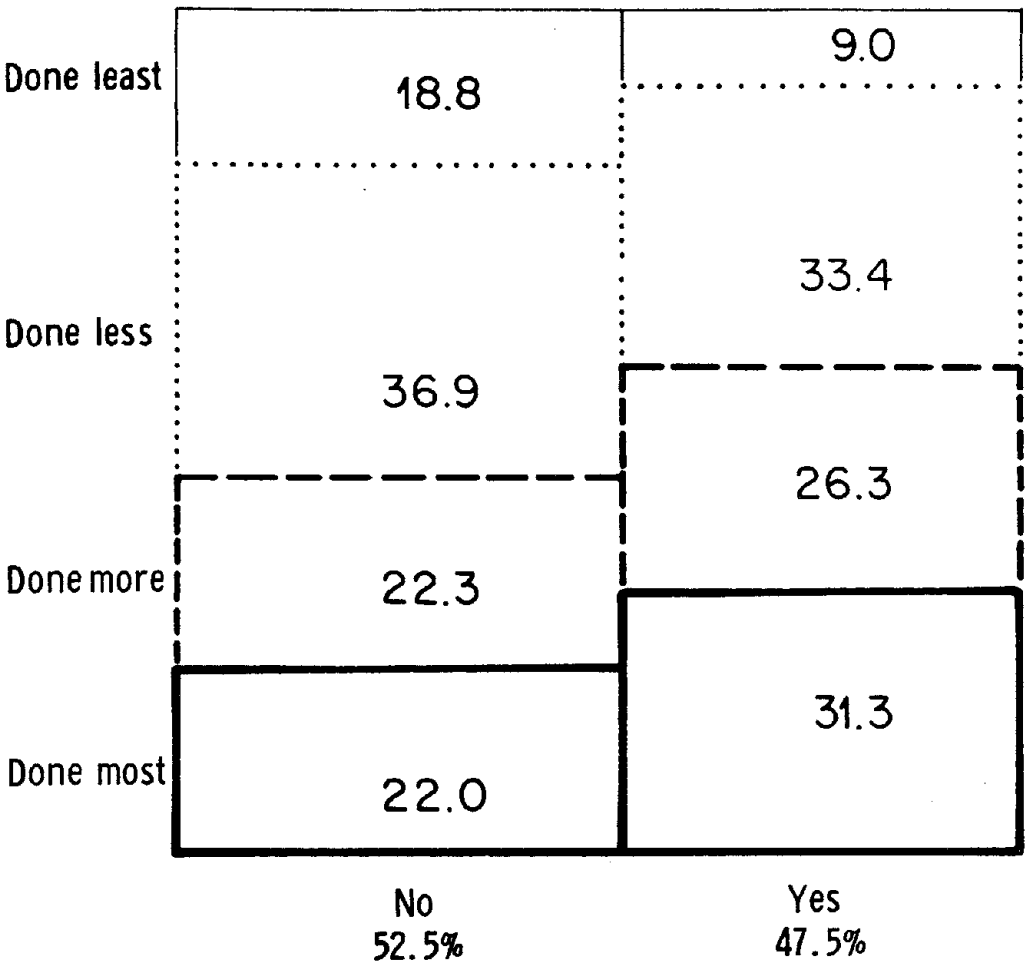
A final three items were especially applicable to households in which there were children. We do not count all families with children--only those in which one or more children were living at home at the time of the interview. Six hundred (41.4 percent) of the households had minor children living at home. Three steps have been widely recommended for parents in such households. In Figure 3 we find the first substantial indication of precautions taken specifically in preparation for an earthquake. Nearly half of the 600 respondents report that they have instructed the children in what to do in case of an earthquake. More than a quarter have developed family plans to be followed in an emergency, such as shutting off gas, etc. And about one family in five has some plan for getting the family members together again after an earthquake. Compared to the general disregard of most other earthquake preparations, this evidence of families with children planning to maintain the supportive family unit in an emergency is encouraging. Nevertheless, these minimal parental responsibilities for the welfare of children have still been ignored in a large share of homes.

The household containing children and the owner-occupied household have responsibilities in preparing for earthquake disaster that are not applicable to other households. It is possible that people in these households may also take more seriously the complete range of personal preparedness measures. In Table 1, we list the ten personal preparedness items discussed earlier. Completion rates for each measure are reported so as to compare owner-occupied households with all other households, and households containing minor children with childless households. We record the percent who have acted, whether they did so because of a coming earthquake or for some other reason.

TABLE 1

EFFECT OF OWNER-OCCUPANCY AND MINOR CHILDREN IN HOUSEHOLD ON PERSONAL EARTHQUAKE PREPAREDNESS MEASURES TAKEN

	Percent who have taken action for any reason			
Preparedness measure	Owner-occupied households	all others	One or more child(ren) in household	all others
Have working flashlight	81.0	63.2	71.0	72.1
Have working battery radio	62.6	47.5	54.6	54.7
Have first aid kit	60.1	48.7	56.3	52.6
Store food	29.5	24.4	27.8	26.2
Store water	19.2	15.3	18.4	16.3
Rearrange cupboard contents	17.3	14.2	16.7	15.0
Replace cupboard latches	14.2	6.4	10.9	9.6
Contact neighbors for information	10.0	9.7	10.7	9.3
Set up neighborhood responsibility plans	4.8	3.2	6.5	2.1
Attend neighborhood meetings	2.6	0.9	2.2	1.4



EARTHQUAKE PREPAREDNESS BY
WHETHER HOME IS OWNED BY MEMBER OF HOUSEHOLD

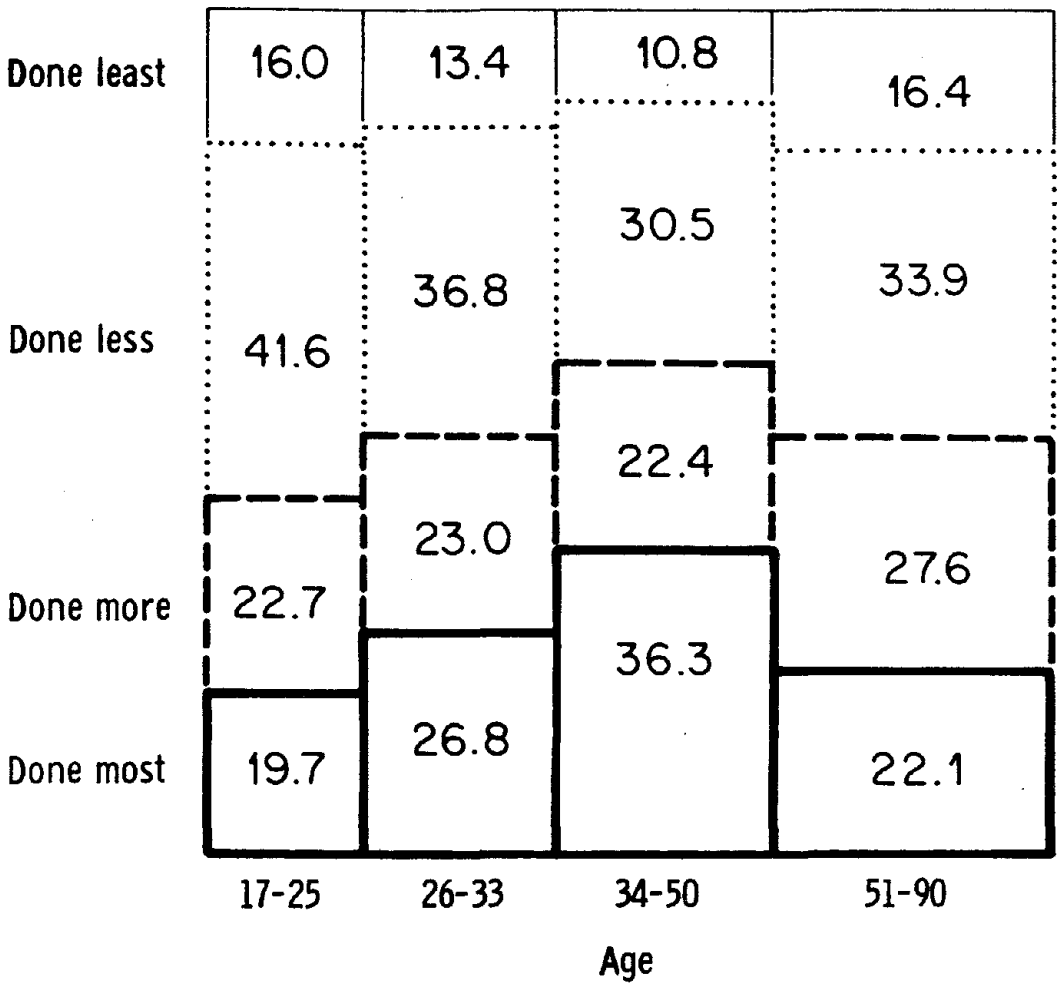
FIGURE 4

Both households with children and owner-occupied households have slightly higher rates of preparedness than other households. However, the effect of owner occupancy is stronger and more consistent than the effect of having children in the home (Figure 4). Owner occupancy makes an especially noticeable difference in possession of the household emergency staples--flashlight, battery-operated radio, and first-aid kit--while having children makes little or no difference.

