Disaster Study Number 15

THE OCCASION INSTANT

The Structure of Social Responses to Unanticipated Air Raid Warnings

by

Raymond W. Mack

George W. Baker

Disaster Research Group

National Academy of Sciences—

National Research Council

Publication 945

DISASTER RESEARCH GROUP

The Disaster Research Group is an activity of the Division of Anthropology and Psychology, National Academy of Sciences — National Research Council. It succeeds and carries on many of the functions of the Committee on Disaster Studies, which met under the auspices of the Division of Anthropology and Psychology from 1952 to 1957.

The Disaster Research Group conducts research, sponsors conferences and publications, and advises with officials on problems of human behavior in disaster and civil defense. It continues publication of the Disaster Study Series initiated by the Committee on Disaster Studies.

At present its activities are supported by a grant from the National Institute of Mental Health of the Department of Health, Education, and Welfare, a contract with the Office of Civil and Defense Mobilization, and a grant from the Ford Foundation.

THE OCCASION INSTANT

The Structure of Social Responses to Unanticipated Air Raid Warnings

Disaster Study Number 15
Disaster Research Group
Division of Anthropology and Psychology

THE OCCASION INSTANT

The Structure of Social Responses to Unanticipated Air Raid Warnings

by

Raymond W. Mack
Northwestern University

George W. Baker
National Academy of Sciences
National Research Council

Foreword by

Robin M. Williams, Jr.
Cornell University

Publication 945
National Academy of Sciences—National Research Council
Washington, D. C.
1961

Library of Congress
Catalog Card Number 61-64605

Available from
Printing and Publishing Office
National Academy of Sciences—National Research Council
Washington, D. C.

Price $2.00

Life is short and the art long; the occasion instant, decision difficult, experiment perilous.

-- Hippocrates

FOREWORD

The Occasion Instant of the title of this publication refers to a crucial moment of urgent decision which requires action here and now, if only to decide not to act. The decision must be made quickly, and its consequences may be enormous. To meet the Instant we have to interpret signs of safety and signs of danger. Fortunate is the occasion in which we really know what we are doing.

In our time the sounds of sirens are signals of emergency—fire, collision, accident, or other situations of urgent need. The most crucial use of the siren is to signal the imminence of air attack.

In the studies reported in the pages that follow, we are given a careful examination of the responses of urban Americans to the unanticipated signal for an enemy air attack which, happily, never came. Analyses are presented of three surprise "alerts" in different cities, under different circumstances. Each occasion is shown to have had unique features. But common elements run through the public's reactions to a signal that one might expect to have an imperative claim to total attention and immediate interpretation.

The authors of these studies are well aware of the complexity of the situations they describe, the difficulties of finding comparability among the three instances observed, and the wide range of modifying circumstances which could decisively alter mass response in other occasions. They are correspondingly cautious in their generalizations. Nevertheless, their interpretations are carefully drawn from sound conceptualization and ingenious use of the available information.

Three populations heard an unanticipated warning of enemy air attack. If the siren meant what it said—and there was no signal to the contrary—great danger was at hand. Very few hearers treated the sirens as real signals of danger. Why? We can readily grant that it is of some importance to have even a tentative set of answers to this question.

It seems clear that the reactions reported in the present studies reflect the great reluctance of the American people to believe in the

reality of possible catastrophe from unexpected air assault. The whole context in which the surprise alerts occurred was one of hope for peace, lack of desire for war, and a kind of forced disbelief that sudden attack could be a real and present danger. In reading the report which follows, it is interesting to ask, as one reads, whether the responses described could be imagined of a people really prepared to take seriously the possibility of massive atomic assault.

The authors face up to the problem posed for civil defense by an "unbelieving" public. They make wise suggestions as to how a complacent or blasé and poorly informed population might conceivably be led to take proper action, in spite of itself (pp. 37-39, 59-62).

Many important advances in scientific knowledge of human behavior are being made nowadays in the laboratory. Other essential findings are being derived from analysis of field experiments and systematic sample surveys. An important, indeed essential, place remains for naturalistic descriptions of social events, when such descriptions deal with delimited phenomena and are informed by thoughtful use of basic theory. The present monograph answers to the latter characterization. Its modest claims are followed by new data and fresh interpretations which add to our knowledge, and which contain implications worthy of serious consideration in matters of public policy and public action at both the local and the national level.

Robin M. Williams, Jr.
August, 1961

PREFACE

In much of the research on human behavior in disaster it has been found useful to divide behavior into time periods. Generally, the pre-impact period is separated into a period of threat and a period of warning. The warning period is followed by the impact of the disaster agent. Clearly, the warning period represents the last opportunity man generally has to prevent or minimize the damage that will be caused by many disaster agents. If an individual receives sufficient warning of an impending flood, for example, he probably will be able to find a place of safety for himself, his family, and some of his possessions. Other kinds of disasters develop much more quickly and the time between warning and impact is significantly less. For some events impact occurs without any warning. The residents of Pearl Harbor did not receive any warning of the attack that was made on them on 7 December 1941.

Regrettably, all the studies to date indicate that people seldom instantly adopt an adequate course of protective action after they have received a disaster warning. However, since patterned human behavior is socially learned, we believe that dysfunctional post-warning behavior can be significantly modified and improved. The very recent evacuation of coastal Texas and Louisiana in response to Hurricane Carla warnings provides considerable confidence for this assumption.

Generally, we must rely on the findings from our studies of natural disaster whenever we desire to extrapolate to hypothetical thermonuclear ones. Given our ethical values, we are limited in the extent to which we can employ the experimental method in social science. Therefore, we must be imaginative and seize upon any analogues which seem appropriate for our needs. In some measure the scheduled civil defense exercises provide an opportunity for studying post-warning behavior. Probably, those which we have witnesses to date have not been compelling or realistic enough to ensure a widespread public response. Thus their value for our research needs has been quite limited.

During the past few years there have been at least three instances when the nation's official civil defense siren was sounded accidentally or for non-training purposes. In each instance it

transmitted the message, "Attack Probable." On these occasions, with negligible exceptions, the siren was heard. Since those who heard the warning message had no valid reason for believing that it did not herald a real disaster, we may assume for research purposes that their post-warning behavior was the same as it would have been if the signal had been caused by an actual approaching enemy attack.

Fortunately for those who have a research interest in such matters, as well as for those who have planning and administrative responsibilities, these three events have been the subject of fairly satisfactory research efforts. An account of the behavior that resulted from the sounding of the civil defense siren in Oakland, California, on 5 May 1955 is found in Public Reaction To A Surprise Civil Defense Alert in Oakland, California by William A. Scott. A working paper report on the sounding of the siren in Washington on 25 November 1958 is available in Operation 4:30: A Survey of the Responses to the Washington, D.C., False Air Raid Warning by George W. Baker. And the Chicago event of 22 September 1959 is described in Joy in Mudville: Public Reaction to the Surprise Sounding of Chicago's Air Raid Sirens (working paper) by Elihu Katz with the assistance of Kenneth Kessin, John L. McCoy, Leonard Pinto, and Reid Strieby. The Chicago study offered an excellent opportunity for design replication, and this was accomplished. However, when the working paper reports were prepared on each of these events, administrative considerations precluded acknowledging that replication had been achieved. Consequently, appropriate comparisons and contrasts were not drawn in either of the two reports.

The present report represents our first effort to draw together in one document what we believe we know about the kinds of post-warning behavior which would probably be witnessed if the public soon experienced a civil defense warning for an enemy attack. We believe that, by presenting the information at this time, we have an opportunity to improve the quality of both our research information and the organization and procedures of the agencies and groups responsible for civil defense planning. Having viewed the studies of Oakland, Washington, and Chicago as offering this potential, we undertook the preparation of the present report with some urgency.

Dr. Raymond W. Mack's acceptance of the senior responsibility for the preparation of the report was a source of considerable personal satisfaction. The execution of his work, as always, reflects most favorably his strong sense of professional responsibility. While it would have been a pleasure to have Drs. Katz and Scott actively join in the preparation of this work, their heavy spring

and summer schedules precluded this. We have profited, however, from the several suggestions which they offered after our manuscript had been drafted.

In addition we want to acknowledge our gratitude to Mr. Troy S. Duster, graduate assistant in the Department of Sociology at Northwestern University, for his extensive bibliographic work and his invaluable suggestions on the manuscript. Professor Robert F. Winch, also of Northwestern, kindly provided a helpful critical reading of Chapter 6. Miss Mary Lou Bauer, Research Assistant for the Disaster Research Group, made insightful suggestions and raised numerous, pertinent questions throughout the last stages of the preparation and publication of the report. Special thanks are due Professor Robin M. Williams, Jr., of Cornell University, for his most constructive comments on our manuscript. We feel especially honored by the foreword which he prepared for our work.

At the outset we anticipated that the substance of the report would be of interest to operational agencies, especially those which have civil defense responsibilities. Therefore, we asked representatives from the Social Sciences Division and the Warning Office of OCDM to read the manuscript critically. Mr. Ralph Garrett and his associates as well as Mr. Harry E. Roderick and his staff responded in a most helpful manner. Cooperation from the staff of the Weather Bureau as well as Mr. William R. Armstrong, Assistant Emergency Planning Coordinator, U. S. Department of Commerce, is also gratefully acknowledged. The last chapter was written after the comments were received from operational agencies.

The reader with an interest in all the details of each of the three municipal post-warning experiences that we have analyzed should consult the appropriate report. These three reports, fully identified in our reference section, are largely the basis for the present synthesis and the source for most of the relatively brief tabular material that we have presented.

Funds from grants made by the Ford Foundation and the National Institute of Mental Health to the Disaster Research Group, and its contract with the Office of Civil and Defense Mobilization made the preparation of the present report possible.

George W. Baker
18 September 1961

CONTENTS

LIST OF TABLES

CHAPTER 1

THE WARNING PROCESS: AIMS OF THIS STUDY

In this monograph we are attempting to systematize recently acquired knowledge about social reactions to surprise civil defense warnings of air attacks. Whenever scholars take the opportunity to compare and contrast parallel cases or situations, they are on the road toward making science of a body of knowledge, toward establishing a set of related propositions of empirical reference. Our aim here is to collate the findings of three separate studies of responses to the unanticipated sounding of civil defense sirens in metropolitan areas, sifting out the differences among them and positing their common features as propositions about human behavior in situations of crisis. The implications of such propositions should provide guidelines for civil defense personnel in the conduct of their awesome job.

While modern military technology has complicated significantly the job of detection and identification of potential crises or enemy agents, the necessity for some sort of warning system is as old as organized human society. Less than a century ago, society's need for warning of approaching enemy and disaster agents was adequately served by scouts and lookouts depending solely upon their natural physical senses. World War II was fought with the aid of human sky scanners employing conventional aural and ocular aids and transmitting warning information by verbal and electrical means. Today's modern arsenal has drastically altered the requirements for an adequate warning system. But the human component with all of its complexities is still an essential part of warning and response to warning.

In ancient times or modern, social and cultural factors must be taken into account. A signal is not enough. It must have meaning in its cultural context. People must be taught its meaning so that they interpret the signal correctly and act upon it automatically. Society must be organized into groups and organizations which will help individuals interpret the signal and guide them to correct behavioral responses. The need to understand, predict, and control the social and cultural part of a total warning system is demonstrably imperative today for the survival of society.

