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Attribution of behavioral and characterological fault towards the victims of a disaster

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ATTRIBUTION OF BEHAVIORAL AND CHARACTEROLOGICAL FAULT TOWARD THE VICTIMS OF A DISASTER

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ABSTRACT

Past research concerning the attribution of responsibility for negative events has yielded results which are inconsistent and difficult to interpret. With their notion of the "just world hypothesis", Lerner and Miller (1978) distinguish between behavioral fault and characterological fault. They state that there is an inverse relationship between these types of blame, such that characterological fault should only occur when no behavioral fault on the part of a victim is evident. Few studies, however, have actually distinguished between behavioral and characterological fault at the level of dependent variables. A further difficulty with this body of research is that it has been concerned almost exclusively with occurrences caused by a perpetrator, while situations involving no perpetrator have been ignored (Chaikin and Darley, 1973). The present study attempted to alleviate these problems by measuring attributions of both behavioral and characterological fault in situations involving both the presence and absence of a perpetrator.

Noting a criticism of past research (Chaikin and Darley, 1973; Vidmar and Crinklaw, 1974), a more involving attributional problem was used in this study: large scale disasters in California which affect thousands of people. The variables of attractiveness of the victims and prior expectancy of the disaster were manipulated using factually-based written stories and slide presentations. Subjects received either positive or negative information about California in general, and were then given reports of either high or low expectancy that a major disaster would strike California in the near future. Subjects then read a detailed report of one of three different disaster types: a man-made earthquake (caused by an act of commission), a naturally-occurring quake (an act of omission, since precautions to minimize damage could have been taken), and a flood (neither an act of commission or omission). Following these disaster reports, subjects answered a battery of questions concerning the behavioral and characterological fault of a married couple who were victims of the disaster.

Results indicated that measures of behavioral fault were not affected by the victims' attractiveness, but did increase as the expectancy of the disaster became greater. Measures of characterological fault, however, revealed a complex interaction between the type of disaster, expectancy, and victims' attractiveness. For the man-made earthquake (a perpetrated event), just world predictions were confirmed. The flood, however, in which there was no perpetrator, produced results completely contradictory to the just world hypothesis. An inverse relationship was found between measures of behavioral fault and three of the characterological fault measures, however, a question concerning the victims' moral responsibility for what happened was found to be positively related to behavioral fault.

In summary, the presence or absence of a perpetrator does appear to affect attributions differentially. Moral responsibility also seems to be unrelated to characterological fault, and these findings point to limited generalizability of the just world notion.

ATTRIBUTION OF BEHAVIORAL AND CHARACTEROLOGICAL FAULT TOWARD THE VICTIMS OF A DISASTER

In his book, "Blaming The Victim", Ryan (1976) discusses the tendency for society to blame the victims of social injustice for their own fate. This victim-blaming process is demonstrated by Ryan using examples from law, education, and social problems such as racial injustice, poverty and unemployment. In each of these areas Ryan insists that although the causes of most of the problems are inherent in our society and the way in which it is governed, this fact is ignored and the blame is instead placed upon those who are victimized by the problems. For example, a person who is unemployed or is on welfare is often thought to be responsible for his or her own plight through a lack of motivation to find a job, apathy, and laziness. Yet in the majority of such cases, the reality of the situation is that there simply are not enough jobs available, or that it is virtually impossible for some individuals to work while taking care of children and a household. In short, the problem is seen by many as being a function of something that is lacking within the individual, rather than the result of other, external factors. This tendency to judge the victims of social injustice unfairly is explained by Ryan as a self-protective mechanism. People are made uneasy and uncomfortable by the obvious inequities of society, and by assigning the blame for this inequality to the victims, can relieve themselves of any sense of guilt or responsibility for the fate of the victims.

A great deal of psychological research has been conducted in an attempt to explain the ways in which people make attributions of

responsibility. The work of Heider (1958) has served as a theoretical framework for much of this research. According to Heider, attributions of responsibility are affected by the amount of "personal force" and "environmental force" perceived to be involved in a given event. The greater the magnitude of the environmental force contributing to the outcome, the less personal responsibility will be attributed to the person involved in the incident. By contrast, attributions of personal responsibility will increase in magnitude when personal force is seen as the major contributing factor. The interaction between environmental and personal forces has been described by Heider as a series of five levels in the attribution of responsibility. These five levels were later named by Shaw and Sulzer (1964), and can be described as follows: (1) Association, in which a person is viewed as being responsible for events which are in any way associated with him; (2) Causality, in which a person is deemed responsible for anything that he has directly produced; (3) Foreseeability, where a person is held accountable for events which he should have expected; (4) Intentionality, where a person is viewed as responsible for events which he intended to create; and (5) Justifiability, when an action is intentional, but also involves some external coercion. The amount of personal responsibility that will be attributed increases across each of the first four levels, such that more responsibility would be placed upon someone who intentionally caused an event than on someone who had merely foreseen the possibility of the event's occurrence. At the level of justifiability, however, the

amount of attributed responsibility decreases slightly from that of Intentionality, since the act, despite being intentional, also had external instigation.

The attributional stages described by Heider (1958) can be seen as rational steps (Fishbein and Ajzen, 1973), independent of the emotions of the perceiver. Recently, some researchers (Brewer, 1977; Tyler and Divinitz, 1981) have asserted that attributions of responsibility follow a rational cognitive process. According to this cognitive model, attributions are the result of a relationship between the prior expectancy (PE) that a particular outcome would have occurred under normal circumstances, and the congruence (C) between the likelihood of that outcome and some action perpetrated by an individual. Attributed responsibility is seen as being a function of the difference between the prior expectancy and congruence components of this model.

Not all attributions, however, are this objective. A second line of attribution research has hypothesized that attribution of responsibility involves motivational distortions which are quite similar to Ryan's (1976) notion of blaming the victim. One of the first studies of motivated distortion of attributions is the work of Walster (1966), which involved a set of stories concerning an accident. The accident occurred when an empty automobile, parked on a hill, rolled away causing either minor or severe damage, depending on the experimental condition. Subjects, after reading about this accident, were asked to determine how responsible the owner of the vehicle was for what happened.

Intuitively, one might guess that because the event was purely accidental, there would be no difference in the amount of attributed responsibility over the various experimental conditions. The findings of Walster's study, however, demonstrated that when the seriousness of the accident's outcome was greater, subjects tended to increase their attributions of responsibility toward the owner of the vehicle. In cases where the outcome was less serious, the accident was more likely to be attributed to chance than to the owner.

These findings were interpreted to be the result of a self-protective response on the part of the perceiver. When an individual attributes an accident to chance, he is thereby allowing for the possibility that such an accident might just as easily happen to him. While this possibility may not be a cause for concern in the case of a minor mishap, Walster argued that a more serious accident is perceived as being threatening. In an attempt to reduce this threat, she suggested that people blame the victim by deciding that he is somehow different, or has behaved in a way which brought such a fate upon him. Therefore, by separating himself from the victim in this way, the perceiver is reassuring himself that a similar event will not befall him.

There have, unfortunately, been several failures to replicate Walster's results for severity of outcome (Walster, 1967; Shaver, 1970; Chaikin and Darley, 1973). These problems led Shaver (1970, Note 1) to hypothesize that there were other factors involved in the attribution of

responsibility. He termed these factors, "situational possibility", and "personal similarity". Situational possibility concerns the likelihood that a perceiver might find himself in similar circumstances to those of the "actor", or person involved in the incident. Personal similarity refers to the amount of perceived overlap between the attitudes and values of the observer and those of the actor.

Unless there is situational possibility, Shaver states that there will be no need to engage in self-protective attributions on the part of the perceiver. Since there is little or no likelihood that a perceiver might find himself in circumstances similar to those of the actor, little threat is aroused by the situation, regardless of the seriousness of the outcome. With high situational possibility but no perceived personal similarity, attributions of responsibility will be directed toward the actor. With both high situational possibility and a great deal of personal similarity, the threat can best be reduced by making attributions to chance rather than to the actor. In doing this, the perceiver is protecting himself from being held responsible were he to find himself in the same situation. This self-protective process was termed, "defensive attribution", and using an experimental procedure similar to that used by Walster (1966), Shaver demonstrated the hypothesized effects of situational possibility and personal similarity. Perceived possibility, coupled with personal similarity, led to more lenient attributions of responsibility on the part of the perceiver.