Who is Prepared?

The general evidence of unpreparedness signals important work to be done--at least in the event of a true earthquake prediction and warning. In attempting to correct the underpreparedness it should be helpful to know which segments of the public are more and less well prepared. We have already seen that having minor children in the home makes little difference in the level of preparedness, while owner-occupied households are noticeably better prepared than rental households. In order to simplify comparisons of preparedness we have computed an individual preparedness index. The index simply states the number of measures taken (whether for earthquake or other reasons) as a proportion of the measures that could be taken. The latter number is different for owner-occupied, adult-child, and other households. The resulting index scores were then simplified so as to identify four sets of respondents, from the most prepared to the least prepared.

Effects of individual and household characteristics. Since most of the measures apply to the household rather than to the individual, it is not surprising that men and women do not differ in preparedness. There is a relationship between age and preparedness (Figure 5), but it is not so simple as the relationship between age and awareness of the Uplift. Preparedness does increase fairly decisively with age until we reach people above fifty. For this oldest group there is a substantial drop in preparedness below the level of both 34 to



EARTHQUAKE PREPAREDNESS BY AGE

FIGURE 5

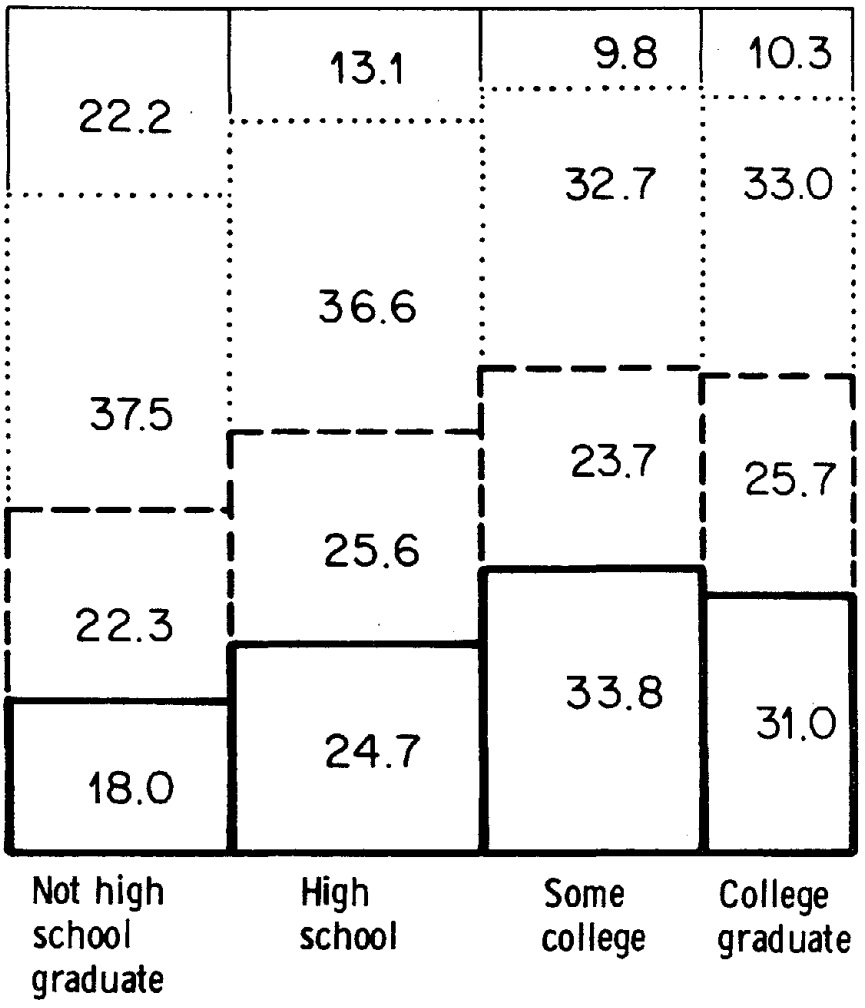
50 years and 26 to 33 years. Although the elderly are the most likely to appreciate the meaning and relevance of the Uplift, they are less well prepared for an earthquake than all but the youngest group.

Awareness increases consistently with educational attainment, but a similar relationship for preparedness does not extend to college graduates (Figure 6). As with age, a decisively upward trend stops short of the highest category. College graduates are no better prepared--and possibly even a little less well prepared--than people who attended college without graduating from a four-year institution.

The relationship between children in the home and preparedness is presented again, this time in graph form using the index (Figure 7). In addition, we present the slightly different graph comparing households with and without school-aged children. Limiting our consideration to school-aged children augments the effect of children in the home on preparedness, in contrast to the opposite relationship to awareness of the Uplift.

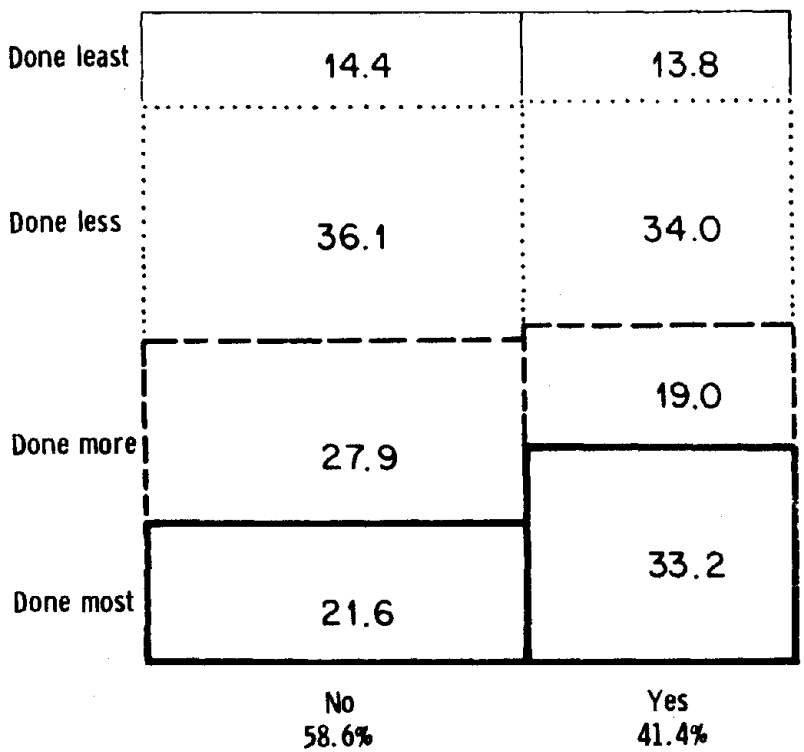
Preparedness and awareness of the Uplift are consistently related to community attachment, increasing as attachment increases (Figure 8). The same is true for family income (Figure 9). Whites are better prepared than Blacks or Mexican Americans, though persons of "other" ethnicity are even better prepared than Blacks and Mexican Americans (Figure 10).

Effects of past experience. Someone who has experienced a disaster in the past should be more ready for the next emergency than someone with little or no past experience upon which to rely. To look at the effects of past experience on preparedness, three indices were correlated with the individual preparedness index. First, we wanted to determine whether past experiences with other natural disaster agents besides earthquake augmented earthquake preparedness. We found that this relationship was moderately strong (gamma = .295) and significant ($p < .001$ for tau = .177), indicating that exper-