Generalizations: Pure and Applied

The history of science reveals a tradition of research on the extraordinary. The study of patterns of deviation from a norm is frequently a helpful way to understand the norm. Interviews with juvenile delinquents may provide clues to the expectations of adolescent status against which they are rebelling. The description of the motivations underlying a strike often contains a wealth of information about the structure and functioning of the system of production. Similarly, research on the reactions of people to a crisis suggests a good deal about their ordinary social organization and social relations.

Such research on the extraordinary has proved useful both to scholars who attempt to compile sets of related facts and to men of action who would utilize those facts to implement policy. Geneticists and physiologists who study diseased organisms can offer valuable information to medical practitioners. At the same time such research on pathology contributes to our understanding of the workings of the healthy body. So does the student of riots marshal knowledge useful to the police as well as to the scholar concerned with institutional integration and the social order.

This study examines individual cases of civil defense warnings for the purpose of reaching generalizations about responses to them. It is directed both to social scientists and to officials faced with policy decisions—civil or non-military defense administrators, wardens, and Weather Bureau officials. We hope that it may be of some use both to those who seek scientific knowledge to help men preserve their cultural heritage in an age when its total destruction seems possible, and to those who would build toward a science of human behavior.

The Sources of Generalization

Three recent studies provide us with data on the behavior of various groups and categories of people when a civil defense warning sounds unexpectedly. In one case [Scott, 1956], an unidentified squadron of bombers was sighted approaching the central west coast of the United States on a weekday morning. Officials sounded the alert signal on civil defense sirens. These were accompanied by warning systems in schools and business offices. Radio stations went off the air. For a few minutes, the situation was as it would have been in the case of an impending attack—including the fact that no one involved in the warning system was certain whether or not an attack was about to occur. Afterward, a random sample of

146 adults in Oakland, California, were interviewed about their reactions to the signal.

The second study [Baker, 1959] is also focused upon the behavior of people in circumstances where even informed civil defense officials were not positive that the siren did not indicate that a real attack was imminent. At four-thirty in the afternoon, an accidental tie-in by telephone workers of the downtown Washington, D.C., warning circuit with the Montgomery County Civil Defense System activated civil defense sirens in several parts of the Washington area; simultaneously, warning devices sounded in a number of Federal buildings. The research provides us with data on the subsequent attitudes and behavior of a questionnaire sample of 1,691 Federal employees from a half-dozen agencies, and from 218 interviews.

In the third instance [Katz, 1960], the fire commissioner in Chicago, who is also the acting director of the city's civil defense corps, authorized the sounding of civil defense sirens to celebrate the winning of the first American League baseball title in forty years by the Chicago White Sox. Since the team clinched the pennant in a night game, the siren sounded at 10:30 p.m. A few minutes before that, but too late for effective dissemination, the commissioner notified the police and fire departments, the public utilities, the newspapers, and all radio and television stations of his intention. A sample of 241 persons randomly distributed within the City of Chicago were interviewed about their experiences when the warning sounded. Many of the questions used in the Chicago research were taken from the interview schedule prepared for the Washington study.

We are confronted, then, with an exciting series of data, challenging in both their limitations and their suggestiveness. All three of the studies were executed under the pressure of time. They necessarily suffer to some unknown extent from the ex post facto nature of the research design; memory dims, and worse, time warps. People recall themselves doing what they ought or would like to have done instead of what they did. Social scientists are as aware as their critics of the possible discrepancies between verbal reports of recall of attitudes and actions on the one hand and actual behavior in time of stress on the other. Nonetheless, in view of the unusual availability of comparable studies of reaction to the same phenomenon, and the urgent need for the development of an adequate warning system, it seems worthwhile to capitalize on these painstakingly gathered data.

Here is an opportunity to seek parallels in social responses in three quite different situations, each laden with the warning of impending disaster. In Chicago, responsible officials were aware that the siren was sounded in a mood of carnival, but the citizenry could only guess a choice between celebration and catastrophe. In one case, we find government employees at work in the nation's capitol, civil defense instructions for identifying warning signals generally posted on the office walls, and supervisors and civil defense personnel assigned to the organization to structure interpretations and guide responses. In contrast, Oakland housewives were at home, their husbands at work, units of the basic primary groups ecologically segregated from one another. Chicago's experience is unique in that an urban community's enthusiasm for its baseball heroes had a large proportion of the population following the exploits of the athletes in a familial setting. Unlike Oakland, Chicago had its families clustered in primary group solidarity; unlike Washington, it had them removed from organizational constraints.

We shall interest ourselves, then, both in the differences arising from varied environments and in the similarities in human behavior which override these, and seem to be common products of the warning of disaster.

Aim and Outline of the Study

"Warning is a function of utmost consequence for preventing and reducing the tragic effects of disaster. With warning, physical defenses—such as evacuation and shelter—are possible. With warning, advance preparations for speedy rescue and relief are possible. With warning, post-impact confusion can be reduced. With warning, individual behavior probably will be more adaptive, and possibly the emotional after-effects will be less severe." [H. Williams, 1956].

For the student of human behavior, it is efficient to view warning as a process. This provides us with both meaningful theoretical cut-points and structured research categories. A warning system consists of: (1) a perceived threat; (2) the sending of signals to individuals, groups, or social categories about (a) the threat and (b) what behavior will avoid it or reduce its hazards; (3) the receipt of the signal; (4) interpretation of it; and (5) action based upon it.

The threat may be physical or psychological or a combination of both. The signal may be subtle (a raised eyebrow) or blatant

(a siren); it may come from one's fellows (a frown), from an agency or organization (church bells), or from the physical environment (darkening sky, high wind). Both the threat signal and instructions for avoiding or reducing it can be learned in advance (public school fire drills, doors marked "emergency exit"—George S. Kaufman claimed he imposed on his daughters "elopement drills"). The warning process may be short-circuited at the reception stage. (Posters are ineffective for illiterates; sirens are inadequate for the totally deaf.) Warning may also fail at the interpretation stage. ("The siren must be to advertise the firemen's benefit dance Saturday." "The wind blew this hard last year, but it never got worse, and no harm was done.") Finally, failure to take action may invalidate the rest of the process. ("I really believe it's an air raid warning, but there's nothing you can do about nuclear warfare, so I won't go to the shelter.")

Our purpose in this monograph is to examine the consequences of setting in motion three quite similar warning systems under three different sets of circumstances. Our focus is not upon the people charged with detection of the threat, nor is it upon those who send out the signals once a threat is perceived. Our goal is to arrive at generalizations about the behavior of recipients of the signal. This study, therefore, is concerned primarily with parts 3, 4, and 5 of the warning system: the receipt of the signal, interpretation of it, and action based upon it.

Each of the next three chapters summarizes a research study focused upon receipt of a signal, interpretation of it, and action based upon it. Chapter 2, Warning Yellow, is a report of the response to the air raid alert in Oakland [Scott, 1956]. Chapter 3, Wrong Number, is a brief summary of the research on the reactions to the Washington alert [Baker, 1959]. Chapter 4, Joy in Mudville, deals with the consequences of sounding the sirens in Chicago [Katz, 1960]. All three of the chapters follow the same outline in presenting the material. Each includes an introductory description of the incident that set the warning process in motion, a report on the design of the research used to study the incident, an analysis of the public's interpretation of the signal, and a section on the behavioral response, or what people did when they received the message—whether they did or did not take any action to insure their protection and survival. Finally, each of the three chapters concludes with a look at the public's interpretation of the whole incident after the crisis had passed.

In Chapter 5, Constants and Variables, the same outline is employed in an attempt to delineate patterns of attitude and social

action found in all three studies. We are of course interested in differences among the three sets of reactions, and we know that such differences may be attributable to the variations in the three sets of circumstances. But our chief enthusiasm is for instances where, despite all the variations, a common pattern of human behavior asserts itself in all three studies. Here, in the constants of social response to specifiable situations, lie the seeds of a scientific body of knowledge: the ability to generalize. The ability to generalize across a set of similar situations suggests the ability to predict behavior in another similar situation in the future. Such prediction is the goal of both the research scholar and the administrator who must apply the scholar's findings to implement policies.

We move, in Chapter 6, to an immodestly ambitious task: the specifying of propositions which will maximize the generalizability of what we know about the interpretation of disaster signals. Given the present state of our knowledge, many of these propositions should be viewed as reasonable hypotheses rather than as established facts. But when our knowledge is limited, we have a great deal to gain from stating reasonable hypotheses. In assembling these propositions, we draw not only upon our own comparison of the three studies summarized in this monograph, but also upon other research findings and the theoretical literature of social science. Since it constitutes a synthetic analysis, Chapter 6 is laden with representative and illustrative references. Because of this, we have minimized our footnoting elsewhere.

Given the tentativeness of our generalizations, Chapter 6 can be viewed as an outline of needed research. In Chapter 7, we attempt to spotlight the gaps in our theory and data so as to focus attention upon the most crucial of the unanswered questions about reactions to disaster warnings. Finally, in Chapter 8, we identify what we believe to be some of the most important practical implications that follow from our study of the civil defense warning system.

The Pertinence of False Air Raid Alerts for Theory and Research

The three studies brought together here are particularly valuable to the social scientist, and to the administrator who needs soundly based predictions, for two reasons.

First, the fact that a disaster did not follow the warning of one is ideal for scholarly as well as humanitarian reasons. In many disasters, the social scientist cannot interview some of the participants afterward because they are dead. The advantage of

the Oakland, Washington, and Chicago data lies in the fact that the siren signalled a real alert, people responded to what was a real alert, but there was no subsequent disaster; hence the entire universe exposed to the warning process was available for research. In a field where the researcher ordinarily has to depend on survivors for an account of what others thought, felt, and did, we have three cases in which everyone who participated in the "disaster" is a survivor. Since none of the survivors was physically injured, the accounts of behavior should be reasonably complete and accurate.

Second, we are dealing with an agent of disaster peculiar in the lack of clues it offers in the external world to its potential victims. Fire crackles and sends up smoke; dark sky, torrential rain, and steadily rising rivers signal the possibility of a flood; even hurricanes send precursors. But when a siren sounds to indicate that nuclear attack is imminent, no external physical manifestations validate the message.

Such a disaster agent, lacking environmental cues, offers a virtually experimental situation. The only signal people receive is the siren. Their action is a product of their definition of the situation and their interpretation of the signal. No flames, no smoke, no wind, no other signals obtrude to supplement the impact or modify the meaning of the siren. Short of attack itself, the only valid source of further information is CONELRAD. The research problem is in this sense simplified; the experiment is kept pure. Except for CONELRAD, recipients of the signal have only one another as sources of further information. The only variables which can influence interpretation of the signal are prior experience and social interaction.

It is precisely for this reason that the research problem constitutes a policy problem. For a civil defense air raid warning to serve its purpose, the signal must be so powerful, the response so conditioned, or so ensured by some organizational apparatus, that protective behavior follows from the signal without environmental reinforcement. Since the impending disaster is not a product of nature, the natural environment provides no supplementary signals. The air raid warning must be taken seriously on its own merits, and there is no time to waste in misinterpretation. The occasion is instant.

CHAPTER 2

WARNING YELLOW

The Incident

On the morning of 5 May 1955, the United States Air Force was unable to identify a squadron of bombers flying over the Pacific Ocean. The bombers were headed in the general direction of the central west coast of the United States. An order was given to sound the alert warning sirens for a probable attack. (The alert at that time was called "warning yellow." Since then the warnings have been revised.) [Office of Civil and Defense Mobilization, 1960].

Sirens sounded in Berkeley and in Oakland, California. Radio stations went off the air in San Francisco. Local warnings in schools and business offices (which had internal warning systems) were sounded almost immediately after "warning yellow."