An alternative explanation for such self-protective, motivated

distortions in the attribution of responsibility has been hypothesized by Lerner (1966). According to Lerner, individuals have a need to believe that the world is a fair and equitable place, and that attributions of responsibility will be made in a way that is consistent with this belief. This theory of the attribution process is what Lerner termed the "just world hypothesis". Support for this hypothesis has been demonstrated in the work of a number of researchers (Lerner and Simmons, 1966; Lerner and Matthews, 1967; Novak and Lerner, 1968). The results of this research show that when someone has suffered a misfortune, a perceiver's attributions of responsibility will be distorted in such a way as to maintain the belief in a just world. In other words, if something has happened to a person, then he must have done something which brought such an outcome upon himself. If that person's behavior cannot be seen as having caused the outcome, then Lerner and Matthews (1967) showed that the perceiver will derogate or devalue the victim's moral character in order to justify that person's suffering. This finding seems to lend some empirical support to Ryan's (1976) "blaming the victim" theory.

A study by Chaikin and Darley (1973) attempted to determine the relationship between the just world hypothesis and the defensive attribution notion. Using manipulations of severity of outcome, situational possibility, and personal similarity, they found support for both just world and defensive attribution hypotheses, although defensive attribution appeared to be the more successful of the two. Under

conditions of high severity of outcome which lacked situational possibility for the subjects, there was a tendency to derogate the victim of a misfortune, as the just world hypothesis predicts. With situational possibility, however, defensive attribution predictions were confirmed; high personal similarity caused more lenient attributions of responsibility. It may be, then, that situational possibility, or the lack of it, is a determining factor in whether attributions will follow either a just world or a defensive attribution pattern.

There are a number of problems in the studies mentioned thus far which make interpretation of the results difficult, and which may explain some of the inconsistency of the findings. The first problem involves the distinction between behavioral and characterological fault. Several studies concerning attributions of self-blame among victims of rape and of accidents, (Bulman and Wortman, 1977; Janoff-Bulman, 1979; Peterson, Schwartz, and Seligman, 1981), have distinguished between behavioral and characterological self-blame, and have measured each of these types of attribution independently. Results of these studies have demonstrated that those victims who blamed their own moral character for their misfortune, as opposed to some aspect of their behavior, tended to exhibit greater signs of depression following the event.

Unfortunately, studies involving a perceiver's attributions of responsibility toward a victim of a misfortune have not been as careful in distinguishing between behavioral and characterological fault. For example, Lerner and Simmons (1966), and Lerner and Matthews (1967) make

hypotheses regarding how behavioral and characterological fault should be related to one another, yet the dependent measures used in these studies were concerned only with the characterological fault of the victim; behavioral fault was ignored. There is also some question as to whether the measures of characterological fault that were used in these studies were appropriate. Victims' perceived attractiveness, likeability, and maturity were used as a measure of derogation of character, but these seem to be measures more of external traits than of a person's internal character. Other studies (Tyler and Divinitz, 1981; Whitehead and Smith, 1976) use measures of "responsibility", but fail to explain to which kind of responsibility they are referring. It would seem that in order to make clear predictions about how a perceiver will make attributions of responsibility for an event, behavioral and characterological fault must both be more clearly defined and accurately measured, and that is the major objective of the present research.

A second major problem with much of the research in the attribution of responsibility was noted by Chaikin and Darley (1973). They suggested that in many studies (Walster, 1966, 1967; Shaver, 1970; Shaw and Skolnik, 1971; Lerner and Simmons, 1966; Lerner and Matthews, 1967) the victim of the misfortune could have been perceived as a potential perpetrator of his own fate. These studies then, dealt with attributed responsibility in situations where some action taken by the victim may have caused the negative outcome (an act of commission). This leaves a question as to what would happen to attributions in other kinds of

situations. For example, would attributed responsibility be the same in situations in which the victim could in no way have perpetrated the event, but may have been able to prevent its occurrence had some action been taken (an act of omission)? Similarly, how would attributions be made when the victim could neither have perpetrated the event, nor prevented its occurrence in any way (totally innocent victim)? These are important questions if we are to attempt to generalize the findings of the attribution research to situations other than acts of commission.

The methodology used in attribution research has also come into question in criticisms by Chaikin and Darley (1973), Vidmar and Crinklaw(1974), and Lerner and Miller (1978). These researchers cite that a possible explanation for the inconsistency of results in attribution research may be that the situations used in many studies were not powerful or involving enough for the subjects. For example, most attribution studies have relied upon stimulus situations in which a fictional or anonymous character suffers some misfortune, such as an automobile accident (Walster, 1966, 1967; Shaver, 1970), theft (Tyler and Divinitz, 1981), rape (Jones and Aronson, 1973; Stokols and Schopler, 1973), or an accident in a chemistry lab (Shaw and Skolnik, 1971). In each of these cases, subjects read a short paragraph about the event, and were then required to make attributional judgements concerning the responsibility of the victim of the misfortune. It is quite possible that such an experience was not very threatening to the subjects, and that they were able to remain detached from the situation.

With minimal threat, there would be no need for subjects to resort to the self-protective, motivated distortions of attributions that just world and defensive attribution hypotheses would predict. This may well explain why results from these studies have been inconsistent and difficult to replicate.

A final problem with this body of research concerns the way in which variables such as the initial attractiveness of the victim or the prior expectancy of the event have been manipulated in previous studies. For example, Jones and Aronson (1973) manipulated the "attractiveness" of a rape victim by stating beforehand that she was either a virgin, a married woman, or a divorcee, and then looked at how attributed responsibility toward the victim differed over the three conditions. They found that greater (behavioral) responsibility was attributed to the virgin and the married woman for the rape, and this finding was interpreted to mean that subjects were threatened by the belief that such a crime could happen to a respectable and innocent victim merely by chance. Therefore, Jones and Aronson stated that subjects attributed the event to some behavior of the "attractive" victims in order to maintain a belief that innocent people do not suffer unjustly. This manipulation of attractiveness, however, was confounded with other variables, such as the victim's age, perceived morality, or personality characteristics.

A study by Whitehead and Smith (1976) contained a similar problem with respect to the manipulation of "expectancy" of an event. In this

study, subjects read a story in which a man builds a house on a plot of land after having been warned by a seismologist that there was either a 0 percent, 50 percent or 75 percent chance that an earthquake would occur on the land within the next few months. Such a manipulation of prior expectancy of the event could easily have led subjects to conclude that the stimulus person victim was acting stupidly in having built his house in that location, despite direct warnings from the seismologist. Therefore, "expectancy" could have become confounded with variables such as the victim's intelligence level, and this makes Whitehead and Smith's finding that higher expectancy of the event produced greater attributed responsibility to the victim difficult to interpret.

The present study will attempt to remedy the theoretical and methodological problems cited above. First, behavioral and characterological fault will be measured separately so that circumstances under which each occurs, as well as the relationship between them, can be more clearly distinguished. Second, situations where victims can be seen as guilty of commission, omission, or totally innocent of both will be used so that attributional differences between these conditions might be determined. In response to the criticisms of Chaikin and Darley (1973), Vidmar and Crinklaw (1974), and Lerner and Miller (1978), this study will attempt to use a more involving attributional problem: large scale disasters which could potentially affect millions of residents of California. Interest and involvement of the subjects will hopefully be enhanced through the use of highly

realistic, factually based information in the form of both written reports and slide presentations concerning California and the threat of disasters occurring there. Finally, the manipulations of subjects' expectancy of the disaster, and their opinions of the victims' attractiveness, will be accomplished in a manner less potentially subject to demand characteristics. Rather than inform the subjects that the stimulus person is either attractive or unattractive, the research will furnish information about the state of California in general, and this information will be either positive or negative in nature. High or low expectancy of the disaster will be manipulated in a similar fashion, with subjects receiving factually-based reports concerning the likelihood that various disasters could occur in California. In this way, the subjects' attributions will be based not on information directly given to them concerning the stimulus persons' attractiveness or expectancy of an event, but upon their own base of information about California as a whole. It is hoped that by manipulating attractiveness and expectancy in this way, a closer approximation of the way in which people make attributions of responsibility in "real world" settings can be obtained.