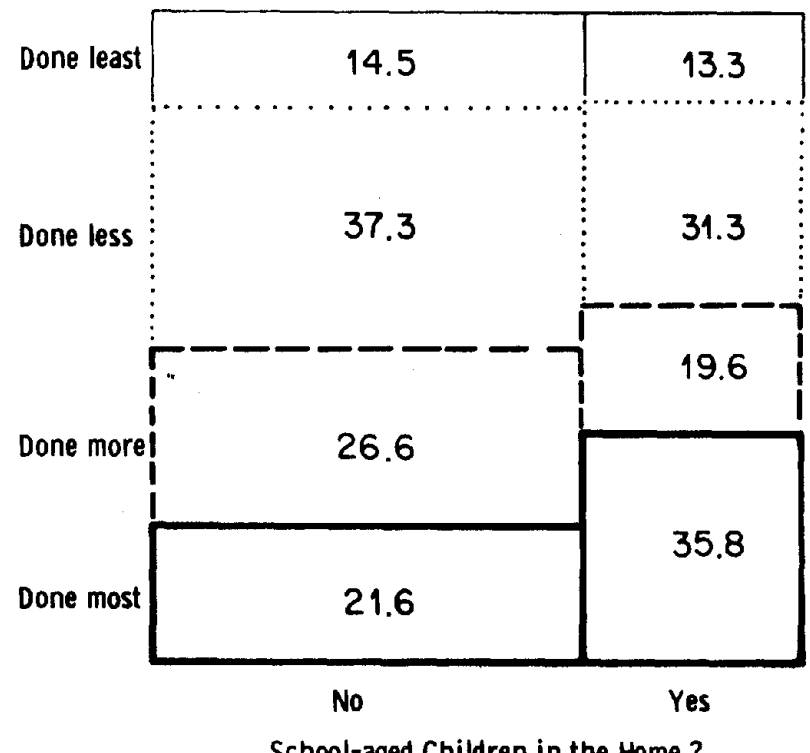


EARTHQUAKE PREPAREDNESS
BY EDUCATIONAL ATTAINMENT

FIGURE 6

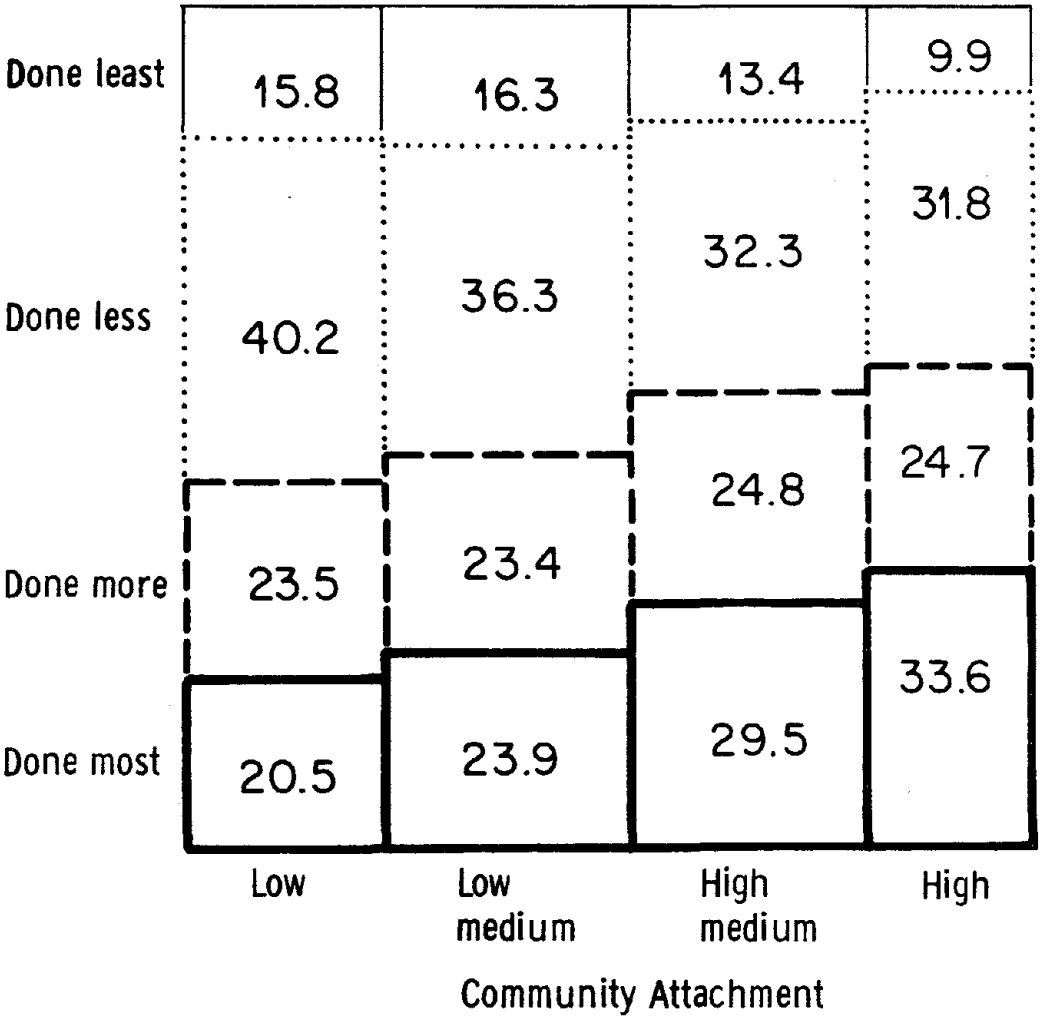


EARTHQUAKE PREPAREDNESS BY
PRESENCE OR ABSENCE OF CHILDREN IN HOUSEHOLD



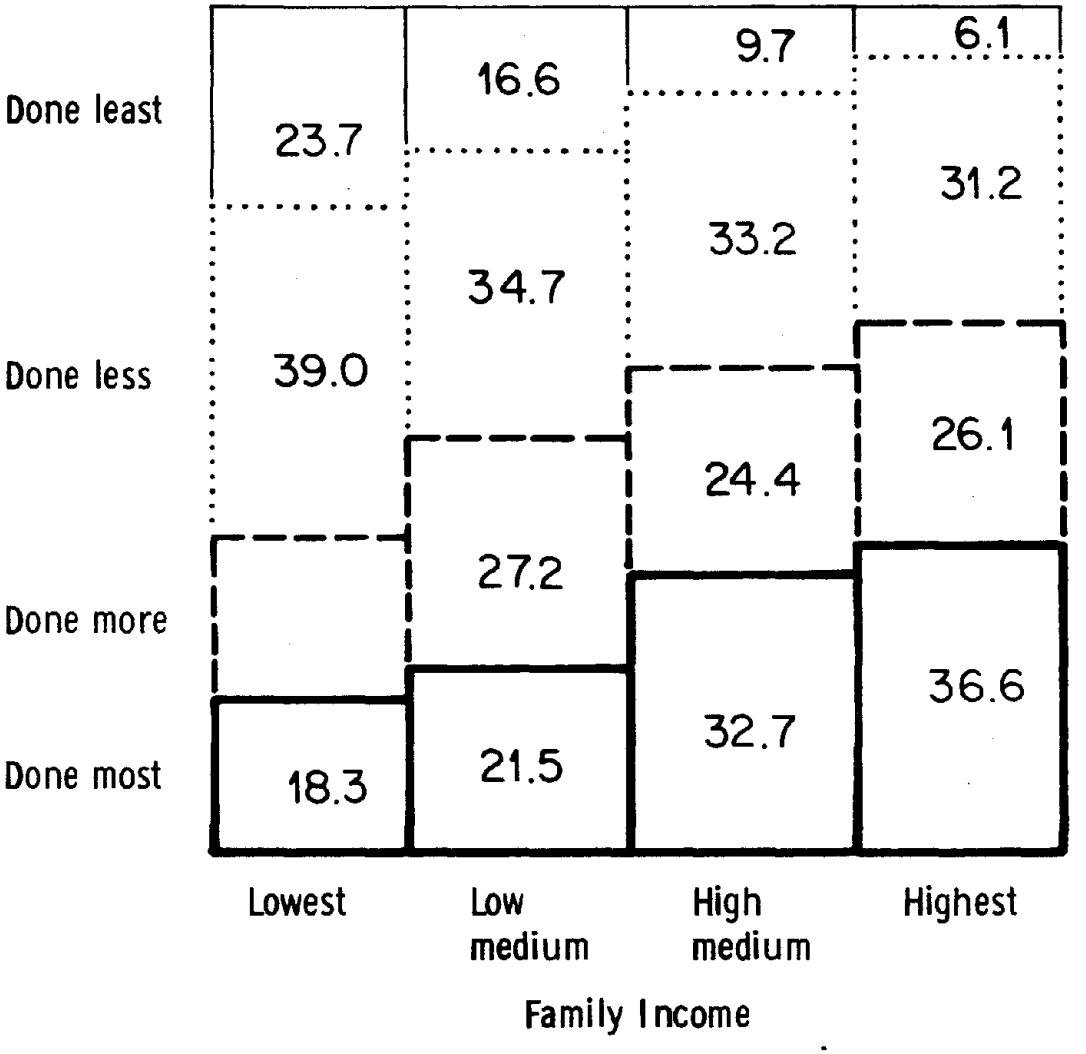
EARTHQUAKE PREPAREDNESS BY PRESENCE
OR ABSENCE OF SCHOOL-AGED CHILDREN IN THE HOME