It took the Air Force only a few minutes to identify the bomb squadron as an American one. All was back to normal in approximately ten minutes. In the same length of time, if the squadron had been enemy-manned and undeterred, it could have delivered a lethal blow.

Oakland, California, is the focus of this study. The siren sounded there at 10:42 a.m.: five minutes of a steady blast, one minute of silence, and then five more minutes of siren blast. The official meaning of the siren is to prepare for an enemy air attack. (The second of these five-minute blasts was cut short when the planes were recognized.) A study was undertaken to learn about the general public's response to the warning [Scott, 1956].

The Research Design

Adult residents in the city of Oakland, California, constituted the population for the study. The objective was to obtain information about the responses to the unexpected air raid alert in order to help civil defense authorities in planning and implementing civil defense procedures.

A random sample of persons aged 21 and over was selected by personnel of the Survey Research Center of the University of Michigan. A list of census tracts and blocks in the city was used to select at random (by a table of random numbers) 34 blocks. Each dwelling unit on each of these blocks was placed on a list. Where there were two or more dwelling units in the same house, they were listed separately. From this list, a ten per cent random sample was drawn. The final sample number was 146. When the interviewer went to a dwelling unit, he listed each adult in residence. He then referred to a table in his instructions that told him which adult to interview.

The Public's Definition of the Situation

When the air raid siren sounded, approximately 25 per cent of the population did not hear it.

The focus of interest for the study is upon the remaining 75 per cent who did hear the siren, what they perceived the siren to be and to mean, and what they did to protect themselves.

Of those who heard the siren, only 22 per cent thought that it was a warning for a real attack. As can be seen in Table 1, over one-half of the people assumed that it was either a test, a practice alert, or a mistake. (We recognize, however, that in civil defense terminology, "tests" encompass practice alerts, drills, or tests of the sirens.)

TABLE 1

The Meaning of the Oakland Signal:
First Thoughts of Respondents

First Thought	Per Cent of Respondents
Air raid alert	22
Practice alert	46
Siren sounded by mistake	5
Fire, ambulance	5
Disbelief, doubt, unspecified or unsure	24

Per cent figures total greater than 100 due to a few persons expressing a "combination" of first thoughts.

N (All those in the sample who heard the siren) = 87

Why did so few people take the signal seriously? Several factors may have affected the public's definition of the situation. One obvious possibility is the previous exposure to many practice alerts. Oakland, unlike many other cities, had practice alerts at various times of the day, and on various days of the week. (Chicago, on the other hand, has practice alerts only at 10:30 a.m. on Tuesdays.) The application of an elementary principle of learning theory in psychology suggests one reason why less than one-fourth of those who heard the siren entertained the idea that an attack was probable. The repeated absence of reinforcement for a stimulus over time results in the extinction of any meaning for the stimulus.

It is, of course, quite possible that where people were at the time of the warning siren would influence their interpretation of its meaning. Approximately 40 per cent of the population of Oakland were at home when the siren sounded; 27 per cent were at work, 12 per cent were "elsewhere in the city," and 19 per cent were out of town. Unfortunately, we have no information on the respondent's definition of the situation organized according to where he was located at the time of the siren.

One characteristic which we do know to be related to an individual's interpretation of the signal is the amount of formal education he has. There is a peculiar curvilinear relationship between education and taking the alert seriously. The highest incidence of protective behavior was among the group who held high school diplomas but had not gone on to college. Both college-educated persons and those who were not high school graduates were less likely to try to protect themselves.

The most commonly used technique of deciding upon and defining the meaning of the situation was first-hand observation of the behavior of others. Most of the respondents in the sample reported that they remained calm and casual because nobody around them seemed to be doing anything. It may also be of significance that of those persons who either ignored the siren or responded with casual curiosity, most were in the company of others.

Finally, it seems that people are most likely to interpret the signal as a real air raid alert if they believe that war is imminent. In response to the question of whether they believed war was likely in the next two years (and whether Oakland would be under attack), more than three-fourths answered in the negative. However, those who regarded war as imminent and attack on Oakland as possible (less than 25 per cent) were much more likely to define the situation as serious and the alert as real.

The Behavioral Response: What Did People Do?

The proportion of people immediately taking any kind of adaptive behavior in the face of an impending air raid was no larger than those who interpreted the alert as a real rather than a practice one: about 15 per cent of the total, or a little over 20 per cent of those who heard the signal. Table 2 reports both the first behavior of the Oakland sample and the entire pattern of behavior during the brief period of the alert.

Lest the reader take too seriously the value of expressions of opinion as indicators of actual behavior, it is instructive to contrast what people say they would do in case of an attack (Table 3) with what the real behavior was in response to the warning siren (Table 2). While over half the people say they would take cover or evacuate, actually fewer than 10 per cent did so. Even if we deal in the ideal world of what people say they would do instead of looking at what they did, a fourth of the respondents have no idea either of how to protect themselves or how to get further information.

As Table 4 shows, only seven per cent of the people have learned the CONELRAD frequencies. Further, if the number of people actually using the telephone even approximated the number who say they would, circuits would be jammed.

The Public's Retrospective Interpretation of the Incident

A relatively small minority expressed in retrospect any feelings about the air raid alert. About 17 per cent felt that it was a good thing to have it happen, in that it made them more aware of the dangers involved in an attack. At the other pole, about 23 per cent regarded the incident as a mixup and were critical of officials responsible for it. The rest either had no opinion at all to offer or gave a mild and disinterested statement about the event.

Five per cent felt that the sirens should not have been sounded. Another five per cent said that there should be some clear distinction between tests and real alerts. A small minority (18 per cent) said that the alert showed that people don't know what to do in such situations. And another four per cent felt that this demonstrated the need for more drills. Some 14 per cent claimed that what they learned from the alert was that they should show more concern next time and take it more seriously.

TABLE 2

First and Entire Behavioral Responses of Oakland Sample to Sounding of Signal

Behavioral Responses	Per Cent of Respondents: First Behavior Only	Per Cent of Respondents: Entire Behavior Pattern
Took alert seriously; behaved adaptively, as if air raid were possible; lay on floor, took other protective measures for self and for others	6	6
Warned others of the alert; tried to make others take the alert seriously	1	4
Followed directions or example of others for air raid drill	2	2
Took alert seriously and was frightened--but either took no action, or exhibited non-adaptive behavior	1	3
Was actively curious or sought adaptive information: turned on radio or tried CONELRAD; called Civil Defense or some other appropriate public office; called newspaper	6	13
Was casually curious or sought non-adaptive information; looked outside or called a friend, or asked someone nearby; looked in a newspaper	27	26
Behaved as if nothing unusual had happened: regarded siren as either a practice or a test; did nothing himself, or paid no attention	32	36
Did not hear alert (or did not hear about it until later, if out of town)	25	25
	100	*

* Totals more than 100 per cent because some respondents exhibited more than one kind of behavior pattern.

N = 146.

TABLE 3

The Kinds of Actions Respondents Claim They Would Take in Case of Attack

Kind of Action	Per Cent of Respondents
Take cover actions	45
Evacuate	7
Either take cover or evacuate, depending upon signal	2
Seek further information from appropriate sources	7
Miscellaneous inappropriate behavior, or don't know what to do	24
Question not asked—respondent did not know about the alert	15
	100

N=146

TABLE 4

Where Respondents Say They Would Seek Further Information After Warning

Source	Per Cent of Respondents
Would use CONELRAD—knows frequencies	7
Would try to find CONELRAD—doesn't know frequency	23
Would use radio—doesn't know about CONELRAD	19
Would use telephone	31
Would ask some other person	5
Respondent does not know where to get information	9
Question asked—respondent did not know about the alert	15
	*

* Total is greater than 100 per cent because some respondents mentioned more than one source.
N = 146

At the end of the interview, respondents were asked what they thought about the civil defense program in general. Nearly all those asked said that civil defense was a necessary activity.

But only three per cent said that they themselves ought to be better prepared in advance of such an alert (e.g., with such things as food, water, and first aid kits). Further, only three per cent said that they would now seek more information as to what to do in case of an alert. Four per cent volunteered that they would not take the next siren seriously, either. Presumably, they would not take it seriously unless, in the interim, information and training led to an appreciable change in their estimate of civil defense.

CHAPTER 3

WRONG NUMBER

The Incident

At four-thirty in the afternoon of 25 November 1958, telephone workers in Washington, D.C., accidentally tied in the downtown Washington circuit with the Montgomery County Civil Defense System.

Air raid warnings sounded immediately in several parts of Washington, in the downtown area, and inside several establishments which had internal air raid systems connected with the central warning siren. Several thousand Federal government employees, among many others, were thus suddenly exposed to an unannounced and unexpected warning siren, a signal which means literally to prepare for an imminent air attack.

The warning signal that sounded was the same one that had been used up to that time only for previously announced practice alerts. However, it should be kept in mind that this was an accidental sounding of the system. Consequently, there were no informed civil defense leaders on hand who knew for sure that this was not a real attack.

The Research Design

At the request of the Office of Civil and Defense Mobilization, The Disaster Research Group began a study of the responses to the accidental alert just a few days after its occurrence. The immediate purpose of the study was to secure information to aid in further planning and implementing civil defense procedures. [Baker, 1959].

The population for the study consisted of Federal government employees in six government agencies. The agencies were: the Veterans Administration; Department of Health, Education, and Welfare (HEW); Department of Commerce (Commerce); the Weather Bureau; Department of the Treasury (Treasury); and the Department of State (State). Approximately 500 respondents were randomly

selected from each agency (except the Weather Bureau and HEW) and asked to fill out questionnaires. Samples for both the Weather Bureau and HEW were randomly chosen but, due to their relatively small size, a different sampling rate was used.

There was a high percentage of returns on the questionnaires, ranging from 71 to 85 per cent in the six agencies. However, 315 questionnaires (or 16 per cent) were eliminated because the respondents failed to satisfy the primary criterion for the study, namely, that they had neither heard the signal nor heard about it at the time. Thus, satisfactory data were collected on 1,691 questionnaire respondents.

In addition to the questionnaires, interviews were held with approximately one per cent of the employees in all of the selected parts of the agencies included in the study. Interview samples were drawn first, and those persons selected for interviews were not included in the questionnaire sample. Thirty-four (or 13 per cent) of the interviewees had not heard the signal. The size of sample of interview respondents who heard the signal was 218.

Unless otherwise specified, the findings from the Washington study presented in this report are based on the questionnaire data. The interview responses were primarily useful in studying the dynamic aspects of behavior, especially the signal-validating or testing process which occurred immediately after the signal was received.

In order to minimize distortion of recall due to lapse of time, both the questionnaire and the interview schedule were administered as quickly as possible after the day of the alert. The first schedules were completed 10 days after the air raid warning sounded, and the whole study was completed within 14 days, or 24 days after the alert. Both instruments were administered during the course of the respondent's work day. The interview contained both open-ended and structured questions, and lasted approximately 45 minutes. The interviews and questionnaires were administered by trained research personnel.

The Public's Definition of the Situation

In response to a forced-choice question as to how they felt at the time of the warning only four per cent responded that they felt either scared or excited. Little more than a third said that they were uneasy or confused, while the same proportion stated that they were curious. "Unconcerned" was the response chosen by 13 per cent.

Another forced-choice question tried to tap what the respondents thought of when they first heard the siren. About 30 per cent thought of checking out the meaning of the siren, while a similar proportion decided only that they ought to wait for further instructions. Little better than 20 per cent thought of looking around to see what others were doing, and about one-fourth thought only of continuing as if nothing had happened. (Any choice could be picked more than once, which explains why the total is greater than 100 per cent.) Only 14 per cent thought of going to a shelter area.