It is expected that for acts of commission (where the victim can be seen as potentially having perpetrated his own fate), the just world hypothesis will be confirmed. Just world theory would predict that behavioral and characterological fault will be negatively correlated, and that lower expectancy of the event should produce greater

attributions of behavioral fault. Initially positive opinions of the victims should also increase behavioral fault, since it would be difficult to derogate the moral character of someone regarded favorably.

An initial study addressing some of these questions (Davis and Shaver, Note 2) evaluated perceivers' attributions toward the victims of an earthquake in California. This research used a situation in which victims could be perceived as being guilty of an act of omission (failing to avoid the earthquake dangers by ignoring building safety codes and disregarding the warnings of the seismologists). Surprisingly, the findings of this study showed a positive correlation between behavioral and characterological fault. In addition, subjects with initially negative opinions of the victims, as well as a high expectancy of earthquake damage, made greater attributions of behavioral fault. It was expected that the results of the present study would follow a similar pattern in situations involving an act of omission. In summary then, this research was addressing the variables of initial attractiveness or opinion of the victims, the prior expectancy of the event, and whether an act of omission or commission contributed to the outcome. Opinion of the victims had two levels: Positive or Negative. Damage expectancy was either High or Low, and there were three types of disasters, varying in terms of the precipitating cause (either an act of commission, omission, or a completely freak occurrence).

Method

Subjects

The participants in the study were 157 students from the Introductory Psychology course at the College of William and Mary. They were recruited on a voluntary basis, and received experimental credit for their participation in the study. Subjects were randomly assigned to one of 12 experimental conditions such that there were at least 11 members in each cell. Four subjects, all in different conditions, produced incomplete results, and therefore, these data were dropped from the final analysis.

Stimulus Materials and Presentation

The experimental conditions varied according to three dimensions: type of disaster, positivity of opinion toward victims, and expectancy of the event.

Disaster Type. There were three different disaster situations used in the study, and they were presented to subjects in the form of a written report. The disaster type varied such that victims could be seen as guilty of an act of either omission or commission, or as innocent of both. For an act of omission, the disaster was a major, naturally occurring earthquake which struck the state of California. Victims in this situation may be seen as guilty by omission in that they might have been able to prevent or lessen the extent of the damage done by the quake had they taken some action (adhered to the building codes, and built in areas away from active earthquake fault zones) A disaster

resulting from an act of commission was an earthquake of equal magnitude, however the cause of this quake was linked to the pumping of water into the ground to facilitate the recovery of crude oil at a drilling site near an active fault zone. In this case, the quake could be seen as having been caused by an act of commission on the part of perpetrators. A third disaster situation was one in which the victims can be seen as innocent of acts of both omission and commission. In this case, a dam in Northern California bursts as a result of shockwaves from a distant earthquake on the California coast, causing heavy flood damage. Since the distant quake was the cause of the disaster, victims can not be seen as guilty of commission. Likewise, since earthquakes had never been a concern in this region of the state the victims could not be seen as having been capable of taking preventative measures against what happened, and are therefore not guilty of an act of omission.

Description of each of these three disasters was based upon factual information concerning earthquakes and environmental conditions in California, and was as detailed and realistic as possible. Also, the scope and magnitude of each of the three disasters was kept as identical as possible, so that the severity of the event was held constant over all conditions.

Opinion Manipulation. The opinion manipulation was accomplished using both written stories and a narrated slide presentation that was either positive or negative in regard to California in general. The

positive opinion story emphasized the state's many attributes, such as climate, productivity, scenic beauty, and recreational opportunities, and the corresponding slide presentation featured pictures of several of California's attractions: Disneyland, the redwood forests, the coastline, and the San Francisco skyline. The negative opinion story centered on California's problems, including high crime rate, social unrest, over-crowding, pollution, and the destruction of natural resources. Slides for this condition included photographs of smog, freeway traffic, the Watts riots in Los Angeles, and oil derricks off the California coast.

Both the written material and the slides used in the opinion manipulation were pretested, and were found to effectively alter subjects' opinions about California. Written stories were pretested using 53 students from an Experimental Psychology class at the College of William and Mary. On a 9 point rating scale, with higher numbers indicating more positive opinions, subjects who read the Positive opinion story had a mean rating of 6.19 with regard to their opinion of the residents of California. The mean rating of subjects who received the Negative story was 4.37. The slides that were used for this manipulation were pretested on a second group of 21 Experimental Psychology students. Positive slides received a mean rating of 7.38 for "pleasantness", and 7.08 for positivity of the slide's "content". In contrast, Negative slides received a mean rating of 3.40 for pleasantness, and of 3.01 for positivity of content.

Damage Expectancy Manipulation. There were two levels of damage expectancy presentations, differing in the amount of optimism or pessimism expressed concerning the possibility that a major disaster would strike California. This information was also presented to subjects in the form of both written reports and slides. For high damage expectancy, statistics regarding the likelihood of a severe earthquake striking the state in the near future, and of the high number of casualties that would result from such a disaster were presented to the subjects. Slides of damage caused by the 1971 San Fernando Valley earthquake were shown to subjects in this condition. For low damage expectancy conditions, a report on building safety standards and advances in the prediction and prevention of earthquakes was followed by slides of some of the new "earthquake proof" buildings being constructed in San Francisco and Los Angeles. Also included were slides of the Mt. St. Helens volcanic eruption in Washington state, to emphasize that California is no different from other geographical areas of the United States in its susceptibility to natural disasters.

There were three slightly different versions of the high and low damage expectancy reports, varying according to the disaster type: naturally occurring earthquake, man-made earthquake, and the dam burst. Copies of each of these reports are in the Appendix. These damage expectancy reports were pretested on the group of 53 Experimental Psychology students mentioned above. On a 9 point rating scale, with higher numbers indicating a greater likelihood that California will

suffer a major disaster in the near future, subjects who read the High damage expectancy report had a mean rating of 6.16. Subjects who read the Low expectancy report rated the likelihood of a future disaster as 4.50.

Stimulus Persons. A short paragraph describing the stimulus persons was presented to the subjects. The stimulus persons in this study were a married couple called the Palmers, who had lived in California for several years, and who were victims of the disaster. A couple was used so that subjects of both sexes could identify more easily with the stimulus persons. Depending on disaster type, the couple lived in suburban San Francisco (naturally occurring quake), on the coast near Los Angeles (man-made earthquake), or in Sacramento (dam burst). In all conditions, the stimulus persons were not seriously injured in the disaster, but their home was completely demolished.

Dependent Measures. Both the manipulation checks and the dependent measures in this study were in the form of questions that could be answered on a 9 point scale. Manipulation checks identical to those used in pretesting were included to assess the effects of the Opinion and Expectancy manipulations. In addition, a check on the perceived severity of the disaster was included that asked, "How serious do you feel the effects of this disaster were?" The dependent measures included a battery of questions concerning both the victims' behavioral and characterological fault. There were also questions concerning how foreseeable the disaster should have been to the residents of

California, how foreseeable it should have been to the Palmers, and a question on how likeable the victims were, included in order to compare the present results more closely to earlier just world research.

In an attempt to increase the practical applications of this research, another manipulation was included at the end of the folder containing the stimulus stories and the dependent measures. First, subjects were asked how strongly they would support federal aid for the victims of the California disaster they had just read about. Next, subjects were randomly assigned to one of 2 groups. In the first group, subjects were informed that earthquake (or flood) insurance had been available prior to the disaster at a high cost. The second group was told that such insurance had been available at a minimal cost. Following this manipulation, subjects were again asked how strongly they would support federal assistance to the disaster victims, as well as the question, "How strongly do you feel that the victims should be blamed for what happened to them?"

Procedure

Subjects were run in groups ranging in size from 3 - 23 members each. Upon arriving at the experiment, they were informed that they were participating in a study concerning people's attitudes about various states in the United States, and were informed of their rights according to the ethical guidelines of the American Psychological Association. Subjects who wished to participate were first given either the positive or the negative story about California, followed by the

matching slide presentation. Next, a high or low damage expectancy report with accompanying slides was presented, followed by the paragraph concerning the stimulus couple. At that point, subjects were asked to answer the two manipulation check questions on opinion and expectancy. Following the manipulation checks, subjects received a detailed, three page long, typed description of one of the 3 disaster types and were informed as to the fate of the stimulus persons. Finally, subjects were asked to complete the questions comprising the dependent measures, including the insurance manipulation and questions.