FIGURE 7



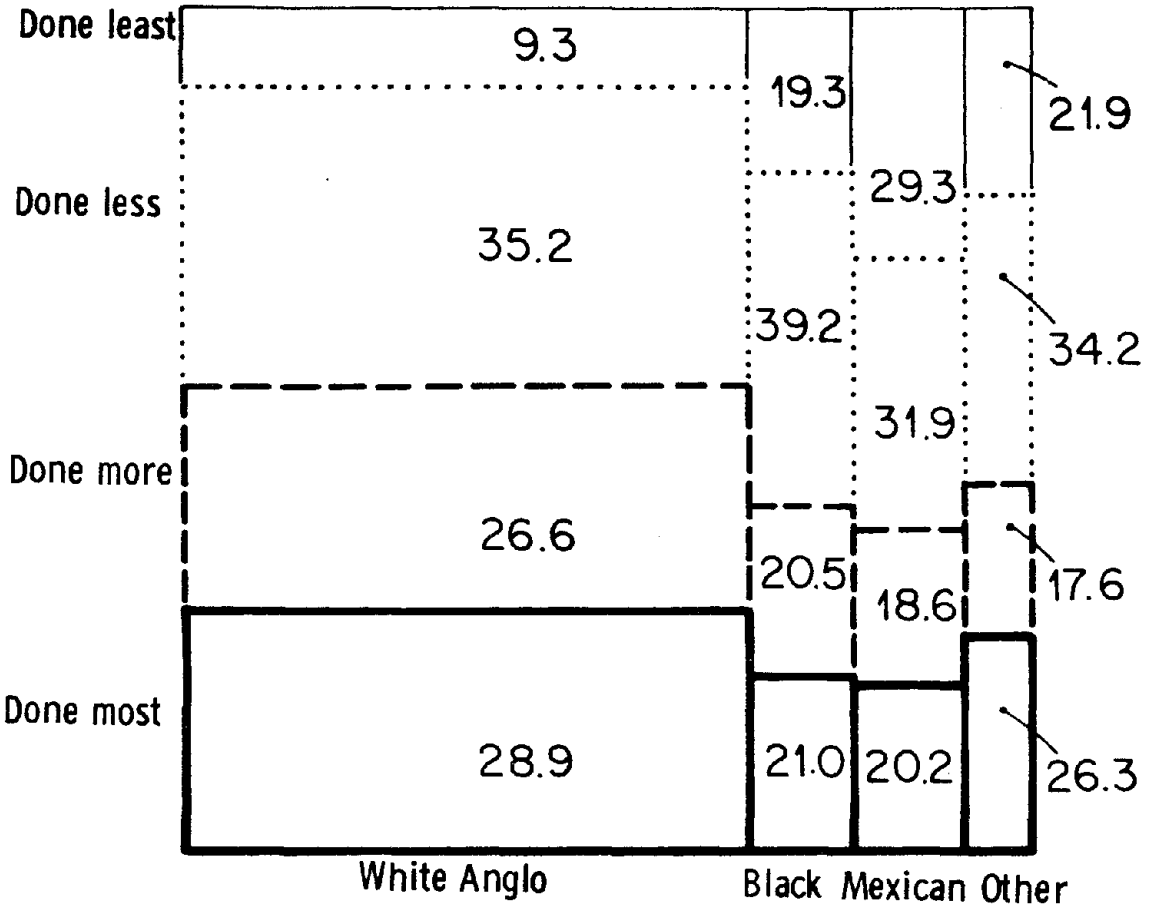
EARTHQUAKE PREPAREDNESS BY COMMUNITY ATTACHMENT

FIGURE 8



EARTHQUAKE PREPAREDNESS BY FAMILY INCOME

FIGURE 9



EARTHQUAKE PREPAREDNESS BY ETHNIC GROUP

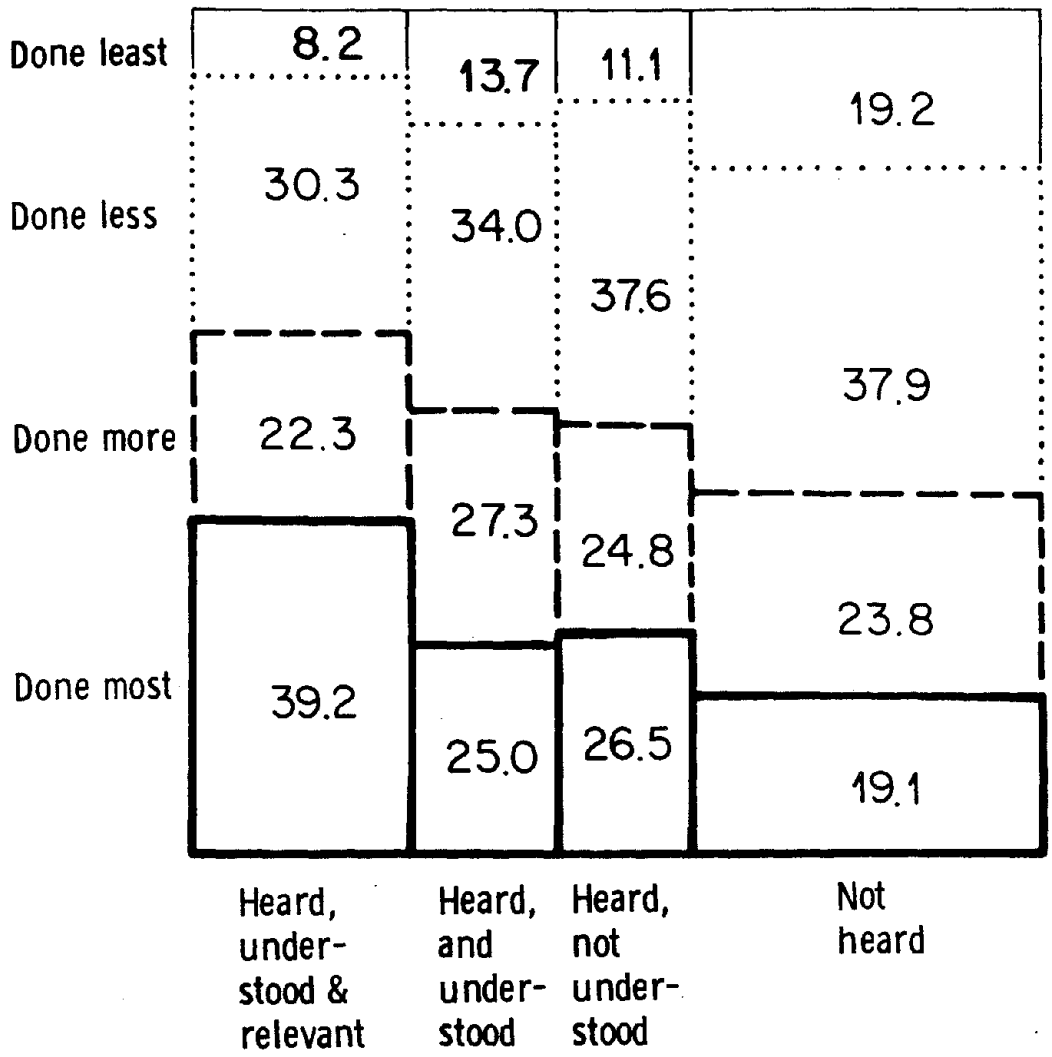
FIGURE 10

ience with other natural disasters carried over to earthquake preparedness.

Next, we investigated the effects of both extent of past experiences in earthquakes and extent of damage or injury sustained in past earthquakes. With respect to both indices, the relationships were moderately strong (gamma = .235 and .273, respectively) and significant ($p < .001$ for both with tau = .163 and .175, respectively). Those who had experienced more earthquakes and those who had experienced more damage or injury (whether to themselves or to close family and friends) from an earthquake were more often better prepared for a coming earthquake than those without such experience. The relationship for both of these indices was linear; i.e., the more past experiences one had, the greater the degree of personal preparedness. However, most people with no prior experience had taken one or two preparedness measures rather than taking none at all. This observation is not surprising in light of the inclusions of such items as flashlights, battery-operated radios, and first aid kits that are useful at other times than during disaster.

Effects of physical proximity. These findings on the importance of past earthquake experience raise the question whether current proximity to earthquake hazards also leads to a higher degree of preparedness. Does physical location affect individual preparedness?

In Part Four we surveyed the extent of awareness and appreciation of the southern California Uplift as a possible earthquake precursor. The obvious question is whether awareness and relevance of the Uplift are converted into precautionary action. Those for whom the Uplift is relevant acknowledge the potential danger which the Uplift may signify for the area in which they live. Figure 11 shows that there is a clear correlation between awareness and action. When we compare the people who have heard of the Uplift, understood its significance, and realized that the earthquake it signifies might



EARTHQUAKE PREPAREDNESS BY AWARENESS OF THE UPLIFT

FIGURE 11

cause damage where they live, with people who don't remember hearing of the Uplift, twice as many of the former are among those who have taken the most steps in earthquake preparedness.

One of the common misperceptions heard about the Uplift is that if it is a precursor to a large quake, the quake will be much more destructive in the Palmdale area than in the Los Angeles metropolitan basin. To determine whether any level of preparedness was affected by proximity to Palmdale, preparedness scores for people in the Palmdale area were compared with scores for people living elsewhere in Los Angeles County, although the small size of the samples from Palmdale prevents the apparent differences from reaching an acceptable level of statistical significance. Although this difference was not significant, there was a tendency for Palmdale area residents to be better prepared.

Are people who live in the San Fernando area any better prepared for an earthquake than those who live in other parts of the county? This question does not necessarily concern personal experience of the 1971 quake. The question is whether the past history of the area in which a damaging quake has occurred has an effect on current residents' states of preparedness. If we could identify such an area effect, we might be able to identify a local disaster or earthquake "subculture." But when we compare people who are currently living in the San Fernando damage area (the specification of which is given in Part Seven) with other county residents, no differences are found (Table 2). The effects of living in special vulnerability and experience zones will be explored more fully in Part Seven.