Summarizing the responses to the two questions above, it seems fair to state that the great majority of the respondents were either mildly concerned or curious. Only a relatively small proportion at either end of the response continuum were either greatly alarmed or completely nonchalant about the whole thing.

At least 75 per cent of the interview respondents in each agency were in the presence of others when the air raid warning sounded. In one agency more than 22 per cent of the personnel were alone at the time of the air raid signal. Being with others at the time of the warning was associated with defining it as a test or practice alert.

Practice alerts in Washington generally sounded at noon. This false air raid alert sounded at 4:30 p.m. One might expect some persons to give credence to an air raid warning sounding four and a half hours after the usual time for practice alerts. It is interesting to note, however, that only nine per cent of all respondents said that they believed the air raid warning was a signal for probable attack <u>because</u> it did not sound at noon.

Of those who rejected the message as a warning of an enemy attack, 23 per cent did so because, as they put it, "that signal" sounds only for practice alerts. Clearly, these people have been so conditioned as to render the signal used completely ineffective as a warning for a real attack. The same can be said for another 10 per cent of the sample, who stated flatly that they ignore all warning messages that have not previously been announced.

Belief in the probability of war was a significant factor for a large percentage of those who took the warning seriously. Of those who did believe that the air raid warning signaled a possible attack, 23 per cent felt that world conditions made war either likely or imminent.

Respondents were asked to identify the major problem which concerned them during the course of the alert proceedings. Twenty-one per cent, the largest single category, stated that their major concern was their own ignorance of the meaning of the signal, and ignorance of what to do in response to the signal.

There were notable differences by organization in interpretation of the signal. Many employees in the Veterans Administration apparently thought immediately of withdrawing in some way, either by going to a shelter or by leaving the building. This is in striking contrast to the Weather Bureau, where only 3 per cent thought of withdrawal. State employees were also very likely to ignore the siren; more than 40 per cent continued on with their jobs as though nothing had happened. HEW was the most other-directed agency; almost 30 per cent first looked around to see what others were doing.

Women generally accorded the warning signal more validity than did men. In all agencies, proportionately more women than men stated that their first feelings were excitement, fear, uneasiness, or confusion. Women were also more likely than men to seek information about the siren from those immediately around them in the office.

Approximately three-fourths of the sample had previous on-the-job training for civil defense warnings. Contrasting the trained and untrained personnel, it was found that the trained were much more likely to identify the siren correctly as the signal for an air raid alert. Those without previous training were much more likely initially to identify the signal as a fire alarm.

The Behavioral Response: What Did People Do?

The question of what people actually did when they heard the warning siren is of course tied up with their original interpretation of the meaning of the signal. Thus it will be instructive later to explore the sequence of interpretations and consequent behaviors for specific groups of individuals. For now, however, only the general behavioral pattern will be discussed.

When the siren sounded, no more than five per cent of the persons responded immediately (that is, without further validation attempts of some sort) by adopting and implementing a protective or adaptive plan of action. One-third acted in some adaptive manner after having made one attempt to ascertain the meaning of the siren (seeking further validation over and above the actual hearing of the

warning). In other words, only five per cent heard the signal and immediately did what the message required—sought shelter or evacuated. One third took appropriate action after making one attempt to check on the signal.

As for behavior in seeking validation, 33 per cent (the highest proportion) used their own experience with drills and tests as the immediate source of validation. The second largest kind of validation technique was to look around and assess the immediate environmental situation, to see what others were doing, or to talk about the situation with the immediate work group. Almost one-third of the respondents did just this in their attempt to interpret the meaning of the siren.

Formal organizational sources were actually contacted only infrequently. Only 17 per cent of the interview respondents went directly to civil defense personnel, to their supervisors, or to any other formal source to get clarifying information.

Determining the meaning of the signal was related to the respondent's first thoughts of what to do in response to it. As might be expected, those who initially defined the signal as a real air raid warning were also more likely to report that they were afraid, excited, or irritated. It is also true that those persons who thought that the attack might be imminent were more likely to go to a shelter or to go outside. In general, initial definitions of the signal were not greatly modified or altered during the course of the alert.

The most characteristic behavioral response to the warning siren was to remain in one's office. Over one-third of the respondents did so. More than one-fourth left the building in which they were working, but did not go to a shelter. One-fifth went to a shelter.

Going to a shelter was not associated with the presence or absence of others at the time the signal sounded. Being alone at the time of the warning, however, was associated with the decision to withdraw from one's office. Interestingly enough, one was more likely to remain in one's office if he had no kin in the Washington area. Whatever the content of the reasoning, those who had kin in the vicinity were more likely to take protective action.

In 95 per cent of the cases, some attempt was made to validate or establish the nature and purpose of the signal.

About a third immediately accepted the signal as an air raid drill or test or mistake, but only about five per cent immediately took some adaptive or protective behavior. Of those who did believe that an attack was imminent, all except two persons utilized additional sources of information before taking protective action.

At some point during the course of the warning period, almost 60 per cent of the employees in this sample withdrew from their offices. Interestingly enough, of those who did remain in their offices, 48 per cent used their own group (or observation of the immediate environment) as the first source of guidance. This is to be contrasted with those who withdrew from their offices, of whom only 22 per cent used their own group for guidance.

With respect to inter-agency differences in withdrawing from one's office, the variation was great indeed. Only 12 per cent in the Veterans Administration remained in their offices, while 91 per cent in the Weather Bureau did not leave the office. Personnel in the Department of State were also very likely to remain in their offices; almost two-thirds did.

No one in the Weather Bureau went to the air raid shelter, but a third of the people at Commerce did. These are the two extremes. Commerce employees were most likely to check out the signal with an official source (33 per cent), while those in HEW were least likely to have employees who did so (13 per cent).

The one factor which the largest single proportion of respondents selected as most influencing their behavior upon hearing the siren was the way other people in their offices or building acted. The radio was also an important source. In the Weather Bureau, more than in any other agency, the radio proved to be the most used source of informing personnel (40 per cent) that the siren did not signal a real attack. For the Commerce Department, radio was the clarifying source for only about 20 per cent of the people.

Proportionately more women than men (in four of the agencies) were mostly influenced by others around them in deciding what to do about the warning signal. Proportionately more men used sources outside their offices to evaluate the situation and to decide what to do.

Proportionately more non-civil defense personnel looked out the window as a means of validating the warning signal. Agency civil defense personnel were more likely to check out the signal by going to another civil defense member, a supervisor, or other

office personnel. Proportionately fewer civil defense personnel remained in their offices. And, logically, proportionately fewer civil defense members used others around them as a base upon which to make judgments about what to do.

The Public's Retrospective Interpretation of the Incident

In response to the question of what the respondent believed would have been the biggest problem if the attack had been real, opinion was fairly evenly divided. Twenty-three per cent stated that it would be panic, hysteria, confusion, fear, or control over unruly crowd behavior. Almost the same percentage (22 per cent) stated that evacuation of the city would have been the biggest problem encountered. Almost the same percentage reported that they felt the biggest problem would be getting to a shelter. Interestingly, only five per cent reported that their families would be the biggest problem they would have faced in the event of a real attack. (Presumably, none of the respondents were with their families at the time the siren sounded.)

Finally, the government employees were asked what they felt they had learned from the whole experience. The largest single percentage (25) said that they realized that they needed more civil defense information, training, and preparation. Next in order of mention, 20 per cent expressed the need for better warning signals and for a better understanding of them. Sixteen per cent suggested more drills and more practice, including surprise drills. No more than five per cent contended that they had learned nothing.

CHAPTER 4

JOY IN MUDVILLE

The Incident

After forty futile attempts in forty successive years, the Chicago White Sox finally won an American League baseball title in 1959. The pennant was clinched when the White Sox won a night game from the Cleveland Indians on September 22, 1959. The game was broadcast and telecast from Cleveland.

Just a few days earlier, the Chicago City Council had "... resolved that bells ring, whistles blow, bands play and general joy be unconfined when the coveted pennant has been won by the heroes of 35th Street." The evening of the ball game, the fire commissioner (also acting director of the city's civil defense corps) decided to sound the civil defense sirens to add to the spirit of the city council's proclamation.

The baseball game ended at 9:50 p.m. Chicago time. Live telecasts and broadcasts from the dressing room of the victorious team were received for about 15 to 20 minutes immediately afterward. Then at 10:30, some forty minutes after the game had ended, the air raid alert signal went off. A steady blast for a full five minutes sounded, a signal which means that an air attack is possible but is not expected for at least 31 minutes.

Prior to his sounding of the siren, the commissioner properly notified the police and fire departments, the public utilities, and all radio and television stations and newspapers. But only a very few minutes elapsed between the arrival of this notice and the sounding of the siren. Thus, the public had no warning of the event.

The Research Design

Four graduate students and a professor in the departments of sociology and communication at the University of Chicago decided that a systematic investigation of the public's response to the siren would add greatly to theoretical sociology of extreme situations. They saw certain parallels between what happened after the White

Sox ball game and the impact of the Orson Welles broadcast of the late 1930's, "The Invasion from Mars." Hadley Cantril's [1940] analysis of the public response to this broadcast provided one model for the initial planning of the University of Chicago students. They soon learned of the earlier Oakland and Washington studies. Contact with the Disaster Research Group was established and they were provided with a detailed account of the design for the earlier Washington study and a copy of the research report on the event. It was agreed that they would replicate key interview and questionnaire items.

The universe of the study [Katz, 1960] was the population residing within the city limits of Chicago. The sample consisted of 250 persons randomly distributed over the city. The sampling procedure involved ordering all census tracts within the city according to median income and systematically selecting 25 tracts from this array. This method was designed to produce a wide scatter over the entire city, and to minimize the clustering of tracts within densely populated and higher-income areas. Within each tract, two blocks were randomly selected and five dwelling units in each block were assigned to the interviewers. Male and female heads-of-household were alternately interviewed. Interviewers were authorized to substitute the next adjacent dwelling unit in case of refusal or in case of respondents not at home after two attempts for an interview. Of the 250 interviews called for by the sampling design, 241 were actually obtained.

The sample seems to be fairly representative of the population of the city on the basis of its parallel to certain other known criteria. The proportion of non-whites in the sample (24.5 per cent) comes close to the estimate of the Population Research and Training Center for July, 1957, which was 20 per cent. The sample contained approximately 31 per cent Catholic and 10 per cent Jewish respondents, while the estimates of the Greater Church Federation of Chicago for Catholics and Jews are 36 and six per cent respectively. Also, reported incomes in the sample had a distribution which matched rather closely estimates of the "Survey of Buying Power" for Chicago in 1958. In the sample, 25 per cent reported family incomes under $4,000. Exactly the same percentage for this category was reported by the "Survey."

Education is the one variable selected which does not seem to be accurately represented in the sample. Comparing the 22 per cent in the sample who claimed to have had some college education with the 13 per cent in this category estimated in the population by the Chicago Community Inventory suggests that the sample respondents are apparently more educated than the general population.

Interviewing did not begin until five weeks after the incident, and was not completed until some 12 weeks after the ball game. The problem of recall is apparent.

Each respondent was asked to recall his whereabouts on the night of the game and, if possible, to recount the sequence of his responses to the unexpected siren. The variables used in the investigation can be classified into the following categories: social characteristics of the individual (age, sex, education, etc.); situational factors (immediate environmental features, alone, in company with others, friends, family, etc.); attitudinal factors (belief in the imminence of war, attitude toward baseball, etc.); personality characteristics (attitudes toward authority, etc.); and finally, relevant knowledge of civil defense procedures.