A complete debriefing followed the procedure, in which the purpose and hypotheses of the study were explained, questions answered, and subjects told how they could obtain a copy of the results of the study.

Results

The manipulation checks, and all of the dependent measures were analyzed in a 2 x 2 x 3 analysis of variance. There were 2 levels of Opinion (Positive or Negative), 2 levels of Damage Expectancy (High or Low), and 3 levels of Disaster Type (Flood, Man-made Earthquake, or Naturally-Occurring Earthquake).

Manipulation Checks

There were three manipulation check questions, each of which was scored on a 9 point rating scale. The results for the manipulation checks are shown in Table 1. The first question concerned the damage expectancy manipulation, and asked, "How likely do you think it is that California will experience a major earthquake (disaster) within the next 5 - 10 years?" There was a main effect for damage expectancy on this question, F (1, 129) = 69.08, p. < .001, such that subjects in High damage expectancy conditions reported significantly greater likelihood of an earthquake or flood (M = 6.90) than did those in the Low expectancy conditions (M = 4.62). There was also a significant main effect for disaster type, F (1,129) = 4.60, p < .05, such that the Man-made and Naturally-Occurring earthquakes were perceived as being more likely to occur (means were 6.10 and 7.73, respectively), than the Flood disaster (mean = 5.18).

Table 1

Mean Scores For Manipulation Checks

Disaster:	Flood				Man-made				Natural			
Opinion:	Positive		Negative		Positive		Negative		Positive		Negative	
Expectancy:	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
n:	11	13	11	11	12	12	12	11	11	13	12	12
Measure												
Likelihood	5.91	3.62	7.36	3.81	7.42	5.00	6.92	5.18	6.73	5.54	7.08	4.58
Opinion	6.73	6.00	5.09	5.27	5.50	6.83	5.08	4.18	6.00	5.77	5.00	4.67
Severity	8.36	7.69	8.27	8.64	8.25	7.83	8.58	8.18	8.45	8.69	8.75	8.08

The second manipulation check was a question asking, "How positive or negative is your overall opinion of the residents of California?". As in pretesting, subjects in Positive conditions expressed more favorable opinions of Californians (M = 6.14) than did subjects in Negative conditions (M = 4.88), and this difference was highly significant, F (1,129) = 21.82, p. < .001.

The third manipulation check, administered after subjects had read the disaster report, measured the perceived severity of the disaster by asking, "How serious do you think the effects of this disaster were?". No significant differences were found for this question. The mean rating of severity across all conditions was 8.31 on a 9 point scale, and there was an extremely limited range of responses on this question. It is evident that all subjects perceived the disaster to be extremely serious, regardless of experimental condition.

Behavioral Fault Measures

There were four separate questions included to measure behavioral fault. The first three measures consisted of questions asking, "How strongly do you feel that by living in California, the Palmers brought their suffering upon themselves?" (behavioral fault), "How strongly do you feel that there were actions that the Palmers could have taken to prevent what happened to them?" (omission), and "How strongly do you feel that what happened to the Palmers was a result of their own actions?" (commission). In addition, there was a question concerning how foreseeable the disaster should have been to the Palmers. Each of

these questions, like the manipulation checks, was answered on a 9 point rating scale. These data are shown in Table 2.

There were no significant effects for either the behavioral fault or the omission question, however the commission question did yield a significant main effect for expectancy, F (1,129) = 9.93, $p.$ < .01. High expectancy produced greater attributions of fault (M = 3.45) than did Low expectancy (M = 2.35).

Because these three measures of behavioral fault were all significantly intercorrelated, they were combined into a single index of behavioral fault, and an analysis of variance was performed on this index. There were two significant main effects on the behavioral fault index, similar to the findings for the manipulation check on expectancy. There was a main effect for expectancy, F (1,129) = 6.27, p. < .05, such that High expectancy produced higher overall ratings of behavioral fault (M = 3.94), than did Low damage expectancy (M = 3.19). There was also a significant main effect for disaster type, F (2,129) = 3.13, $p.$ < .05, such that the greatest behavioral fault was attributed to victims of the naturally-occurring earthquake (M = 4.07) as compared with the man-made earthquake (M = 3.18) and the flood (M = 3.44).

Table 2

Mean Scores For Dependent Measures of Behavioral Fault

Disaster:	Flood				Man-made				Natural			
Opinion:	Positive		Negative		Positive		Negative		Positive		Negative	
Expectancy:	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
n:	11	13	11	11	12	12	12	11	11	13	12	12
Measure												
Behavioral Fault Index	3.88	3.10	3.39	3.39	3.75	2.92	3.64	2.42	4.09	3.72	4.89	3.58
Living in California	3.82	2.69	3.18	3.73	3.75	3.00	3.50	2.45	3.27	3.69	5.08	4.08
Omission	4.64	3.85	3.91	3.73	4.25	3.67	4.33	3.18	5.27	4.85	5.25	4.00
Commission	3.18	2.77	3.09	2.73	3.25	2.08	3.08	1.64	3.73	2.62	4.33	2.67
Foreseeability	6.00	3.85	6.36	4.45	5.83	4.25	5.58	3.73	6.54	4.85	6.92	4.17

A final behavioral fault measure concerned the foreseeability of the disaster, and asked subjects, "How foreseeable do you think this disaster should have been to the Palmers?". There was a highly significant main effect for expectancy, F (1,129) = 40.22, $p.$ < .001, such that with High expectancy, greater foreseeability was assigned to the victims (M = 6.22) than in conditions of Low expectancy (M = 4.22). There were no other significant effects for this question.

Characterological Fault Measures

As for behavioral fault, there were four different questions concerning the victims' characterological fault. Ratings for these characterological fault measures are shown in Table 3. The first question concerning characterological fault was similar to the manipulation check for opinion, and asked, "How positive or negative is your overall opinion of the residents of California?". This question, however, was asked following the disaster report, while the manipulation check was asked prior to subjects reading that report. The analysis for this question revealed a significant main effect for opinion, F (1,129) = 16.43, $p.$ < .01. Subjects in Positive conditions expressed more favorable opinions of Californians (M = 5.62), than those individuals in Negative conditions (M = 4.94).

There was also a significant interaction on this question between opinion, expectancy, and disaster type. A similar interaction was found on two of the other measures of characterological fault, and therefore, the nature of this interaction will be discussed in detail below.

Table 3

Mean Scores For Dependent Measures of Characterological Fault

Disaster:	Flood				Man-made				Natural			
Opinion:	Positive		Negative		Positive		Negative		Positive		Negative	
Expectancy:	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
n:	11	13	11	11	12	12	12	11	11	13	12	12
Measure												
Characterological Fault Index	4.91	4.03	4.12	4.64	4.44	4.69	4.39	3.63	4.15	4.36	4.47	4.08
Opinion of Residents	6.09	5.31	4.64	5.73	5.33	6.33	5.17	4.36	5.36	5.31	5.17	4.58
Opinion of Palmers	6.09	5.54	5.09	6.18	5.33	6.08	6.17	5.45	5.45	5.54	5.67	5.75
Likeability	6.73	5.92	5.18	5.91	5.67	5.83	5.92	5.36	5.64	5.92	5.75	5.50
Moral Responsibility	2.55	1.23	2.64	2.00	2.67	1.67	1.83	1.09	1.64	2.23	2.58	1.92

The second measure of characterological fault was a question that asked, "How positive or negative is your overall opinion of the Palmers?". No main effects were found for this question, however, a significant interaction between opinion, expectancy, and disaster type did occur. As mentioned above, this interaction will be discussed in detail below.

The third measure of characterological fault was a question similar to those used in much of the previous just world research, and asked subjects, "How much do you think you would like the Palmers?" The same interaction between opinion, expectancy, and disaster type that appeared in the previous two questions, also occurred on this question.