Beliefs about living-at-risk. However, one subjectively identified ecological factor--residential proximity to a fault--was related, although marginally, to one particular preparedness measure--purchasing earthquake

TABLE 2

EARTHQUAKE PREPAREDNESS FOR RESIDENTS OF PALMDALE, SAN FERNANDO DAMAGE AREA AND OTHER AREAS OF LOS ANGELES COUNTY

Preparedness index	Palmdale and vicinity	Other areas
Done least	4.3	14.4
Done less	28.3	35.5
Done more	30.4	24.0
Done most	37.0	26.1
Total	100.0	100.0
Total number	46	1404

Preparedness index	San Fernando Damage Area	Other areas
Done least	15.5	14.0
Done less	31.6	35.5
Done more	20.0	23.9
Done most	32.9	26.6
Total	100.0	100.0
Total number	155	1295

TABLE 3

INSURANCE DECISIONS BY BELIEF THAT A HOMEOWNER'S RESIDENCE LIES WITHIN A MILE OF AN EARTHQUAKE FAULT

Assumed proximity to a fault	Purchased Insurance?		Total	Total Number
	Yes	No		
Definitely within a mile	23.5	76.5	100.0	51
Probably within a mile	20.3	79.7	100.0	79
Probably not within a mile	10.1	89.9	100.0	169
Definitely not within a mile	14.0	86.0	100.0	143
Don't know	9.3	90.7	100.0	246

insurance. A home owner who believed that his or her residence was within a mile of a fault was more likely to have purchased earthquake insurance than one who did not believe the home lay in such close proximity to a fault ($X^2 = 9.06$, 3 df, $p < .05$)(Table 3).

In Chapter Two when we found that the decision to purchase a home in a special study zone was related to whether the potential buyer believed he or she currently lived near a fault, we also found that those who didn't know whether they resided close to a fault were likely to be more hesitant about purchasing a home in such a zone. In that instance, being in doubt about one's current exposure to danger apparently led to a "cautious" approach to the possibility of increasing that risk. With respect to the purchase of earthquake insurance, however, doubt about one's current exposure to potential danger was associated with greater likelihood of taking a "risky" course of action (i.e., not buying earthquake insurance). Of those who said they didn't know whether they lived within a mile of a fault, 90.7 percent had not purchased insurance. In this respect, they were much more like those who believed that they didn't or probably didn't live in close proximity to a fault than those who believed they did. The apparent discrepancy is probably explained by the difference between passively accepting risk and actively taking a risk. In both instances people who don't know tend toward the course of inaction, whether it places them at greater or lesser risk.

In order to investigate the effects that perceptions of living-at-risk have on preparedness, we decided to look more closely at two variables, namely, safety of one's residential structure and safety of the area in which one's residence lies. In the survey conducted in July, 1978, we asked our respondents:

> In the event of a damaging earthquake, how safe do you think you will be in your home? Do you think you will be very safe, somewhat safe, somewhat unsafe, or very unsafe?

Of the 536 respondents in this sample, about 18 percent (N = 95) felt that their residences would be unsafe to some degree (Table 4).

Respondents who believed they were "at risk" were then asked why they held this assessment. Six were unable to give any reason for their beliefs, and only eight gave more than one reason. The overwhelming majority of their reasons referred directly to structural characteristics of their homes (Table 5). Over one-third of the respondents referred to the poor or weakened construction of their homes, and an additional 12 percent or so implied a weakened structure by stating that they live in an older building. Almost 21 percent of the answers referred to multiple-stories as the unsafe feature of their residences. About seven percent of the reasons referred to past experiences in their homes, usually in earthquakes. A similar percentage doubted the safety of their homes because of the expected magnitude of a coming quake. A small number of respondents mentioned other environmental features, such as living in a high density area or location of the home on a geologically insecure foundation as reasons for questioning the safety of their residence.

When respondents' scores on the individual preparedness index were cross-tabulated with their evaluation of their residential safety, no significant relationship was found. There was even an apparent slight tendency for those with the highest evaluations of their home's safety to have taken more preparedness actions.

To find out how safe respondents felt the area in which they lived was, we asked:

TABLE 4

PERCEPTION OF RESIDENTIAL SAFETY

Safety assessment	Percent
Very safe	15.9
Somewhat safe	64.2
Somewhat unsafe	13.6
Very unsafe	4.1
Don't know and No answer	2.2
Total	100.0
Total Number	536

TABLE 5

REASONS FOR AN UNSAFE ASSESSMENT OF ONE'S RESIDENCE

Reasons	Percent of total responses	Percent of respondents
Structural Reason	71.1	77.5
Poor construction of structure	36.1	39.3
Multiple-storied building	20.6	22.5
Live in an old building	13.4	14.6
Extensive use of glass	1.0	1.1
Personal Experience Reason	7.2	7.9
Damaging previous earthquakes	5.1	5.6
"Know my house"	2.1	2.3
Environmental Reason	5.2	5.6
High density area	3.1	3.3
Geologic foundation insecure	2.1	2.3
Reason related to magnitude of future earthquake	7.2	7.9
Other	9.3	10.1
Total	100.0	100.0
Total number	97	89

TABLE 6

NUMBER OF HAZARDS CITED BY RESPONDENTS
WHO BELIEVE THEY LIVE IN HAZARDOUS AREAS

Number of hazards mentioned	Percent of total sample	Percent of those who perceive a localized hazard
No hazard or Don't Know	75.4	----
One	21.1	85.6
Two	2.8	11.4
Three	.7	3.0
Total	100.0	100.0
Total number	536	132

> Do you consider the location of your residence, that is, the area where you live, hazardous if a damaging earthquake strikes the Los Angeles area?

Almost a quarter of the respondents (N = 132) replied that they did believe their area was hazardous. These were then asked:

> What features of your particular location make you think it is a hazardous place to be in the event of a damaging earthquake?

Respondents were allowed to give as many reasons as they wished; no responses were suggested by the interviewers.

Of those who believed there was some hazard associated with the area in which they lived, only 14 percent mentioned more than one feature (Table 6).

As shown in Table 7, proximity to an earthquake fault was the single most frequently mentioned hazard. Living near the ocean or near the beach was the second most frequently cited hazardous condition, ostensibly because of the threat of a tsunami generated by an offshore quake or because of the extensive structural damage that could result from siesmic waves passing through wet, sandy soils underlying coastal residences. Those who perceive that densely populated areas and areas below dams are hazardous conditions are much less frequent. Even though we tried to stress that our concern was with features of the area in which they lived, 12 percent of the respondents still phrased their concerns in terms of their type of dwelling, mentioning either an old or high-rise building as an important hazard.

It should be remembered that this was an open-ended question and that if respondents mentioned a particular feature, it was because they spontaneously identified it as a hazard. In order to find out whether there were other people who were exposed to similar conditions without perceiving them as hazardous, we asked each respondent about the location of the residence. This question was asked near the end of the interview, when we were gathering information about the type of dwelling in which the

respondents lived.

> Is your residence located: In a canyon? On or near a steep incline? In a residential area? Near multi-storied buildings? Within 15 feet of a bridge or freeway overpass? Within three blocks of a beach marina? Below a dam?

The respondent was allowed to answer "yes" or "no" to each of these conditions. Although it was not possible to elicit information on all of the spontaneously mentioned "hazards", we had sufficient data to look at the relationships between perceived hazards and knowledge about the presence of the conditions for those living in hillside homes, below dams, and near a fault. Those who lived below dams (Fisher's exact test yielded a probability of less than .001) and those who lived near faults ($X^2 = 4.124$, 1 df, $p < .05$) were more likely to have mentioned these locations as indications of a hazardous environment. Living on a hillside was not perceived to be a hazard to any significant degree by those exposed to this condition.

To determine whether perceptions of hazards in one's area of residence had any impact on preparedness actions, we first compared those who weren't aware of any hazards with those who mentioned at least one such condition. No significant relationship was found; those who were aware of environmental conditions as hazards were no more likely to take precautions than those who weren't. To find out if being aware of <u>more</u> hazards was related to taking preparedness actions, we compared those who mentioned one hazard with those who mentioned two or more. Again, no relationship was found. By itself, awareness of personal exposure to risks, whether from one's residence or from conditions in the area in which one lives does not appear to increase the likelihood that the respondent's household will be better prepared for a coming earthquake.