The Public's Definition of the Situation

The interview tried to get at the first thoughts the respondents had when they heard the siren on the night of September 22. From Table 5, it is clear that three major kinds of first thoughts occurred to the respondents. While 37 per cent made an immediate connection with the ball game, exactly one-third thought at first that this was an air raid alert. The third major category of persons consisted of those who believed the sirens signaled something about a fire.

It is interesting to note here that in sharp contrast to the Oakland and Washington studies, only three per cent of the respondents in the sample regarded the siren as a practice alert, and that only one per cent reported that they had thought the whole thing was a mistake. The explanation for this will be explored later in the section on factors relevant to the definition of the situation. It will suffice at this point to suggest that one of the major reasons for this is probably the fact that Chicago never has practice alerts at night (although this certainly does not explain why more people did not initially define the sounding of the siren as a mistake).

Also, more than half the respondents went on to relate their second thoughts about the meaning of the siren. That constitutes approximately 55 per cent who reported two or more different thoughts (changing over time) about the siren. Table 6 is a record of the first and second thoughts of only those who reported having two or more thoughts.

From Table 6, it is impossible to say anything about the complete sequence of individuals' thoughts, since there is no information about the direction of shifting interpretations by individuals. It is

TABLE 5

The Meaning of the Chicago Siren:
First Thoughts of Respondents

First Thought	Per Cent of Respondents
Ball game	37
Air raid alert	33
Fire, fire engines	15
Disaster, major accident	3
Practice alert	3
Siren sounded by mistake	1
"Something bad" (unspecified)	2
Police, ambulance	-
Other	5
	100

N (all hearers) = 197

TABLE 6

The Meaning of the Chicago Siren:
First and Second Thoughts of Respondents

Meaning	Per Cent of Respondents	
	First Thought	Second Thought
Ball game	16	47
Air raid alert	43	29
Fire, fire engines	25	5
Disaster, major accident	5	2
Practice alert	3	7
Siren sounded by mistake	1	5
"Something bad" (Unspecified)	3	-
Police, ambulance	-	4
Other	5	2
	100	100

N = 109

quite possible that one person switched from thoughts about a fire to the connection with the ball game, while another may have made the same kind of switch from air raid alert to ball game. From this table, statements can only be made about group characteristics. The clear tendency was for the majority of the first thoughts to be about an air raid alert, while the second thought was much more likely to be about a connection with the siren and the ball game.

Chicago has warning system tests at 10:30 a.m. on Tuesdays. The sirens are sounded in the city every week at the same time and, indeed, with such unfailing precision that residents in the area have been known to remark upon hearing the sirens, "Ah, it's 10:30, and it must be Tuesday." Up to the night of 22 September 1959, the alert siren had never been heard at any other time. It is understandable that this might contribute to the fact that 51 per cent of the respondents reported at one time or another during the course of the interview that they thought at least once that this was a warning for an attack.

Eighty-three per cent of the respondents reported having heard the siren on the night of 22 September. Almost all of the remaining 17 per cent were out of town, in a work situation which prohibited audibility, or sleeping.

Approximately two-thirds of the respondents characterized themselves as baseball fans of a sort. These persons, of course, were much more likely to make the connection between the siren and the ball game than were the non-fans.

The actual physical location of respondents at the time of the siren adds some important information to the total configuration of circumstances leading to a definition of the situation. This becomes apparent when reviewing the figures on location of persons on the evening in question; 78 per cent were at home. Another three per cent were at the homes of friends or neighbors, which means that more than four-fifths of the sample were in home situations.

As to what people were doing when the siren sounded, by far the largest group (42 per cent) reported that they were watching television. The next two most reported kinds of activities were "preparing for bed" and "conversing" (13 per cent each). Eight per cent said they were either listening to the radio or reading, and the remainder of the activity was spread rather evenly (all less than seven per cent) over household chores, driving, walking, and so on.

Now we turn to an interesting predictive situational factor: whom the respondent was with at the time the siren sounded. Of those who heard the siren, 65 per cent were with their families. Seventeen per cent were alone, 13 per cent were with non-family persons, and the remaining five per cent were in a situation mixed with family and non-family members. Persons in the presence of family members only were more likely to take the alert seriously and to think of more alternatives concerning the possible meaning of the siren. However, there was no discernible relationship between being alone and the interpretation of the signal, except a tendency for persons who were alone to consider more alternatives in possible meaning of the siren than those who were in the company of others. Despite this, respondents who were alone did not consider the siren as a signal for an air alert any more often than did those in company with others.

Belief in the imminence of war is directly associated with apprehension of the siren, and with the interpretation that the siren meant a real air attack. The same association is found between recognition of great tension at the international level and taking the siren seriously.

Women were much more likely to consider the possibility that the siren was a signal for a real alert than were men, while men were more likely to report that they immediately connected the siren only with the ball game. This is partly an outcome of the fact that men are more likely to be baseball fans, although this does not account for all of the variance by sex. Women respondents were also much more likely to report that they were afraid during the course of the alert siren.

Little difference was observed between whites and Negroes on the various interpretation of the meaning of the siren. What slight differences did appear were these: Negroes were more likely to connect the siren with the baseball game only, whereas whites were more likely to entertain a variety of possible meanings. Also, Negroes exceeded the whites slightly in interpreting the siren to mean an air raid alert. Whites also reported more fear than did Negroes, although the differences on this point are also rather slight.

As in the Oakland research, one of the more striking findings in this study is that the middle-educated group (high school graduates, but no college) tended to be the most apprehensive, and the most likely to interpret the siren as a signal for a real attack. The relationship between education and fear is here curvilinear.

The groups with either high or low achievements in formal education were less likely to express fear, and less likely to interpret the siren as a signal for an air raid alert. If we compare the highly educated group with those of low formal education, there is little difference between the two groups in their response to the meaning of the signal.

The older the respondent the more likely he was to interpret the siren in a variety of ways other than either ball game or probable air attack. This, perhaps, is the reason why the older respondents were less likely to interpret the siren as a signal for an air raid alert.

Finally, persons who had been born or reared in small towns were more likely to associate the siren with the ball game than were those who had been born or reared in large metropolitan areas.

There is much overlapping among the variables. Education and race are associated, as are education and age. Being of small town origin is probably related to age, race, and education. In short, correlations between such social variables and interpretations of the signal are suggestive, but they cannot be treated as causative without considerably more evidence.

The Behavioral Response: What Did People Do?

Among those individuals who at one time or another believed that the siren signaled a real air alert, the most likely method of verification or validation was turning on the radio or television, or, if it was already on, paying sharper attention to it. The next most frequent action reported was looking out the window. Likewise, these are the two most frequently listed activities of verification reported by respondents who thought that the sirens signaled a fire, a disaster, or a practice air raid alert. The third most important form of verification consisted of asking the opinion of someone else in the same room with the respondent.

The telephone was used as a source of verification for some 10 per cent of those who thought it might be an air raid alert. Six per cent of these calls went to a public agency, and four per cent went to friends and acquaintances. If this figure were projected onto the total population, there would be enough calls to jam the switchboards. And this is exactly what happened the night of 22 September. In connection with the use of the telephone, two different phenomena might have increased the fear of those who did use this as an instrument of verification. First, telephone operators

themselves were generally uninformed during the first few minutes of the siren. Thus, some actually instructed individuals to take cover. Second, the jammed switchboards made it impossible for many who attempted to use the telephone to get a dial tone. This added to the fear of a real alert on the part of many.

As to the sequence of acts of verification, the most frequent first action consisted of either discussing the situation with someone in the immediate environment or of looking outside to see what was going on. Turning on or paying stricter attention to the radio or television closely followed the above two as a first reaction. Those who reported a sequence of three activities of verification generally went outside in stage three. The typical sequence was thus to turn to someone near you for an opinion, then to turn on the radio, then to go outside.

Only two per cent of the entire sample took what might be considered protective action. Of those who thought that the siren might have signaled an air attack, six per cent took protective action. Six cases are far too few to justify any meaningful cross-tabulations. The behavioral sequence of these six went like this: one got her children up, dressed them, and was starting to get canned food, flashlight, etc., and would then await further instructions; two more went down to their basements; another hid under a table; a fifth just started running around the house trying to do something, though it was not clear even to her what she would do; and the last got her children up. Five of these six were women with children.

Little more than half of those who thought that it might be an air raid even contemplated some form of protective action. This makes about 25 per cent of the whole sample who at one time thought of doing something to protect themselves. The majority of these persons (two-thirds) said that they thought of going to the basement for protection.

These persons were asked why they decided to do nothing. Three kinds of responses were given to this question: first, there was disbelief that it was an air raid alert; second, the respondent reported that there was no corroboration from other sources (i.e., no support from the radio, people were in streets, etc.); and finally there was the complete feeling of either futility or ignorance of what to do. These responses were divided rather evenly, approximately one-third each, although disbelief was expressed by 41 per cent.

People varied by social category in their responses on the question of contemplated protective action. Females were more

likely to think about doing something to protect themselves than were males. White respondents were much more likely to think of taking protective action than were Negroes (58 per cent to 35 per cent respectively). Neither education nor income, nor even having watched the ball game or not, were at all related to contemplated protective action. Age was slightly related, however, with older persons being a bit more likely to think of taking care of themselves in a specific manner.

The Public's Retrospective Interpretation of the Incident

Each respondent was asked to sum up what he had learned from the whole experience. Only two per cent stated that they had learned what to do next time a warning signal is sounded. An additional 12 per cent stated that they had learned absolutely nothing. The largest category of persons said they had learned that the sirens were used irresponsibly, and that people should be warned with sirens only in emergencies. About a third stated that they had learned of the inadequate civil defense facilities in case of an attack (i.e., lack of sufficient number of air raid shelters, etc.).

A majority of the sample believes that if Chicago is attacked in a nuclear war, there will be total death and destruction. Further, about one-fourth of the respondents felt that civil defense would be useless in case of an attack.

The overwhelming majority of respondents—almost 80 per cent—said that it was not a good idea to sound the sirens in celebration of the baseball victory. Among the 18 per cent who thought it was a good idea to sound the sirens to signal the baseball victory, education was a relevant variable. The higher the education, the less likely one was to say that such use of the siren was a good thing.

CHAPTER 5

CONSTANTS AND VARIABLES: A COMPARISON

The Incidents

We are primarily concerned, as we pointed out in Chapter One, with the analysis of the receipt of a signal for an imminent or threatening disaster, the interpretation of that signal, and the action based upon that interpretation. We can therefore treat the three incidents—in Oakland, Washington, and Chicago—as identical occurrences from the point of view of the three publics exposed to the signal.

In each case a siren was sounded. The siren was the warning signal for an enemy air attack. In no case did the public hearing the signal receive either beforehand or simultaneously any official countervailing message suggesting that the siren did not "mean what it said." It is true that in Chicago a few key people in municipal government and the communications industry knew that the siren was to be sounded to celebrate the baseball victory, but the general public had not been informed of this. We can view all three research reports, then, as studies that provide analyses of the public's interpretation of and action in response to a signal of an impending attack.

The portent of the siren was the same in all three cases then, but the situational contexts varied in an almost ideal experimental way. One major difference relates to the time of day when the siren sounded. The Oakland siren went off in the morning, the Washington siren in late afternoon, while the alert was sounded in Chicago late at night. Concomitantly, there was an increase in the proportion of the respective populations who took the alert seriously.