These three measures of characterological fault were significantly intercorrelated, and therefore, like the measures of behavioral fault, they were combined into a single index. An analysis of variance on this index yielded only a significant interaction, again, between opinion, expectancy, and disaster type. All of the measures of characterological fault, as well as the combined characterological index, displayed this same pattern of interaction. When the disaster was the Naturally-Occurring earthquake, there were no differences based on either expectancy or positivity of opinion. Within Positive conditions, there was an interaction between expectancy and disaster type: In the Man-made earthquake condition, Low expectancy led to more favorable opinions of victims, but in the Flood condition, High expectancy produced more favorable opinions of the victims.

By contrast, within the Negative conditions, the pattern of this interaction was reversed: For the Man-made quake, High expectancy led to more favorable opinions of the victms, while Low expectancy led to more positive evaluation of victims in the Flood condition.

An additional measure of characterological fault was a question that asked, "Do you think that the moral character of the Palmers in any way influenced what happened to them?" High ratings on this question indicated a greater degree of characterological fault. A significant main effect, F (1,129) = 5.04, p. < .05, was found for expectancy, such that in High expectancy conditions, greater blame was placed on the victims' moral character (M = 2.32) than in Low expectancy conditions (M = 1.69).

Behavioral and Characterological Fault Comparisons

In order to test the hypothesis that behavioral and characterological fault would be inversely related, a correlation was performed on the dependent measures. Table 4 shows the correlations obtained for the various dependent measures.

The most interesting result of this analysis was that the question concerning the moral responsibility of the victims was found to be unrelated to other measures of characterological fault except the question dealing with opinion of the Palmers. There was, however, a significant positive correlation between moral responsibility and all measures of behavioral fault.

Table 4

Correlations Among Dependent Measures

	(LC)	(O)	(C)	(F)	(CI)	(OR)	(OP)	(L)	(MR)
Behavioral Fault Index (BI)	.86**	.88**	.90**	.39**	-.37**	-.43**	-.30**	-.10	.41**
Living in California (LC)		.60**	.70**	.36**	-.41**	-.50**	-.30**	-.10	.33**
Omission (O)			.68**	.35**	-.29*	-.30**	-.23*	-.13	.35**
Commission (C)				.32**	-.29*	-.35**	-.27*	-.02	.39**
Foreseeability (F)					-.24*	-.38**	-.21*	-.10	.13
Characterological Fault Index (CI)						.83**	.82**	.72**	-.18
Opinion of Residents (OR)							.50**	.35**	-.15
Opinion of Palmers (OP)								.46**	-.21*
Likeability (L)									-.07
Moral Responsibility (MR)									

* $p. < .05$

** $p. < .001$

In addition, there was a significant negative correlation between the opinion questions of characterological fault, and all measures of behavioral fault. Although there was a slight negative correlation between likeability and the behavioral fault items, this correlation was not significant.

Practical Implications

Willingness To Help. The question which asked, "How strongly would you support federal assistance to the victims of the California disaster?" produced no significant results. The mean rating on this question was 8.15 on a 9 point scale, indicating that all subjects, regardless of experimental condition, were equally supportive of federal aid to the victims.

Insurance Manipulation. Following information concerning the availability of either high or low cost disaster insurance, the question concerning federal assistance to the disaster victims was repeated. This insurance manipulation did produce a significant interaction between expectancy, disaster type, and insurance cost for this question. The nature of this interaction was such that subjects were least willing to support aid for the victims of the Naturally-Occurring earthquake when insurance was inexpensive, and expectancy was High, or in Man-made conditions when insurance was expensive, and expectancy was High.

Discussion

Based on just world predictions, behavioral fault in this study was expected to increase as a function of either Positive opinions of the victims, or of High expectancy of the disaster. This hypothesis was only partially confirmed. Positivity of opinion had no significant effects on attributions of behavioral fault toward the victims. Two measures of behavioral fault, the question concerning whether "living in California" brought about victims' suffering, and the omission question, both showed no significant effects as a result of either opinion or expectancy manipulations. On the remaining two behavioral fault questions, however, just world distortion did occur. When the disaster was perceived as having been more likely to occur (High expectancy conditions), subjects attributed greater amounts of foreseeability to the stimulus persons. Likewise, with increased expectancy, behavioral fault as measured by the commission question, also increased. Subjects in High expectancy conditions were more likely to belive that what happened was the result of some action taken by the victims themselves. These findings for behavioral fault, then, not only lend some support to the just world notion, but they also indicate that a perceiver attributes his or her own expectancies to a suffering victim. Despite the fact that no mention was made in the description of the stimulus persons concerning the Palmers' own expectancies concerning a disaster, subjects in High expectancy conditions stated that the disaster should have been more foreseeable to the Palmers than subjects in Low

expectancy conditions.

On the basis that the just world hypothesis predicts an inverse relationship between behavioral and characterological fault, it was expected that the ratings of characterological fault would increase with conditions of Low expectancy and Negative opinion. The results obtained for measures of characterological fault, however, were not that clear cut, and did not support such a hypothesis. Three of the measures of characterological fault yielded an interaction between opinion, expectancy and Disaster type. It appears that the nature of the disaster does affect victim derogation differentially, since the Man-made earthquake produced attributions of characterological fault that were completely reversed for the Flood. The Man-made quake, which was an event involving a perpetrator (an act of commission) produced results that seem consistent with just world predictions. Negative opinions of victims prior to the disaster, coupled with a High expectancy, did yield some degree of victim derogation. The flood, however, which involved no perpetrator, showed an opposite trend in that Negative opinions of the stimulus persons and Low expectancy produced more favorable opinions of the victims. It is interesting to note that, for the naturally-occuring earthquake , an event that although not perpetrated, could perhaps have been planned for, the results for measures of characterological fault remain constant over all conditions. For perpetrated events, or acts of commission, then, just world predictions hold true. For events lacking a perpetrator, and in which an act of omission has not occurred, just

world predictions are contradicted, and for events involving an act of omission, results do not follow any specific pattern. This finding then, seems to cast some doubt as to the generalizability of the just world hypothesis to situations where no perpetrator is involved.

A surprising finding in this study was that the measure of characterological fault that involved victims' moral responsibility for what happened seems unrelated to other characterological measures. The interactions found for all of the other characterological fault questions did not appear for moral responsibility. Instead, there was only a main effect for expectancy such that with High expectancy of the disaster, greater moral responsibility was attributed to the victims. The results of the correlations among the dependent measures further demonstrates this difference between moral responsibility and other character fault measures. Moral responsibility was found to be unrelated to characterological fault, while being highly positively correlated with measures of behavioral fault. The two "opinion" items of characterological fault were found to be negatively correlated with behavioral fault measures. This inverse relationship is predicted by the just world hypothesis. However, the likeability measure, which was similar to previous questions used in just world research, showed no such relationship to behavioral fault, though there was a slight trend in the predicted negative direction.

To summarize, it would appear that while characterological fault, as measured by questions concerning "opinion" or "likeability" of

victims, is inversely related to measures of behavioral fault, victim's moral responsibility for his or her own fate emerges as a separate factor that is more closely related to behavioral than to characterological fault. Like measures of behavioral fault, moral responsbility is based on the expectancy of the event, and is not affected by one's prior opinion of the victims. This is an important finding in that it points to the neccessity for more specific and well-defined attribution measures. Are the findings of victim derogation in original just world research (Lerner & Simmons, 1966; Lerner & Matthews, 1967) referring to measures of characterological fault, or does derogation reflect moral responsibility?

Finally, the results obtained for the insurance and federal assistance questions give some indication of how such factors as the expectancy or predictability of a disaster, and the availability of precautionary measures prior to the catastrophe, would influence the willingness of others to help the victims in the aftermath of such an event. While there was no difference in individuals' willingness to support federal assistance prior to the insurance manipulation, changes did occur following the information they received about the availability and cost of insurance. Perhaps the most relevant finding with regard to California and its earthquake threat, was that individuals were least likely to support federal assistance to California disaster victims when low cost insurance was available, expectancy of the disaster was high, and the state was hit by a massive, naturally-occurring earthquake.

In conclusion, two points need to be emphasized. First, it is apparent that the way in which one asks perceivers to make attributions of responsibility makes a definite difference in the type and degree of attributions that will be made. Second, the variables which affect attributions of responsibility have not been given careful enough consideration in past research in the field, and should be studied in greater detail in the future.