TABLE 7

HAZARDOUS CONDITIONS THAT RESPONDENTS BELIEVE APPLY TO THEIR RESIDENTIAL AREAS

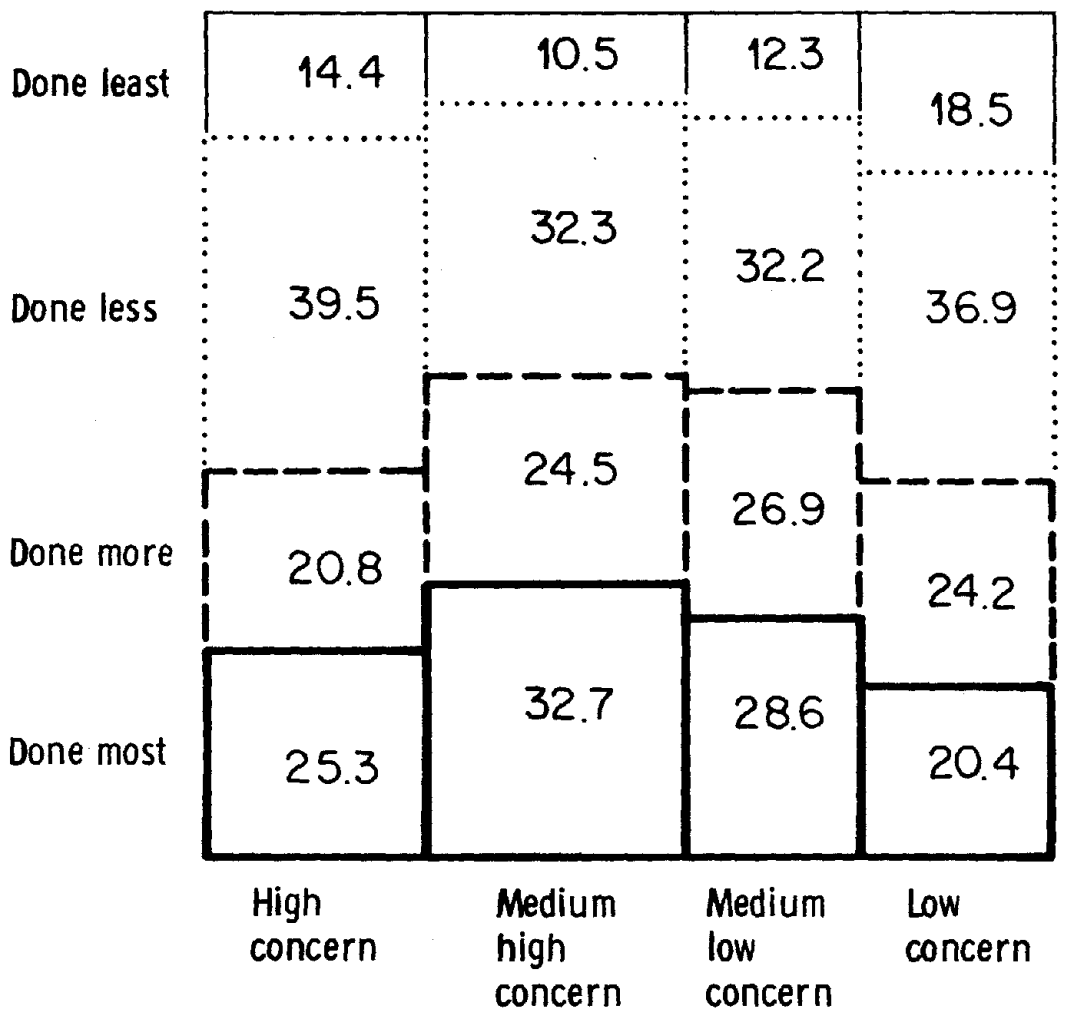
Hazards	Percent of total responses	Percent of aware respondents
Near an earthquake fault	34.2	40.2
Near the ocean or beach	14.2	16.7
On a hillside or steep incline	9.7	11.4
In an old/pre-1934 building	8.4	9.9
In a densely populated area	5.8	6.8
Below a dam	5.8	6.8
In a high rise	3.2	3.8
Near an overpass or bridge	.6	.8
Other	18.1	21.2
Total	100.0	-----
Total number	155	(132)

[1]Bases on 132, the number of respondents who believed their area was hazardous.

Effects of threat awareness. In Part Four, we explored fear and concern over earthquakes. The obvious question is whether fear and concern are converted into action. Figure 12 shows there is a clear relationship, but it is not strong. The graph is interesting, however, because of the support it gives to a widely held hypothesis about the relationship between fear and action. This is the thesis that fear motivates action, but only up to a point. When the amount of fear exceeds a critical threshold, the effect is a sort of paralysis. From the graph we see that actions increase as fear and concern increase until we reach the highest level of concern, at which point the level of preparedness drops markedly and consistently.

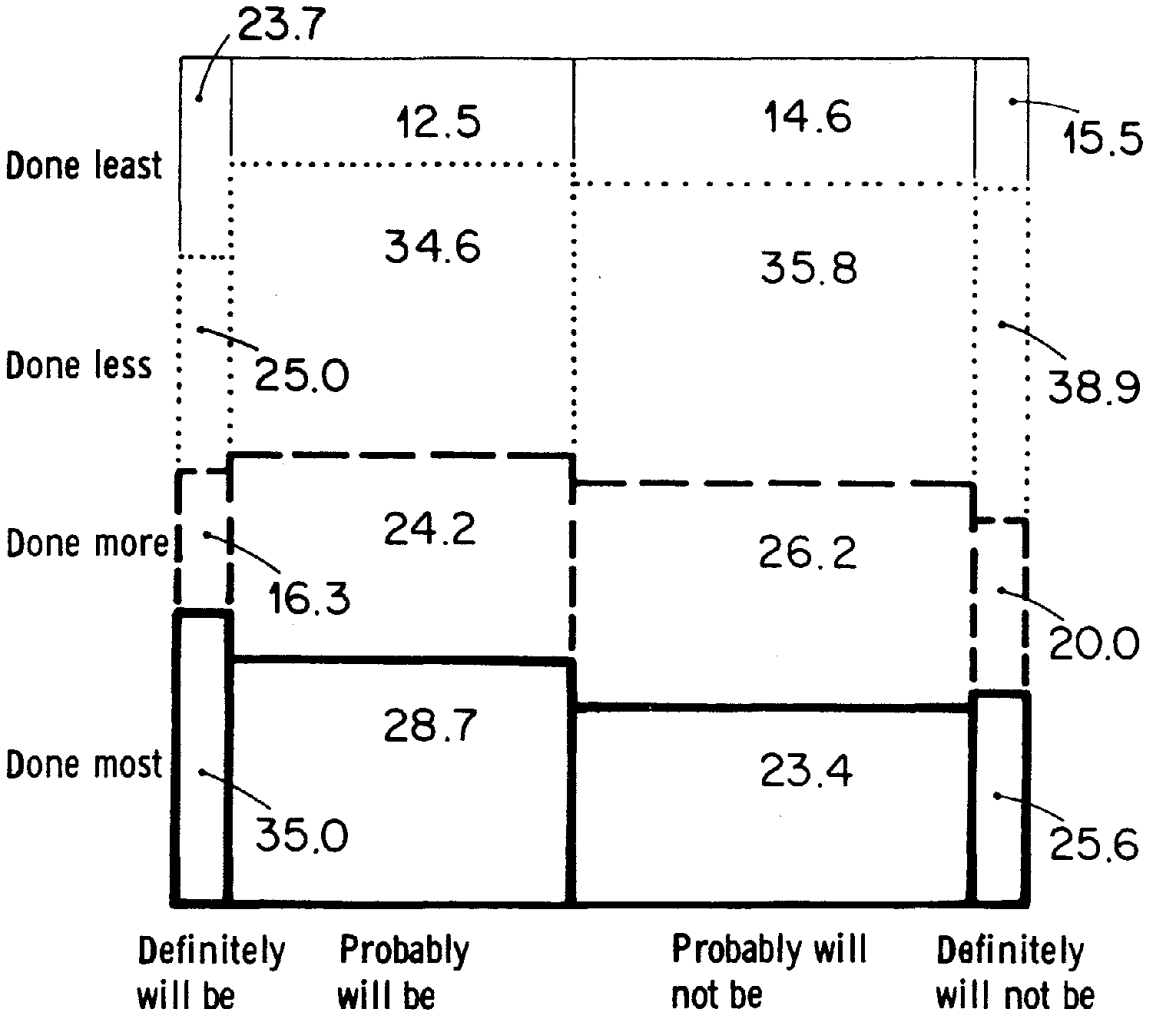
In Part Four, we were struck also by the large proportion of Los Angeles County residents who expected a damaging earthquake within a year, and the detachment of this expectation in many cases from knowledge of any specific prediction, forecast, or caution. As Figure 13 shows, people who expected a damaging earthquake were more likely to have made some preparations than people who did not ($p < .05$ for tau = .035). However, this relationship is also not striking; the difference between those who expect a quake and those who don't expect a quake is not great.

Since expecting an earthquake was marginally related to preparedness, we might also expect people who had heard specific predictions to take more preparedness actions. When we crosstabulated the number of earthquake predictions that people heard and took seriously by their preparedness scores, we find again that the two variables are only marginally related ($p = .04$ for tau = .035). If we use the number of predictions of damaging quakes which people took seriously, the relationship is little changed ($p = .03$ for tau = .036). Whether damage is anticipated or not, the more predictions one hears and takes seriously, the more likely one is to be mobilized into



EARTHQUAKE PREPAREDNESS
BY EXTENT OF CONCERN OVER EARTHQUAKES

FIGURE 12



EARTHQUAKE PREPAREDNESS
BY EXPECTATION OF AN EARTHQUAKE

FIGURE 13

taking more preparedness actions.

Does understanding the significance of the southern California Uplift also lead people to take more preparedness actions? If the Uplift is believed to be a possible precursor to a major quake and if it is believed that that quake will cause damage where the respondent lives, will the respondent take more protective actions?

As we have seen already in Figure 11, people who had done the least were those who had no knowledge of the Uplift, while the best prepared people were those who anticipated damage where they lived from an Uplift-related quake. The overall relationship between the variables is moderate (gamma = .22) but significant ($p < .001$ for tau = .152). Even though the announcement of the Uplift was in the form of a long-range, uncertain forecast, those who were aware of it and who took it seriously responded by preparing themselves.

Awareness of threat, through hearing predictions and forecasts that are taken seriously, does motivate people to take preparedness actions.