Associated with the variation in time of day are differences in group structure. During the morning in Oakland, husbands were at work and wives at home. In Washington, government workers in an organizational setting heard the siren in the afternoon. The evening incident in Chicago found families together, and in some cases sharing the evening with friends.

The Research Designs

There are social organizational differences in the publics exposed to the signal and in the universes sampled for study. The Chicago and Oakland studies claim to be fairly representative of the city populations, respectively. The Washington claims are understandably more modest, purporting to represent only the governmental agencies that were sampled for the study.

The sampling of the whole populations produced data from families which had been separated at the time of the alert in Oakland and together at the time of the Chicago warning. However, the wiring error which caused the Washington alert affected only a limited universe, agency work groups. The Washington study offers suggestions on differences in the range of variations in interpretation of the signal and of behavioral responses to it which may stem from differences in the organization and training of the work group receiving the warning.

Finally, the Chicago research had the advantage of being designed to replicate a number of questions from the design of the Washington study. The questionnaire items and interview questions from the Washington study were given to the Chicago researchers, and a deliberate attempt was made to replicate parts of the Washington design in Chicago. Hence, our best comparisons of the responses of different samples to the same questions come from these two analyses.

The Definition of the Situation

A segment of learning theory helps to explain some of the variations in response to the alerts in the three cities. Chicago has warning-system tests every week at the same time, 10:30 a.m., on the same day, Tuesday. Thus, Chicagoans have come to associate the siren with the Tuesday morning test. When the sirens sounded at a time other than that to which the people were conditioned, the expected confusion resulted. The fact that Chicagoans knew that sirens were sounded only at a specific time of day contributed greatly to the belief that the night siren was a real alert. Oakland, on the other hand, was accustomed to many sporadic alerts which occurred at several different times of day, and on different days of the week. Any siren, therefore, can be unexpected in the sense that there need be no necessary association with a specific practice time. Washington provides an interesting intermediate between these two extremes. Civil defense warnings were sounded in the District of Columbia generally at noon, although

one day of the week was not set aside and always used for the tests. If degree of consistency in sounding the practice alerts is a contributing variable in defining the situation when an unannounced siren is sounded, then we would expect persons in Oakland, Washington, and Chicago respectively to be progressively more afraid.

Our data suggest that Chicagoans were most frightened, despite the fact that Chicagoans had an occasion which could explain the sounding of the siren—the baseball victory. About two-thirds of the respondents in the Chicago sample characterized themselves as baseball fans. No comparable event, and no comparable predisposition, was present in either Oakland or Washington, D.C., to serve as a possible deflector or plausible explanation for the siren which might lead recipients of the signal to dismiss its manifest message. Yet, as Table 7 shows, Chicagoans were much more likely than Washingtonians to describe themselves as scared, excited, or uneasy, and considerably less likely to be unconcerned about the signal.

TABLE 7

Percentage Distribution of Emotional Reactions to the Meaning of the Siren

Reaction	In Washington (N=1691)	In Chicago Among Those Who Thought the Siren Meant		
		Ball Game (N=53)	Other (N=41)	Air Raid (N=98)
Scared	2	2	17	63
Excited	2	6	10	56
Uneasy	16	7	24	66
Confused	18	--	--	--
Annoyed or Irritated	6	4	17	34
Curious	34	11	78	82
Unconcerned	13	9	24	11
Other or no answer	8	--	--	--

(In interpreting this table, the reader should note that the Washington design calls for a forced-choice answer, so that replies total 100 per cent, whereas Chicago respondents were allowed to describe their reactions in as many of the categories as they considered appropriate.)

Furthermore, even allowing for different choices offered in questionnaires or volunteered by respondents ("Testing" in Washington, "Ball game" in Chicago), it seems clear from Table 8 that Chicagoans were markedly more likely to define the signal to mean attack was probable than either of the other two populations. Repeated use tends to dilute the meaning of a signal used in randomly timed practice alerts and weaken its symbolic value. In both Oakland and Washington, over half the population defined the siren as a test, practice drill, or mistake—an interpretation made by only four per cent of the Chicago sample.

In view of the findings cited in the Chicago study that persons with their families are more likely to treat the alert seriously, it is instructive to note the varying locations of persons in the three cities at the times of the sirens. In Chicago, almost 80 per cent were at home. The Oakland researchers found about 40 per cent of their respondents at home, while in Washington, the total sample (100 per cent) consisted of those in the work situation, since subjects were taken only from those employed in six government agencies. According to the Chicago findings about families, we would expect Chicagoans to take the alert most seriously, the Oakland sample to be less convinced of the reality of the message, and the work groups in the Washington sample to be the most nonchalant in their interpretation of the warning alert; and indeed, according to Table 8, they were.

TABLE 8

The Meaning of the Siren:
First Thoughts of Respondents

	Per Cent of Respondents		
First Thought	Oakland (N=87)	Washington (N=1691)	Chicago (N=109)
Real air raid alert	22	7	43
Practice drill	46	32	3
Testing signals	--	26	--
Mistake	5	7	1
Fire, ambulance	5	6	25
Disaster, major accident	--	--	5
Ball game	--	--	16
"Something bad" (unspecified)	--	--	3
Other: disbelief, doubt, don't know, didn't think about it	24	20	5

In all three of the studies, it was found that belief in the imminence of war was directly associated with taking the warning seriously. Those who believed the international political situation to be tense were much more likely to define the situation as a warning for a real attack. This is one of the few variables affecting the definition of the situation that could be traced through each of the research projects, and it is therefore of some significance that the findings converge.

In the two studies where sex was reported as a variable (Washington and Chicago), women took the warning signal more seriously than men. Women were more likely to believe that the signal was a warning for a real attack, and they were much more likely to express fear, concern, irritation, and excitement. This seems to be especially true of women with children. Further, women were more likely to attempt to validate the siren by looking around in their immediate environment for some kind of evidence.

In both Oakland and Chicago, researchers found that the middle-educated group (high school, but no further education) was most likely to regard the siren as a warning of probable attack. If this had been a finding in only one of the studies, it would have been interesting in itself, but more easily dismissable as an anomalous finding. That the same pattern was discovered in both of the cities where education was used as a variable lends credence to the hypothesis of a curvilinear relationship between "serious concern" and education.

The Behavioral Response: What Did People Do?

Probably the most conclusive general finding from the research experiences in the three cities is that hearing the warning siren alone is totally inadequate to stimulate people to immediate protective action. What people do, in fact, upon hearing the siren, is to seek additional information either to validate or to refute their own initial interpretation of the meaning of the signal.

In seeking additional information, the majority of the persons sampled turned to unofficial, informal, and, in terms of civil defense criteria, incorrect sources. Civil defense instructions specifically state that the telephone should not be used in an alert, since, with only a very small percentage of the total population using the telephone simultaneously, switchboards are quickly and easily jammed. True enough, switchboards were jammed in Chicago, thereby increasing the apprehension of those who were unable to get a dial tone.

Protective action was taken only by a rather small percentage of the population of each city sampled. In Chicago, for example, only two per cent reported that they had engaged in activity that could be even loosely interpreted as protective. At first glance, it seems both confusing and contradictory that some 20 per cent took protective action (going to a shelter) in Washington; Chicagoans reported that they were genuinely more frightened than those reporting their feelings at the time of the Washington alert. Why did fewer Chicagoans take protective measures, when more of them say that they were afraid? Clearly this is a question with operational implications; an answer to it offers an opportunity to apply our findings so as to increase the proportion of people receiving the signal who take protective action.

The most obvious variable to which we can attribute the Washington response is organization. The workers in government offices were in an environment where there was a known correct reaction to the siren. If a recipient of the signal did not know that response, he might be in the company of others who did; he could turn to his supervisor or to a colleague with civil defense training for instruction; there generally were placards on the office wall telling what to do if the siren sounded. It was not necessary that one believe the import of the siren. There was organizational encouragement for him to take action when he heard the siren, no matter how he interpreted its meaning.

Here is an interesting analogue to social science research on racial and ethnic prejudice and discrimination: Attitudes are separable from behavior. An organization can inhibit a man's discriminatory behavior even if he holds prejudiced attitudes. When the United States Navy desegregated recruit companies, white apprentice seamen shared bunk, mess, and shower facilities with Negroes whether or not they were prejudiced. Why? They received, interpreted, and acted upon the organization's signal to behave in a non-discriminatory manner because the organization had power over them. They had become accustomed to the fact that the organization could impose sanctions, that it would reward those who responded to directives and punish those who did not. They had become conditioned to conforming when a directive announced that "All personnel will now..." do the following, whether it was fall out for rifle drill or form companies into racially integrated units.

We might expect, then, that where an organization is present to impose constraints upon its members, it is possible to get higher proportions of the population to take protective action, regardless

of their attitudes toward the signal they receive. Our experience in training and organization indicates that a nearly perfect response can ultimately be secured. An employee of an organization may think, "Ho, hum, another phoney alert," or "What a lousy waste of time," but this does not mean that it is essential to change his attitudes toward practice drills. If sufficient and appropriate sanctions are employed he will take protective action.

A sound civil defense policy does not necessitate converting the whole population into true believers. It requires reaching and directing them through social organization.

CHAPTER 6

SOME GENERAL PROPOSITIONS AND HYPOTHESES

"Incomparable" is an adjective more flattering when applied to essays in the humanities than to research reports in the sciences. The building of social science calls for comparable research designs. Originality may be richly rewarded but replication is sorely needed. Carefully replicated research is all too rare in the social sciences [Hanson, 1958; Mack, 1951]. An inventory of the convergences in an area of inquiry lets us know where the gaps in our theory and research are. It calls our attention to our strengths and weaknesses and spotlights areas of possible breakthrough. While the attempt to integrate the data reported on here into a systematic theoretical scheme may seem premature, it seems to us worthwhile to assemble a sampling of what is known and what seems likely about human reactions to disaster warning.

In this attempt at a theoretical contribution, we shall continue to keep our attention upon the phases of the warning process following the detection of a threat and the transmission of a warning message: the receipt of the signal, the interpretation of it, and the action based upon it. Our focus remains upon the parts of the warning system which are dependent upon elements of the social structure: the social organization of the recipients, their primary group memberships, and the social categories from which they are drawn.

The process of warning obviously contains many elements that are inappropriate to the focus of this monograph. We shall make no attempt to deal with such important questions as the relative effectiveness in various contexts of a siren, horn, or bell; the detection of the threat which makes the sending of a signal necessary in the first place; the decisions as to whether or not to send a message, to whom the message should be directed and what its contents should be; the administration of an agency whose responsibility it is to detect threats and send warnings; or even the feedback of information to the warning agency about responses to its signal. Each of these is too important and complicated a topic to be touched lightly here; each deserves adequate study as a separate problem.

We have reviewed three cases of air raid alerts in which the signal denoted a probable attack. We have noted the differences among them, and have summarized their common features. We shall now raise our level of abstraction, and set forth some general propositions about the responses of human beings to signals of impending danger. We shall attempt to order our knowledge of the social responses to disaster warnings so as to answer the following questions: (1) When a warning message is received, what factors influence the definition of the situation? (2) What is the impact of primary group participation? (3) What is the pertinence of such social categories as sex, education, race, and age? (4) Does it matter whether one is participating in a large or small social organization, a weak or a strong one? (5) What is the relationship of one's definition of the situation to his subsequent action? (6) How does one interpret his definition of the situation and his behavior in retrospect?