Appendix

Positive Opinion Story

Since World War II, California has been attracting new residents at incredible rates; during the 1960's, 1,000 new residents entered the state each day. Attractive job opportunities, a temperate sub-tropical climate, and incredible natural beauty have combined to make California the most popular state in the nation. It is also the most populous state. In 1980, 24 million people, or nearly 1 in every 10 Americans, lived in California. The state's residents enjoy one of the highest standards of living in the world, and measured against the national average, are younger, healthier, and better educated. Many of the country's leading medical centers, research facilities, and universities are located in California.

No single state is as vital to the rest of the nation as California is. Of all the food produced in the United States, 25% of it comes from California, including 45% of all fresh fruits and vegetables, and 75% of the wine. Because of its year-round mild climate, the state can supply the rest of the nation with fresh produce all winter long. With most of the recording, television and film industries located in Los Angeles, entertainment is almost exclusively the realm of California. The state also serves as a vital trade link with the Far East; the ports of San Francisco, Long Beach, and San Diego are among the busiest in the world.

California also leads the nation in the number of state and federal parks and recreational areas within its borders. The state contains

vast areas of forests, beaches, mountains, and deserts. The world's oldest and tallest trees, the Sequoia and the Redwood, respectively, are found only in California. Adding to the state's diversity are dozens of manmade attractions including Disneyland, Knott's Berry Farm, Marineland, and the world-reknown San Diego Zoo, to name only a few. It is therefore not surprising that Californians also spend more time in leisure and recreational activities than do the residents of any other state.

The cities of San Francisco, Los Angeles and San Diego are among the most cosmopolitan and influential in the country. The San Francisco Bay area, with a population of over 4 million, is well known for its breathtaking beauty, excellent restaurants and stores, and its rich, varied ethnic mixture. Los Angeles is often referred to as a prototype for the city of the future. This city of over 7 million has recently completed construction of an enormous civic and cultural center, is noted for its striking modern architecture, and has one of the most elaborate and efficient freeway systems in the world. San Diego, a city of 3 million, reflects its Spanish origins with its Mediterranean architecture, and has become a haven for those seeking a relaxed atmosphere, abundant recreational facilities, and an ideal climate (the average year-round temperature is 70 degrees).

In light of all of these assets, it is not surprising that California continues to receive a steady influx of new residents each year. In 1980, San Diego and San Jose replaced two eastern cities in

the list of the 10 largest cities in the United States, and San Jose is currently the fastest growing city in America. It appears that California today, just as during its gold rush days in the 1800's, is a symbol of hope, opportunity, and prosperity, and that the migration to California is showing no signs of waning.

Negative Opinion Story

California, with a population of 24 million as of 1980, is beset with many serious problems. Since World War II, there has been a massive migration to California, but this explosive growth has worked to ruin the paradise that the state was once reputed to be.

Los Angeles is the prime example of how unbridled growth has affected the entire state. This city covers an area the size of the entire state of Rhode Island, and the population of the metropolitan area is now greater than 7 million. Because Los Angeles is so spread out, hundreds of miles of freeways were built to link the various areas of the city, and the automobile is literally the only efficient means of transportation. This exclusive reliance on the auto, as well as the city's geographical location (it sits in a basin, ringed by mountains on three sides), has created a very severe air pollution problem. On the average, severe smog blankets the city about 70 days per year, creating thousands of cases of eye irritation and respiratory difficulties. When pollution levels reach dangerous proportions, schools, businesses and stores sometimes need to be closed in order to keep people inside and off of the freeways. Los Angeles is not even able to provide its residents with enough drinking water, and must therefore import water from as far away as Arizona or the Owens Valley, 200 miles north of the city.

Los Angeles, however, merely reflects problems which the rest of

California shares. Areas of the state that were once rich in scenic beauty have been wiped out to make way for increasing development. In Northern California, thousands of acres of Redwood forests, the tallest trees in the world, were ravaged for building purposes. Likewise, in Southern California, orange groves and farmlands were removed in order to make way for new housing developments and freeways. Some writers have predicted that by the year 2000, if not sooner, the entire coast of California between Los Angeles and San Diego, which are 150 miles apart, will become nothing but a continuous urban sprawl.

California is, and has long been, a cauldron of social injustice and unrest. The diverse ethnic population of which San Francisco now boasts was for decades greeted with bitter prejudice and discrimination. The garment industry in Los Angeles, and the hundreds of farming communities in California's Central Valley have profited immensely through the use of Mexican laborers who are subjected to intolerable working conditions and receive far below the minimum wage. Not only were the Watts riots in Los Angeles and the student demonstrations at Berkeley virtually the first such major revolts seen in America during the late 1960's, they were also among the most violent. In addition, such events as the "hippie" movement in San Francisco, and the emergence of bizarre religious cults such as the "Moonies" or Jim Jones' "People's Temple" are all products of California. The state also has one of the highest rates of violent crime in the world, and leads the nation in the incidence of suicide, divorce, prostitution, homosexuality, alcoholism,

drug abuse, and venereal disease.

In summary, California seems to be an example of "Paradise Lost". What once may have been a land of great hope, opportunity, and vitality has become one of the most polluted, overcrowded and troubled societies that the world has ever known.

High Damage Expectancy - Naturally Occuring Earthquake

California experiences over 1,000 measurable earth tremors each year, and the state is laced with dozens of earthquake fault zones. The largest of these is the San Andreas, which stretches some 650 miles from just north of San Francisco to the Mexican border. The San Andreas is located only 50 miles east of both Los Angeles and San Diego, and passes within 10 miles of San Francisco. Other smaller faults criss-cross the state as well, such as the Hayward Fault near Oakland and Berkeley, and the Garlock Fault just north of Los Angeles. California has suffered many severe quakes over the years: Los Angeles - 1857, Santa Barbara - 1925, Long Beach - 1933, Imperial Valley - 1940, Bakersfield - 1952, San Fernando Valley - 1971, and of course, the famous San Francisco earthquake of 1906 which almost totally destroyed that city. Most experts agree that another quake is already long overdue in California, and it has been hypothesized that the state can probably expect a major earthquake within the next 5 - 10 years.

Despite such predictions, as well as its history, California seems to be ignoring the imminent danger. Of the state's population of 24 million, 90% live in large, densely populated metropolitan areas, all of which are within 50 miles of a major earthquake fault. Some cities, such as San Bernardino and Palm Springs, are built directly atop the San Andreas Fault. The financial district of San Francisco, where most of the city's skyscrapers are located, is built on land fill from San

Francisco Bay, despite the fact that this same type of land was shown to be extremely unstable during the 1906 earthquake. Los Angeles in the late 1960's relaxed many of its building safety codes, allowing for the construction of skyscrapers 60 - 70 stories high, even though such structures have sustained frightening damage in quakes all over the world. A further example of the blatant disregarding of safety standards has been the construction of nuclear power plants, some of which are only a few miles from active fault zones.

Even those structures which have been built to meet all known earthquake safety standards cannot be considered free from risk. For instance, a large hospital built in Sylmar, California in 1970 according to the strictest safety precautions collapsed during the relatively minor San Fernando Valley earthquake of 1971. Similarly, many of the buildings which were destroyed in an earthquake in Caracas, Venezuela in 1967 had been constructed according to the same building codes that are used in San Francisco for the construction of highrise apartment complexes. In short, none of the skyscrapers, shopping centers, bridges, or freeways currently being used in California has been put to the test in a major quake, and it is therefore a fallacy to describe them as being "Earthquakeproof".

Taking into account California's incredible population density and numerous building hazards, estimates of casualties run into the millions in the event that a major earthquake were to strike California today. Unfortunately, there is no way of predicting or controlling earth

movements at the present time, and even if a major quake could be predicted, evacuation of such huge masses of people would be impossible.

High Damage Expectancy - Man-Made Earthquake

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As if the threat of a devastating, naturally occuring earthquake in California is not already great enough, geologists have found that it is possible to produce man-made earthquakes. Underground nuclear testing, for example, creates shockwaves comparable to those of an earthquake. In the 1960's, the city of Denver, Colorado was rocked by a series of over 700 earth tremors, which although not severe, were puzzling since there was no known earthquake fault in the region. The cause of these tremors was eventually traced to the pumping of toxic wastes deep into the ground at a nearby military installation. These liquid wastes evidently lubricated weak areas of underlying rock, causing them to slide more easily against one another, resulting in an earthquake. Once this pumping was halted, the quake activity near Denver ceased. A similar event, were it to occur near one of California's dozens of active fault zones, could conceivably trigger the cataclysmic earthquake that geologists have long been expecting.