Governmental and personal responsibility. In Chapter Two, we learned that while people hold a collective orientation toward the meliorability of hazards for earthquake endangered groups, they generally tend to believe that the government has the responsibility for taking these actions. With such a strong tendency toward "letting the government do it", are people more likely to forgo taking their own preparedness measures because they think the government will make preparations for them?

We asked our respondents:

> In dealing with earthquake preparedness problems, would you say public officials are doing a good job, an average job, or a poor job?

TABLE 8

EVALUATION OF PUBLIC OFFICIALS' EFFORTS
IN DEALING WITH EARTHQUAKE PREPAREDNESS

Evaluations	Percent of total sample	Percent of evaluators
Good job	19.4	21.7
Average job	41.1	45.9
Poor job	29.0	32.4
Don't know	9.8	----
Not answered	.7	----
Total	100.0	100.0
Total number	1450.0	1296.0

TABLE 9

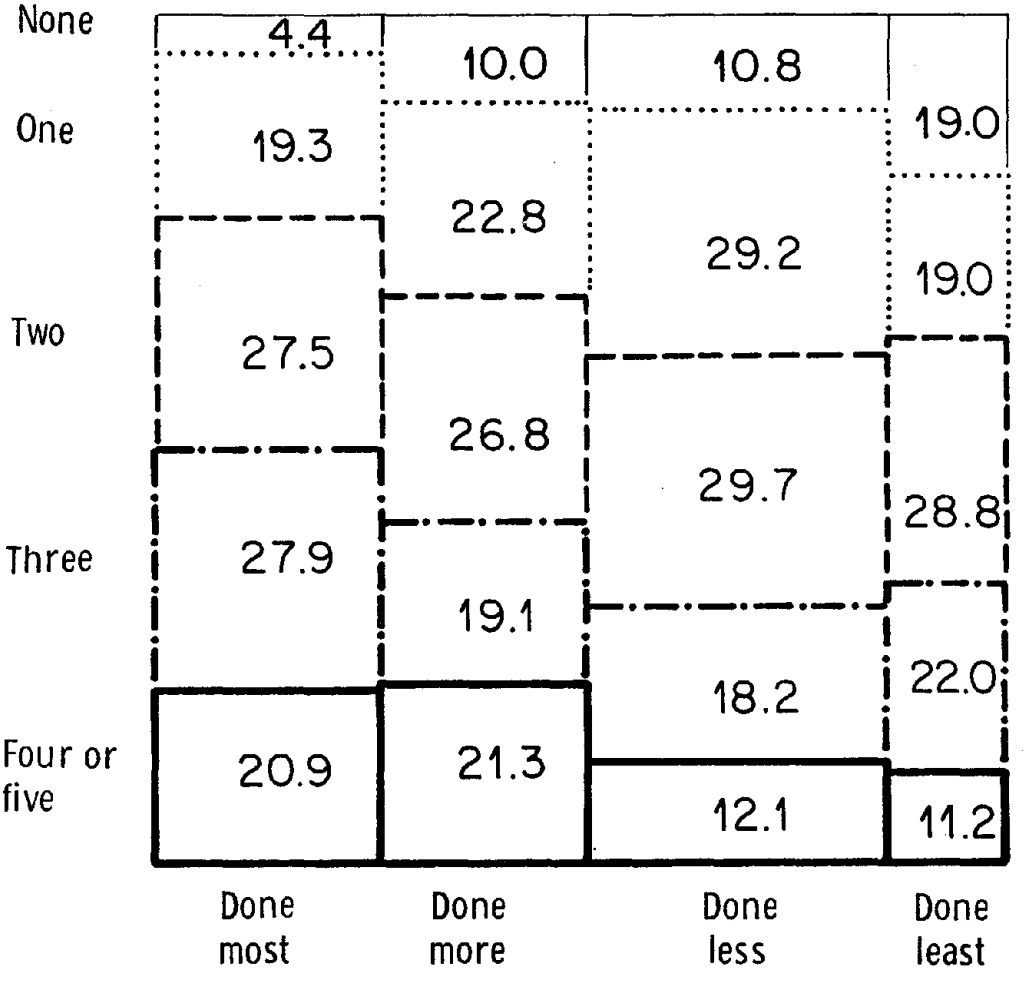
EARTHQUAKE PREPAREDNESS BY EVALUATION
OF GOVERNMENT PREPAREDNESS

Personal preparedness	Government preparedness		
	Good job	Average job	Poor job
Done least	16.4	14.1	9.0
Done less	34.2	34.9	35.4
Done more	24.9	24.8	24.0
Done most	24.5	26.2	31.6
Total	100.0	100.0	100.0
Total number	281	596	421

Table 8 indicates that the respondents do not place a very positive evaluation on officials' competency in dealing with earthquake preparedness problems. Of the 1440 respondents who answered the question, the most frequent response was that public officials were doing an "average" job. In looking at the extreme categories, more respondents believe that officials are doing a "poor" job of handling these problems than believe they are doing a "good" job. Almost ten percent of the sample didn't even feel they could form an assessment of how the government was handling earthquake problems.

When we look at the relationship between evaluations of governmental preparedness and extent of personal preparedness (Table 9) we find that it is negative and linear. Although the relationship is modest (gamma = .097), it is highly significant ($p < .005$ for tau = .067). Those who have a low evaluation of the government's handling of earthquake problems are more likely to have taken preparedness measures themselves.

It is also appropriate to take notice of whether having ideas for government action is related to personal preparedness or not. Having many ideas for government action might be the expression of a "Let George do it!" attitude. In that case we should find no relationship between personal preparedness and suggestions for government action. We might even find that the people who are least prepared are the most ready to say what government should be doing. On the other hand, personal preparedness and being able to offer suggestions for government action might both be expressions of intelligent concern for earthquake safety. If this is true we should expect to find that people who are personally more prepared are also the ones who have offered the most suggestions for government action. We should then have reason to take their suggestions more seriously.



SUGGESTIONS FOR GOVERNMENT ACTION BY PERSONAL EARTHQUAKE PREPAREDNESS

FIGURE 14

Figure 14 shows the relationship between the number of suggestions for government action and the personal preparedness score. The relationship is modest (gamma = .184), significant ($p < .001$ for tau = .14) and positive. In general, the people who have more suggestions for public officials are themselves better prepared for an earthquake.

Since people who make a less positive evaluation of government efforts to handle earthquake preparedness problems are better prepared than those who make more positive evaluations, the question is raised whether they would be willing to have the government invest large sums of money for further preparedness. If they have personally invested time and money to prepare themselves, will they be reluctant to have tax money spent on general preparedness? In Chapter Two we learned that respondents felt that the "general public" was quite unprepared for a coming earthquake. Is an "I-did-it-so-you-can" attitude likely to prevail, causing the better prepared segments of the population to protest the spending of additional money on earthquake preparedness by the government?

When we look at the relationships between personal preparedness and the two governmental investment indices (the structural improvement index and the prediction and warning system index, both of which were discussed in Chapter Two), neither was found to be significant. The extent to which one has prepared one's household for a quake does not apparently affect one's decision to support the government's investment in hazard-reduction activities.

Explaining Personal Preparedness for an Earthquake

Throughout this chapter we have focused on the specific measures people have taken to prepare for an earthquake. Now we will attempt to answer the question: why have some people taken measures to prepare for a future earth-

quake while others have not? A model was developed to examine the relationship between sets of independent and intervening variables and personal preparedness for an earthquake in order to answer this question.

Individual and household characteristics, prior disaster experience, and vulnerability were included in the model as independent variables. Barton (1969), Fritz (1961) and Moore (1964) suggest that factors such as age, length of residence in the community, and prior disaster experience may influence both the way people interpret warning messages and their disposition to action. We hypothesized that the aged, long-time residents of the community, and people with past disaster experience would be less likely to prepare for a future quake because of their tendency to deny danger.

Patterns of communication and earthquake orientations were included in the model as intervening variables. The literature suggests that confirmation of the warning message (Mileti, Drabek and Haas, 1975; Mileti and Beck, 1975) as well as people's perception of risk and the availability of resources for coping (Kunreuther et. al., 1977; Janis and Mann, 1977) should lead to increased vigilant response.

Finally, we included three variables in the model to assess the impact of the current earthquake threat on preparedness behavior. These variables included the number of prediction announcements taken seriously, awareness of the Uplift, and the likelihood of an earthquake within a year. We hypothesized that people who perceive the earthquake threat as a relevant concern will take more measures to prepare for an earthquake than people who do not understand the significance of the current earthquake threat.