While this chapter is built upon the three studies we have summarized, it is a synthetic analysis. It exploits not only the Oakland, Washington, and Chicago research but, in addition, draws upon any theory and data which seem pertinent to an inventory of propositions and hypotheses relating to responses to disaster warning. These propositions and hypotheses should in general be viewed as educated guesses. Although some of them are well documented in the research literature of social science, most of these statements are more properly described as hypotheses than as laws. It is important that these tentative generalizations be greeted with a proper scepticism. On the other hand, if we are to marshal the fragmentary findings on this topic with the goal of applying what knowledge we have, social science at this point has little to lose and much to gain from the orderly drafting of reasonable hypotheses. [For similar efforts at propositional inventories, see R. Williams, Jr., 1947; Demerath, 1957; Mack & Snyder, 1957].

The Roman numerals indicate broad general propositions, not usually specific to disaster research but encompassing patterns of human social behavior which would include responses to warnings. The Arabic numerals indicate hypotheses subsumable under these propositions. Some are documented by research; some are suggested by the theoretical literature; all attempt to specify more precisely the relationships among the variables treated in the preceding proposition. Our footnotes, of course, do not exhaust, nor are they intended to exhaust, the literature. Representative and illustrative support for these propositions and hypotheses in both the classical theoretical literature of social science and in recent research findings is indicated in parenthetical references to the bibliography.

The Definition of the Situation

The Incident

I. People define a situation not only on the basis of the objective reality of the situation, but also on the basis of their own interpretation of signals which are intended to communicate that situation [Weber, 1947; Thomas, 1923; Parsons, 1951].

1. The interpretation placed upon a warning signal is independent of the ultimate validity of that signal [Scott, 1956; Baker, 1959; Katz, 1960].

The fable of the little boy who cried, "Wolf! Wolf!" is illustrative of both sides of this proposition. The first few times that the shepherd boy jokingly cried out (signaled) "Wolf!," the objective situation was that there was no wolf attacking the sheep. Yet, the men interpreted the cry as indicating real danger. Finally, when the wolf did attack (objective reality) and the cry was presented (signal), the men chose to ignore it as another prank. In both cases, the interpretation of the signal was independent of the objective situation about which the communication was intended.

Tables 7 and 8 in Chapter 5 show this empirically. Oakland had a real alert in response to unidentified planes; Washington had an accident; Chicago had a celebration. Neither fear nor the interpretation of the signal as real is related to the relative validity of the circumstances leading to its sounding.

II. The interpretation of the meaning of a signal depends in part upon the observation of the behavior of others in the immediate physical environment.

2. When an individual observes persons in his immediate environment acting in such a way as to indicate that they believe the signal to be valid, then the observing individual is likely to treat the signal as valid [Cantril, 1940; Lee & Humphrey, 1943].

People tend to look around them to see how others are responding to a situation. Fires that have occurred in confined places such as theaters provide tragic reminders of some of the more unfortunate consequences of this tendency [Foy & Harlow, 1957]. It is generally the case that the greater danger in such restricted situations is the panic, not the fire. And the panic is generally contagious, beginning with the first few who smell smoke

(signal) and scream "Fire!" (signal) [Janis, Chapman, Gillin, & Spiegal, 1955]. Observation of this behavior causes a few more similar reactions, and the first stages of the contagion have begun.

3. When an individual observes persons in his immediate environment acting in such a way as to indicate that they believe the signal to be invalid, then the observing individual is likely to treat the signal as invalid [Baker, 1959; Katz, 1960].

As Table 9 demonstrates, an excellent predictor of one's definition of the situation is the interpretation which his companions place upon the signal. In evaluating this table, it should be borne in mind, of course, that respondents tend to project their own interpretations to others.

III. The interpretation of the meaning of a signal depends in part upon the degree of reinforcement provided by previous experience with the same signal.

4. Continuous use of the signal without subsequent validation will result in the extinction of the possible interpretation of the meaning of the signal as valid [Hilgard & Marquis, 1961; Mowrer, 1950].

5. When the signal is used only for the event which it is intended to preface, and when the event occurs always and only after the presentation of the signal, the signal will be interpreted as valid [Hilgard & Marquis, 1961; Spence, 1956].

When the telephone rings, we expect that when we pick up the receiver and say hello, someone will answer on the other end. In countless past experiences, when the telephone bell has sounded and the receiver was picked up, a voice has responded from the other end. The ringing bell (signal) in this case is almost always used only for the event (another party speaking on the other end) for which it is intended.

IV. The interpretation of the meaning of a signal depends in part upon the response of official or formal sources to questions which call for validation, corroboration, or refutation [Danzig, Thayer, & Galanter, 1958; Rosenstock, Hochbaum, Leventhal, et al., 1960].

6. When official sources are unsure or ambiguous, the number of alternative interpretations of the signal increases [Cantril, 1940; Katz, 1960].

7. When official sources are positive and direct as to the meaning of the signal, the interpretation will follow the direction suggested by the official sources [Merton, 1957; Blau, 1955].

For example, note the following incident: In early afternoon in a rural area of Kansas, the sky grows suddenly dark, and great gusts of wind containing dust blow over the land. A call is placed to the local weather station to find out the possibility of a tornado. A direct statement from the weather station (either yes or no, or even a probability statement) makes a direct interpretation most likely.

Primary Groups

V. The interpretation of the signal varies with the type of primary group within which the individual is situated at the time the signal is presented [Cooley, 1929].

8. In a situation perceived to be potentially disastrous, the primary group in which the individual maintains membership at the time the signal is presented is likely to be the most important reference group for an interpretation of the situation [Stouffer, et al., 1949; Shils & Janowitz, 1948].

Just as people tend to look around to observe how others are interpreting the signal, so too do they observe the specific behavior of the smaller group of friends or relatives if such a group happens to be present at the time the signal is presented. For example, in the illustration cited above about contagious panic in a theater fire, if a small family unit is present, the members are likely to take behavioral cues from the father or another in the role of head-of-household.

9. Persons situated in their own family group will tend to treat the signal more seriously than when situated in any other primary group [Kirkpatrick, 1955; Waller & Hill, 1951].

If the signal is a warning for a potentially disastrous occurrence, being in the presence of one's family is likely to make one more afraid. Being with a group of friends is likely to make one take the whole thing less seriously. This may be due to the norm that it is acceptable to express concern for one's family, or even fear for its safety. One is more subject to ridicule if there is an indication of anything but a carefree and nonchalant attitude in such a situation with friends.

TABLE 9

Interpretations of the Chicago Siren by Respondents and Their Companions

Respondents Who Said They Thought	Per Cent Reporting Their Companions as Thinking			Number of Total Replies (N=109)
	Game	Other	Raid	
Game Only	64	18	18	(22)
Game and other	50	50	--	(10)
Other only	--	89	11	(9)
Raid and game	36	16	48	(31)
Raid and other	10	40	50	(10)
Raid, game, other	7	7	86	(14)
Raid only	15	15	69	(13)

10. Individuals situated in a group of peers are least likely to treat the signal as valid [Piaget, 1954; Cohen, 1955].

For a day and a half before the crest of a flood sweeping down the Rio Grande, the residents of Eagle Pass, Texas, and Piedras Negras, Mexico, received repeated warnings. If the situation had been defined accurately by the recipients of the signals, much property damage could have been averted and all lives could have been saved. When asked why they did not use the time between the signal and the disaster for protective action, respondents replied, "I did not believe it." They used the time instead for considerable discussion among friends, neighbors, and relatives about whether or not to evacuate. The tendency of those whose advice was asked was to discourage belief in the warnings, and the time was invested in seeking further information [Clifford, 1956].

11. An individual who is not in the presence of his family, but who knows that his family is in the area potentially covered by the signal, is more likely to interpret the signal as valid than one whose family is not in the area potentially covered [Baker, 1959; Killian, 1952].

12. Probably an exception to propositions 9, 10, and 11 is found where the primary group is a task-oriented group whose task is relevant to the signal. We would expect a meeting of air raid wardens or a peer group of Weather Bureau personnel to take seriously official warnings relevant to their specialties.

Social Categories

VI. The higher the rank of an individual within a given social category, the more likely he is to interpret as invalid a signal intended to preface a disastrous situation [Mannheim, 1956; Mannheim, 1936].

A plausible explanation of this is that persons who have achieved or enjoy high social status are less willing to entertain the possibility that a disaster could occur which would spoil everything. It may be that persons in low-status ranks within social categories are so used to the hard knocks that they come to expect any signal as a harbinger of more bad news.

13. Women are more likely to interpret the signal as valid and indicative of an impending disastrous situation than are men [Zelditch, 1955; Parsons & Bales, 1955; Baker, 1959; Katz, 1960].

14. Women are more likely to report a strong emotional response to a signal representing a potentially disastrous situation [Zelditch, 1955; Parsons & Bales, 1955; Baker, 1959; Katz, 1960].

In addition to occupying a generally lower status, women are also covered by a norm which allows them more expression of concern and fear for the well-being of others.

15. Middle-educated groups are most likely to interpret the signal to mean what it is formally intended to mean [Scott, 1956; Katz, 1960].

16. Poorly educated (persons who have gone no farther than grammar school) and college-educated individuals are alike in their tendency to disregard the formal meaning of the signal [Scott, 1956; Katz, 1960].

The finding that high school-educated persons tend to take a civil defense warning signal more seriously than college-educated persons is consistent with the general proposition above about

social rank and social categories. However, the finding that those even less well-educated are more indifferent to the siren than are the high school group clearly contradicts this proposition. One interpretation that would remain consistent within this framework is that the less well-educated group does not even know what the signal means and therefore could not possibly take it seriously. Whether this is the case or the general proposition needs major revision is an empirical question. An alternative explanation is that those with high school educations are relatively well-informed and responsible, but, unlike the college-educated, are not sophisticated and blasé enough to treat the siren cynically.

17. There is very little difference between races in the interpretation of a signal portending danger [Davis & Havighurst, 1946].

18. The slight tendency for Negroes to express less often an emotional response to the signal portending danger probably is attributable to the general relationship between formal education and race [Katz, 1960].

That is, this may be more nearly an indication that less well-educated groups are less emotionally involved, rather than that Negroes are less involved. Studies in other areas indicate that when education is held constant, differences by race tend to be minimal. The behavior of the college-educated Negro is more similar to that of the college-educated white than it is to the behavior of the grammar school-educated Negro [Davis & Havighurst, 1946].

19. Small-town residents or urbanites with small-town backgrounds are less likely to interpret a signal as valid than are residents of large cities [Kaufmann, 1944; Katz, 1960].

Small-town residents may be accustomed to the sounding of local fire alarms and other noise-making devices upon any number of occasions for local celebration, such as an important high school basketball victory [Katz, 1960]. But this is a highly tentative generalization, since being of small-town origins may—especially in selected universes such as a Northern metropolitan area—be highly correlated with other social-category variables, e.g., race, education, and age. Furthermore, the small-town resident is probably accustomed to considering his area as one of no interest as an enemy target.

20. Members of "middle-status" churches are more likely to interpret as valid a signal intended to preface a disastrous occurrence [Katz, 1960].

As with the race variable, this is perhaps not a causative association, but rather the result of the relation between education and religion. If so, it is simply a finding supportive of propositions 15 and 16. Certainly future research should attempt to examine further the relationship between a respondent's religious commitment and his interpretation of a disaster warning [Schneider, 1957; Lachman, 1961].

21. Generally, the older the individual the less likely is he to interpret as valid a signal intended to preface a disastrous occurence [Katz, 1960].