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numerous building hazards, estimates of casualties run into the millions in the event that a major earthquake were to strike California today. Unfortunately, there is no way of predicting or controlling earth movements at the present time, and even if a major quake could be predicted, evacuation of such huge masses of people would be impossible.

High Damage Expectancy of Dam Burst at Oroville, Calif.

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It is also likely that the occurrence of an earthquake is not the only source of danger to the residents of California. During the 1971 San Fernando Valley earthquake, the Van Norman Dam, located in the hills above Los Angeles, was severely damaged. Had this dam given way, thousands of homes in the valley below would have been obliterated. Geologists claim that certain structures are highly susceptible to the gentle rocking from a major quake occurring hundreds of miles away. The Oroville Dam, (the highest earthen dam in the world), is located in Northern California, approximately 150 miles from San Francisco. Below this dam lies the Central Valley of California, which includes major population centers such as Sacramento Davis, and Stockton. Although this area is not considered an earthquake zone, and is not likely to be directly affected by a large earthquake along the San Andreas Fault, distant shockwaves from such a quake might well weaken a structure like the Oroville Dam, thereby jeopardizing hundreds of thousands of people who had escaped the earthquake itself.

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Low Damage Expectancy of Man Made and Naturally Occurring Quake

California experiences over 1,000 earth tremors each year. Of these, the vast majority cannot be felt, and are only detected with sensitive seismic instruments. The state has experienced several strong earthquakes in its history, yet these have caused relatively minor damage to property and few casualties. Even the great 1906 earthquake in San Francisco, one of the strongest quakes on record, resulted in fewer than 450 casualties, and most of these were the victims of fires which swept the city after the quake.

Although some scientists predict that a major quake may be imminent in California, others have a different theory. They believe that the periodic quakes which strike the state release tension that builds up along earthquake fault zones, and that this tension release helps to prevent the triggering of a truly severe quake. Lending support to this theory is the fact that over the last 75 years, there have been a number of moderate quakes, (1925, 1933, 1940, 1952, 1971), located in various areas of the state. These quakes have caused a minimum amount of damage, and there have been no quakes nearly as serious as the 1906 earthquake.

Even if a major quake should strike California, state officials are optimistic that serious damage or large numbers of casualties will not result. Safety standards and building codes have been designed to minimize earthquake damage. For example, in Los Angeles, brick

structures cannot be taller than 13 stories. New skyscrapers in both Los Angeles and San Francisco have been dubbed "earthquakeproof". They have been constructed using flexible steel girders, allowing them to rock and sway with ground motion, rather than rigidly resisting such movements. It is this rigid resistance which causes the enoromous stresses that could topple a structure during an earthquake. The Golden Gate Bridge is another example of earthquakeproof construction. The supports for this bridge have been embedded dozens of feet into the underlying bedrock, thus making the bridge far less likely to be affected by tremors.

Seismologists have also been encouraged by the recent cooperation between the state of California and the governments of Japan and China in earthquake research. It appears that a method for predicting earthquakes may soon be perfected, allowing for the evacuation of unsafe areas or buildings in the event of a forthcoming quake. Attempts at earthquake control and prevention are also underway, some of which involve what can best be described as "lubrication" of earthquake fault zones. It is possible that pumping small amounts of water into the ground near an active fault zone might produce smooth, gradual movement along the fault line, rather than the sudden grating of one side against the other, which produces an earthquake. These attempts are, of course, experimental, since there is presently no way to know how much water is enough to insure gradual movement without creating a major tremor.

The residents of California tend not to regard the possibility of

earthquakes as a serious threat. They have for decades heard predictions that the entire state is about to slide into the Pacific, and have seen the predicted dates of these disasters quietly pass. Californians contend that their earthquake risks are actually no greater than the dangers of tornados to Mid-Westerners or of hurricanes to those who live along the Gulf Coast. They support this belief by pointing out that the death toll from such storms across the United States each year is considerable, while not a single person has been killed in a California earthquake in almost 30 years.

Low Damage Expectancy - Dam Burst at Oroville, Calif.

California experiences over 1,000 earth tremors each year. Of these, the vast majority cannot be felt, and are only detected with sensitive seismic instruments. The state has experienced several strong earthquakes in its history, yet these have caused relatively minor damage to property and few casualties. Even the great 1906 earthquake in San Francisco, one of the strongest quakes on record, resulted in fewer than 450 casualties, and most of these were the victims of fires which swept the city after the quake.

Although some scientists predict that a major quake may be imminent in California, others have a different theory. They believe that the periodic quakes which strike the state release tension that builds up along earthquake fault zones, and that this tension release helps to prevent the triggering of a truly severe quake. Lending support to this theory is the fact that over the last 75 years, there have been a number of moderate quakes, (1925, 1933, 1940, 1952, 1971), located in various areas of the state. These quakes have caused a minimum amount of damage, and there have been no quakes nearly as serious as the 1906 earthquake.

Even if a major quake should strike California, state officials are optimistic that serious damage or large numbers of casualties will not result. Safety standards and building codes have been designed to minimize earthquake damage. For example, in Los Angeles, brick

structures cannot be taller than 13 stories. New skyscrapers in both Los Angeles and San Francisco have been dubbed "earthquakeproof". They have been constructed using flexible steel girders, allowing them to rock and sway with ground motion, rather than rigidly resisting such movements. It is this rigid resistance which causes the enoromous stresses that could topple a structure during an earthquake. The Golden Gate Bridge is another example of earthquakeproof construction. The supports for this bridge have been embedded dozens of feet into the underlying bedrock, thus making the bridge far less likely to be affected by tremors. The 1971 San Fernando Valley quake, which occurred in a highly populated area north of Los Angeles, gave seismologists the opportunity to determine how various structures would withstand an earthquake. For the most part, the area's skyscrapers and freewys held up well, and there was minimal damage. In addition,several major dams in the area were also unaffected by the tremors. Seismologists have also been encouraged by the recent cooperation between the state of California and the governments of Japan and China in earthquake research. It appears that a method for predicting earthquakes may soon be perfected, allowing for the evacuation of unsafe areas or buildings in the event of a forthcoming quake. Attempts at earthquake control and prevention are also underway, some of which involve what can best be described as "lubrication" of earthquake fault zones. It is possible that pumping small amounts of water into the ground near an active fault zone might produce smooth, gradual movement along the fault line, rather than the

sudden grating of one side against the other, which produces an earthquake. These attempts are, of course, experimental, since there is presently no way to know how much water is enough to insure gradual movement without creating a major tremor.

The residents of California tend not to regard the possibility of earthquakes as a serious threat. They have for decades heard predictions that the entire state is about to slide into the Pacific, and have seen the predicted dates of these disasters quietly pass. Californians contend that their earthquake risks are actually no greater than the dangers of tornados to Mid-Westerners or of hurricanes to those who live along the Gulf Coast. They support this belief by pointing out that the death toll from such storms across the United States each year is considerable, while not a single person has been killed in a California earthquake in almost 30 years.

Naturally Occurring Earthquake - San Andreas Fault

The initial tremors hit San Francisco at 8:45 on a Thursday morning, and gradually built in intensity. The first casualties were rush-hour commuters, stalled in traffic on the Golden Gate Bridge as the span's north tower buckled. In the city, the highrise apartment complexes and office buildings went almost immediately, their slab floors slapping together like quickly shuffled playing cards, as the mud flats upon which they had been built simply gave way beneath them. The blaring of horns drowned out the screams of the injured as motorists frantically tried to leave the city and dodge debris. In the downtown shopping district there was general panic as plate-glass windows burst, and masonry crashed to the sidewalks below. Damage and loss of life was also heavy along the densely populated San Francisco Peninsula, as tract housing slid down hillsides, and crevasses opened, splitting and swallowing entire houses. The cities of Oakland, Berkeley, and San Jose were all extremely hard hit by the quake.