Personal earthquake preparedness was measured by the index used throughout the chapter which simply states the number of measures taken for an earthquake or other reason as a proportion of the measures that could be

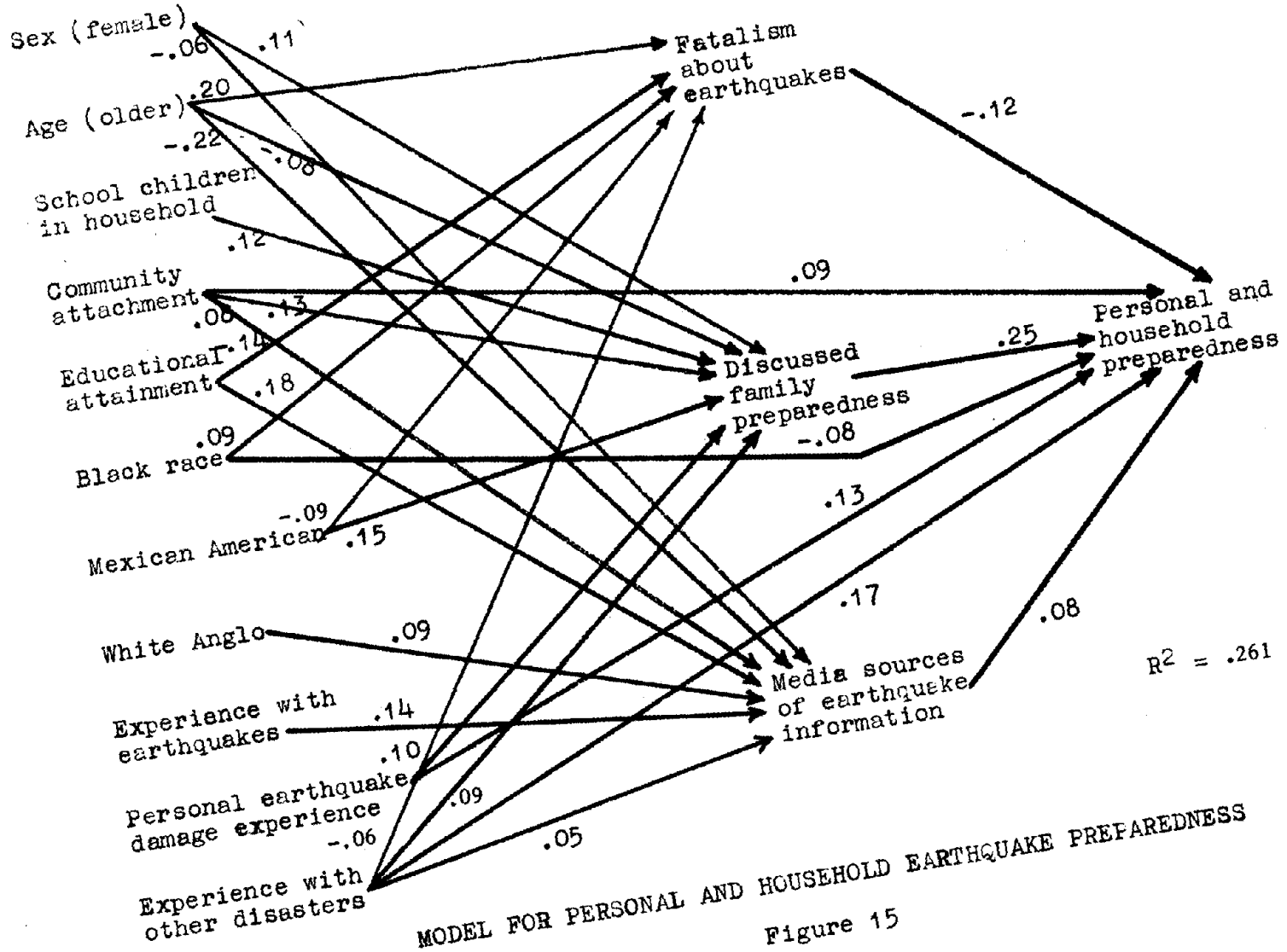
taken. The number of measures that could be taken is different for owner-occupied households, households with children, and other households.

The strongest direct predictor of personal earthquake preparedness is the extent of interpersonal discussion of family preparedness (Figure 15). People who have discussed family preparedness within informal networks are likely to have taken a greater number of steps to prepare for a quake than people who have not been involved in such discussions. Decision-making about earthquake preparedness is apparently similar to decision-making under other uncertain conditions. Before people take action on what they have heard, they seek information and confirmation through direct face-to-face interaction with their peers.

Use of a wide range of mass media sources also has a direct effect on personal preparedness. Although its effects are less substantial than informal discussion, people who use a range of media sources are likely to have taken a greater number of measures to prepare for a quake than people who have learned about earthquakes from few media sources. More than was true for awareness variables, informal discussion is more critical for action than the use of the media.

Fatalism about earthquake danger has a substantial negative relationship to earthquake preparedness. People who are fatalists over their ability to cope with earthquake danger are less likely to have taken measures to prepare for a future quake. The belief that something can be done to mitigate earthquake hazards is clearly related to people's disposition to action.

Experience in disasters other than earthquakes has both direct and indirect effects on personal preparedness. Experience in other types of disasters is the second greatest predictor of personal preparedness. People who have experienced other types of disasters are likely to have taken a



MODEL FOR PERSONAL AND HOUSEHOLD EARTHQUAKE PREPAREDNESS

Figure 15

greater proportion of measures for a future quake than people who have not experienced disasters such as tornadoes, hurricanes, floods, and tsunamis. This finding suggests that disaster experience can be generalized. Some of the same measures that contribute to earthquake preparedness are also relevant for other kinds of disasters, so we may be seeing a generally better state of emergency preparedness rather than preparedness specifically for an earthquake among respondents who have been through other disasters. The failure of experience with other disaster agents to correlate with most other earthquake variables lends plausibility to this interpretation.

Experience with other disaster agents also has an indirect effect on personal preparedness which is mediated by use of the media, discussion of family preparedness, and fatalism over earthquakes. People who have had disaster experience are more likely to have learned information about the earthquake threat from both the media and interpersonal discussion. In addition, they are less likely to be fatalistic about earthquakes.

While experience in other disasters has a direct effect on personal preparedness, the extent of earthquake experience only has an indirect effect on preparedness. The indirect effect is through the tendency for people with more earthquake experience to use a wider range of media sources.

The extent of damage experienced in an earthquake by the individual and close associates has a direct effect on earthquake preparedness. People who have personally suffered loss or have friends, relatives, or neighbors who have suffered loss in a damaging earthquake are likely to have taken a greater number of measures in preparation of a future quake than other people. This finding points to the importance of experience of personal loss from an earthquake rather than the mere fact of experience with an earthquake as stimulating individual preparations for a future damaging earthquake.

Damage experience has an indirect effect on personal preparedness as well. People who have experienced loss in a previous earthquake are more likely to discuss family preparedness than people who have not. The substantial relationship between discussion and action in turn adds to the direct effect of earthquake damage experience.

Only two demographic variables have direct effects on personal preparedness. These variables are community attachment and ethnicity. People with strong attachments to the community are likely to have taken more measures to prepare for an earthquake than people who are not attached to the community. We can assume that people who have some commitment to the area are less likely to leave the area because of a future earthquake; therefore, they would rather invest their time and money in protecting their home and family. Community attachment also has indirect effects on personal preparedness. People who are strongly attached to the community are more likely to discuss family preparedness and to use a wider range of media sources than people who are less attached to the area. Involvement in communication adds further to their greater personal preparedness.

We find some interesting differences in personal preparedness among ethnic groups. Blacks are more often fatalistic than other groups, and consequently are less often well prepared for an earthquake. But in addition to this indirect effect, there is also a direct relationship between being Black and low levels of preparedness. Whether they are fatalistic or not, Blacks are slightly less disposed to make emergency preparations.

The greater personal preparedness by White Anglos and Mexican Americans is fully explained by the effect of ethnicity on communication. Anglos are likely to use a wide range of media, while Mexican Americans are likely to be involved in discussion of family preparedness with a variety of partners.

Age, sex, education, and the presence of school children in the home, only have indirect effects on personal preparedness. Older people are less likely to discuss family preparedness in informal networks, are less likely to learn about earthquakes from a wide range of media sources, and are more likely to be fatalistic over earthquake than younger people. Since involvement in communication and low fatalism are positively associated with personal preparedness, the observed tendency for older people to take fewer measures to prepare for a future quake than younger segments of the population is explained.

Sex and the presence of school children in the home are indirectly related to personal preparedness through their association with channels of communication. Women and people with school children are likely to prepare for a future quake because of their involvement in discussion of family preparedness. Men, on the other hand, are likely to prepare for a quake because of their exposure to a range of media.

Education has an indirect effect on personal preparedness for an earthquake. The tendency is for more highly educated people to learn about earthquakes from a wide range of media sources. The more highly educated are also less fatalistic about earthquakes. These two relationships explain why people who are highly educated are likely to take a greater number of measures to prepare for a quake than less educated people.

A total of twenty-six percent of the variance is explained by this model, therefore it is a moderate but substantial predictor of personal preparedness for an earthquake. Perhaps the most significant finding is that neither the number of prediction announcements taken seriously, awareness of the Uplift, nor the belief in the likelihood of an earthquake within a year have any significant effect on personal earthquake preparedness. This

suggests that current events and understanding of the earthquake threat have had little influence upon the decision to adopt personal preparedness measures. Instead, the decision to adopt personal preparedness measures is better explained by past experience in disasters, damage experienced in previous earthquakes, attachment to the local community, discussion of family preparedness within informal networks, use of the mass media, and the belief that one's actions will be effective in alleviating earthquake hazards.

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