As the shockwaves continued to move southward, along the course of the San Andreas Fault zone, the small coastal towns of Monterey, Carmel, and Santa Barbara, as well as the inland farming communities to the east, received heavy structural damage. Homes, shops and motels were shaken off their foundations, but loss of life was minimal since this was not a heavily populated area.

As the tremors reached the Los Angeles area, the metropolis was

crippled almost instantly. The huge aqueducts which carried water to the city were severed, while elevated portions of freeways throughout the Los Angeles Basin collapsed into rubble. Hillside and cliff-top homes began to slide, carrying their residents with them as the shockwaves caused the land to crumble and give way. Downtown, the steel skyscrapers remained structurally intact, however hundreds of occupants of these buildings were literally beaten to death as the buildings swayed violently back and forth. In the streets below, pedestrians ran about haphazardly, trying to avoid the glass and debris that rained down upon them from the buildings above. Hastily built housing developments in the suburban areas of San Bernardino and Riverside were flattened almost instantly, and in houses built along the San Andreas Fault line residents could actually look down into seemingly bottomless, gaping cracks.

In San Diego, further to the south, the quake was less severe in intensity. Panic was nevertheless widespread, as rumors of damage to a nearby nuclear reactor caused people to desperately attempt to leave the area. Fear of food shortages and scarcity of vital supplies created looting and hoarding. In the quake's aftermath, the state was declared a disaster area. Throughout the state airports were closed due to cracks and rubble on the runways. The ports of San Francisco, Long Beach and San Diego were virtually knocked out, and most major highways in the state were impassible. Television, radio, telephones and electricity were out, and home owners were being advised by local police

and fire departments regarding the danger of gas leaks and furnace explosions. A critical water shortage in Los Angeles resulted in widespread fires which could not be brought under control.

In the days following the quake, aftershocks continued to make it unsafe for people to return to their homes, since even houses which looked sturdy could be brought down by another aftershock. When damage estimates began pouring in, loss of life was thought to be close to 100,000, while injuries and property damage could not even be assessed.

Seismologists determined that the earthquake measured 8.5 on the Richter scale, making it one of the largest quakes on record. The quake's epicenter was located just north of San Francisco, not far from that of the great 1906 earthquake.

Man-Made Earthquake - Newport Inglewood Fault

Tremors began in Los Angeles at 8:45 on a Thursday morning. Almost immediately, the metropolis was crippled as the huge aqueducts which carried water to the city were severed, and elevated portions of freeway throughout the Los Angeles Basin collapsed into rubble. Hillside and cliff-top homes began sliding downhill as the land beneath them crumbled and gave way, carrying their residents with them. Downtown, the steel skyscrapers remained structurally intact, however hundreds of occupants of these structures were literally beaten to death as the buildings swayed violently back and forth. In the streets below, pedestrians ran about haphazardly, trying to avoid the glass and debris that rained down upon them from the buildings above. Hastily built housing developments in the suburban areas of San Bernardino and Riverside were flattened almost instantly.

The shockwaves began to decrease in intensity as they moved northward from Los Angeles, then suddenly began to intensify once again. Now the small coastal towns of Santa Barbara, Monterey and Carmel, as well as the inland farming communities to the east felt the tremors, and structural damage was heavy in these areas. Homes, shops and motels were knocked from their foundations, but loss of life was minimal, since this part of the state was not densely populated.

Damage and casualties were heavy along the San Francisco Peninsula, however, where tract housing slid down hillsides and crevasses opened

up, splitting and swallowing entire homes. The cities of Berkeley, Oakland and San Jose were all extremely hard hit by the quake.

In San Francisco, the first casualties were rush-hour commuters, stalled in traffic on the Golden Gate Bridge as the span's north tower buckled. Highrise apartment complexes and office buildings collapsed almost immediately, their slab floors slapping together like quickly shuffled playing cards. The blaring of horns drowned out the screams of the injured as motorists frantically tried to leave the city and dodge debris. In the downtown shopping district there was general panic as plate glass windows burst and masonry crashed to the sidewalks below.

Far to the south, in San Diego, the quake was less severe, though panic was nevertheless widespread. Rumors of damage in a nearby nuclear reactor caused people to desperately attempt to evacuate the area. Fear of food shortages and scarcity of vital supplies caused looting and hoarding.

In the earthquake's aftermath, the state was declared a disaster area. Throughout the state, airports were closed due to cracks and debris on the runways. The ports of San Francisco, Long Beach, and San Diego were virtually knocked out, and most major highways in the state were impassible. Television, radio, telephones, and electricity were out, and home owners were being warned by local police and fire departments regarding the danger of gas leaks and furnace explosions. A critical water shortage in Los Angeles resulted in widespread fires which could not be brought under control. In the days following the

earthquake, aftershocks continued to make it unsafe for people to return to their homes, since even houses which looked sturdy could be brought down by the next aftershock. When damage estimates began pouring in, loss of life was thought to be close to 100,000, while injuries and property damage could not even be assessed.

Seismologists determined that there had actually been two earthquakes; the first occurring on the Newport-Inglewood Fault off the coast near Los Angeles, which in turn, triggered another series of shocks along the San Andreas Fault, farther to the north. Experts also discovered that the cause of the earthquake was linked to the pumping of large quantities of water into the ground near the Newport-Inglewood Fault. This procedure was being used at offshore oil drilling sites, since it facilitates removal of oil deposits. This added water pressure near an active fault zone produced a massive earth movement along the course of the fault, resulting in one of the most serious earthquakes on record.

Earthquake on San Andreas Fault and Dam Burst at Oroville, Calif.

The initial tremors hit San Francisco at 8:45 on a Thursday morning, and gradually built in intensity. The first casualties were rush-hour commuters, stalled in traffic on the Golden Gate Bridge as the span's north tower buckled. In the city, the highrise apartment complexes and office buildings went almost immediately, their slab floors slapping together like quickly shuffled playing cards, as the mud flats upon which they had been built simply gave way beneath them. Damage and loss of life were heavy along the densely populated San Francisco Peninsula, as tract housing slid down hillsides, and crevasses opened, splitting and swallowing entire houses. The cities of Oakland, Berkeley, and San Jose were all extremely hard hit by the quake.

As the shockwaves continued to move southward, along the course of the San Andreas Fault zone, the small coastal towns of Monterey, Carmel, and Santa Barbara received heavy structural damage. The cities and towns of the Central Valley, far to the north-east also felt the tremors, though they were not as severe as they had been along the coast. In most homes there was at least some minor damage as pictures and knick-knacks crashed to the floor. Some of the large buildings in Sacramento and Stockton suffered structural damage, such as cracked plaster and broken windows. Further north, the Oroville Dam seemed to slump ominously, but did not give way to the shaking.

As the tremors reached the Los Angeles area, the metropolis was

crippled almost instantly. The huge aqueducts which carried water to the city were severed, while elevated portions of freeways throughout the Los Angeles Basin collapsed into rubble. Hillside and cliff-top homes began to slide, carrying their residents with them as the shockwaves caused the land to crumble and give way. Hastily built housing developments in the suburban areas of San Bernardino and Riverside were flattened almost instantly, and in houses built along the San Andreas Fault line residents could actually look down into seemingly bottomless, gaping cracks.

As the shockwaves began to subside in Southern California, cracks began to appear in the face of the Oroville dam, 600 miles to the north. Within seconds, the structure simply collapsed, and a wall of water, mud, rock and other debris began to descend upon the heavily populated area in the valley below. Evacuation was virtually impossible, given the speed and force of the flood waters, and the situation grew worse as smaller dams and levees downstream were washed away, adding still more to the torrent that rushed through dozens of towns and cities. Automobiles were hurled through the air, trees uprooted, and entire houses merely pushed out of the way of the churning water. In its wake, the flood left appalling damage and thousands of casualties in the towns of Oroville, Gridley, Marysville, and Davis. Hardest hit, however, was the state capital, Sacramento. Built between two major rivers, the city was completely inundated, and even after the peak floodwaters had subsided, several feet of water covered the streets.

In the days following the disaster, most major highways were impassible, and television, radio, electricity, and telephones were all out for several days. The entire state was declared a disaster area, however, the northeastern portion of the state was the most severely obliterated area. When damage estimates began pouring in, loss of life was thought to be close to 100,000, while injuries and property damage could not even be assessed.

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