This could be due to several factors, among which are 1) Older people are more likely to hold traditional views and ideas, and full-scale nuclear destruction is not among them. They have lived longer than young people without experiencing such a disaster. Thus, it may be that the older people are less likely to accept even the possibility of a real attack [Beach & Lucas, 1960]. 2) The older the individual, the less likely is he to be aware of the intended meaning of the signal (i.e., the formal intended meaning of the siren or air raid alert). 3) Age is another variable in the matrix of correlations which shows association among race, education, religious denomination, urbanity, occupation, and income, among others. Hence, without statistical or experimental controls, association is the most we can posit. We have insufficient data to allow generalizations differentiating young Negroes from young whites or old Negroes, wealthy Baptists from poor Baptists, educated female Episcopalians from educated male Episcopalians or uneducated female Episcopalians, and so on. (Note: In generalizations about age, it should be kept in mind that the studies concern only the reactions of the adult population.)

Organizational Factors

VII. The larger and more complex the scale of the organization to which the individual belongs or with which he is associated at the time the signal is presented, the more likely is he to interpret the signal as valid [Durkheim, 1933].

22. The more pervasive or diffuse the organization's influence upon the life of its members, the more likely is the

individual member to rely upon official organizational directives in the interpretation of the meaning of the signal [Weber, 1947; Selznick, 1949].

23. The more highly structured and precise the organizational roles, the more likely is the individual to seek an interpretation of the signal from his nearest structural-level superior [Weber, 1947; Janowitz, 1949].

24. An individual is likely to interpret a signal as valid to the extent that the organization of which he is a part provides training and leadership in the interpretation of signals, and drill in proper responses to them [Baker, 1959].

Perception of the Environmental Context of the Signal

VIII. An individual is more likely to interpret a warning signal as valid to the extent that he perceives his total environment as threatening or fraught with hazard.

"In American society, psychological insecurity concerning position on the scale of social stratification is most intense in the lower middle class" [R. Williams, Jr., 1947]. Here is an intervening variable which may explain the curvilinear relationship noted in propositions 15 and 16 between education and tendency to treat the signal seriously.

25. People evaluate current warnings in terms of past experience [Blum & Klass, 1956; Wolfenstein, 1957].

People who have experienced low-level floods respond to warnings by putting things on table tops; people who have experienced deep floods prepare for another severe one [Instituut voor Sociaal Onderzoek, 1955].

26. An individual is likely to interpret a warning signal as valid to the extent that he already believes the message it is intended to convey is a likely occurrence [Beach and Lucas, 1960].

People are likely to treat an air raid alert seriously if they believe that war is imminent, that the international situation is worsening, or that World War III will be set off by mistake [Scott, 1956; Katz, 1960].

The Behavioral Response

The Incident

IX. The behavioral response is made to the perceived situation, not to the objective reality of the situation [Thomas, 1923; Merton, 1957].

To return to the example of the little boy who cried, "Wolf! Wolf!": The first few times that the men ran back to defend against a wolf that wasn't there, they were responding to an interpretation of the situation (belief that the signal was valid) rather than to the real situation. And again, when the wolf finally did attack, and the men ignored the cry (signal) and did nothing, they were also responding to an interpretation of the situation ("The boy is merely playing again.") rather than to the objective reality of the situation.

27. In the absence of compelling situational strictures, individuals behave in accordance with what they interpret or perceive the signal to mean, not in accordance with what the signal officially means [Scott, 1956; Baker, 1959; Katz, 1960].

In Oakland, where the siren meant, "Prepare for enemy attack," nearly half the people interpreted it as meaning "another practice alert"; more than a third of the people behaved as if nothing unusual had happened. In Chicago, the siren was sounded to celebrate a baseball victory, but a third of the people thought it was an air raid alert, and 10 per cent of the population jammed the telephone switchboards. In all three of our cases, we find interpretations resulting in behavior inappropriate to the manifest content of the signal.

X. Logical or rational behavior is not a necessary outcome of logical and rational interpretation [Weber, 1947, Katz, 1960].

A college student, out with his friends on the evening before an important examination, can logically and rationally conclude that he ought to go home and get some sleep. Instead, he stays up even later than usual for an ordinary night. That he interprets his situation rationally is no assurance that rational behavior will follow.

28. The interpretation of a signal as a warning for a potentially disastrous occurrence does not commonly result in adaptive or protective action [Foy & Harlow, 1957; Moore, 1958; Scott, 1956; Baker, 1959; Katz, 1960].

For example, many people in Chicago thought of the possibility that the air raid siren sounded after the White Sox won the pennant in 1959 was the warning for a real attack. Yet there is evidence that not more than five per cent of the people responded in an adaptive or protective manner.

Primary Groups

XI. The behavioral response varies with the type of primary group within which the individual is situated at the time the signal is presented [Shils & Janowitz, 1948; Merton & Kitt, 1950].

29. The primary group in which the individual is most likely to take adaptive action upon interpretation of the signal is the family [Kirkpatrick, 1955; Waller & Hill, 1951].

The rationale here is similar to that in the discussion of proposition 9 on primary-group membership and the interpretation of the signal. In the family situation, interpretation tends to be the basis for subsequent action. Individuals in family situations are more likely to take adaptive action once they interpret such situations as potentially disastrous.

30. The primary group in which the individual is least likely to take adaptive action upon interpretation of a signal intended to portend disaster is the peer group [Piaget, 1954; Cohen, 1955].

Social Categories

XII. The behavioral response varies with the social categories from which the recipients of a signal are drawn [Taylor, 1961].

31. Women are more likely than men to behave with greater emotionality at both ends of the adaptive-nonadaptive continuum. That is, women are more likely to indulge in excited maladaptive behavior, but they are also more likely to take immediate protective action when confronted with a signal of a potentially disastrous situation [Zelditch, 1955; Parsons & Bales, 1955].

32. Middle-educated groups (those who have gone to high school but no further) are most likely to take adaptive or protective action upon interpretation of a signal intended to preface a disaster [Scott, 1956; Katz, 1960].

The rationale for the two preceding propositions is contained in the discussions of propositions 13 through 21.

Organizational Factors

XIII. The behavioral response varies with the size, complexity, and pervasiveness of the organizational structure of which the recipient of the signal is a part.

The references in propositions 22 and 23 are pertinent here.

33. An individual will take protective action as a response to a warning signal to the extent that the organization of which he is a part provides training in the interpretation of signals and drill in proper responses to them [Baker, 1959].

Perception of the Environmental Context of the Signal

XIV. People respond to warning signals on the basis of previous experience [Wallace, 1956].

34. People who have survived earlier disasters repeat what was rewarding behavior in previous situations [Instituut voor Sociaal Onderzoek, 1955].

35. People with previous disaster experience are more likely than those without it to go through organizational channels for information and verification, and more likely to obey organizational directives [Baker, 1959].

Retrospective Interpretation

XV. The retrospective interpretation of the meaning of what has transpired is not based upon the objective reality of the possible or probable validity of the signal but upon the individual's interpretation of the outcome of his response to the signal [Weber, 1947; Parsons, 1951].

> After something has happened to a person, he tends to arrive at the meaning of the situation in terms of the way in which the outcome has affected him. For example, if a too zealous suitor is slapped by the object of his desire, the meaning of the slap retrospectively is contained within and linked to the outcome of other actions pursuant to the fulfillment of his desire.

36. If the outcome is not perceived by the individual to be detrimental to his goal, his interpretation of the next similar signal will not be significantly different [Znaniecki, 1936; Miller, 1959].

To continue the preceding example: If the suitor gets the girl (successful outcome) by persisting, then the slap contains no meaning (retrospectively) as a signal, and further, he will treat the next slap accordingly.

Similarly, a series of warning signals which one ignores without punishment will result in the signal becoming meaningless, and will increase the tendency to ignore future signals.

CHAPTER 7

QUESTIONS NEEDING ANSWERS: PROPOSALS FOR CRUCIAL RESEARCH

To establish higher levels of predictability of human behavior in response to warning signals, every proposition in Chapter 6 ought to be treated as a hypothesis. This is not to imply that we do not know anything. On the contrary, we can bring some order out of a number of separate studies. We can see enough comparability among different sets of findings to organize a set of tentative propositions. It is time, then, that we re-examine those propositions with research designs calculated to increase the degree of precision of our statements.

What are the most important gaps in our knowledge? What kinds of research are most likely to correct our errors and make up for the present inadequacies in our knowledge?[1/]

Attitudes Versus Behavior

One can hardly look at Chapter 6 without being struck by the relative richness of our information about factors related to the definition of the situation. Examination of the section on the definition of the situation leaves the material on behavioral response to the signal looking somewhat sparse. In other words, we know more about attitudes than about behavior.

This imbalance is even worse than it appears to be at first glance. Most of the references on behavioral response are to studies of what people <u>say</u> they did. What we have called data on behavior is, as is too often true in social science, data on verbal reports of questionnaire and interview respondents on what they claim is their best recollection of what they did.

1/ This chapter offers suggestive rather than exhaustive answers to these questions. For more detailed treatments, see Barton, in press, and Baker & Chapman, in press.

There are simply too many chances for error here. Occasionally, people may deliberately falsify answers, perhaps out of fear of punishment from the organization, hope of approval from the interviewer, or shame at their own ignorance, cowardice, or folly. Probably more often the case is that, out of similar motivations, people unintentionally or unconsciously warp their own memories of a situation so that they see themselves as they would like to have been rather than as they were.

A set of research projects using observational methods is necessary to round out our knowledge. If we want to know what people do under the stress of a disaster alert, we should systematically observe what they do instead of waiting until afterward and asking what they did. Ideally, teams of well-trained, experienced social scientists should be distributed through a community or organization where a disaster is going to occur. They should observe the normal course of behavior before an alert, note what people in their part of the environment do when the signal is sounded, watch them during the period of threat and afterward. The psychology and social psychology of responses to warning signals are a crucial portion of needed knowledge, but they are not enough. We must develop a more complete sociology and anthropology of disaster, a set of principles which will help us to understand the social structure and culture during the warning process.

Experimental Design

The preceding paragraph suggests the desirability of knowing about the social context in which an alert occurs. Too few of our studies tell us what the situation was before the signal sounded. As we have seen, those research reports that do detail the circumstances before the alert offer us valuable leads for interpreting our data.

Virtually none of the research on natural disaster incorporates a control group in its design. An ideal experimental model provides for two groups, with subjects randomly assigned to each: an experimental one, which receives the stimulus, and a control group, matched with the experimental variable. Both groups are observed through time—before the experimental variable is introduced into the situation, and afterward.

Figure 1.

Experimental Design

	Before	After	Difference
Experimental group	X	X'	X' minus X equals d_1
Control group	Y	Y'	Y' minus Y equals d_2

d_1 minus d_2 equals D, the experimental difference

Disaster research needs experimental design to clarify a number of things. It would be worthwhile for measuring the impact of tests, practice drills, lectures, and other preparations for attack. Two carefully matched offices, departments, or branches of the same organization should be exposed to a warning signal simultaneously. If one had had civil defense training and the other had not, we could get more precise measures of the impact of such training.

Even quasi-experimental designs are useful. In effect, we have tried in this monograph to contrast studies of three essentially similar situations which can, to some extent, serve as controls for one another. We can, for example, have more confidence in our generalizations about the consequences of being with one's family when the signal sounds than we could be with only one study. The variation among the three studies in time of day, and its consequences in the distribution of families as units, provides a kind of control.

Similarly, it would be productive in the case of a real disaster to study a community similar to the disaster-stricken one. The control community should be one which received a warning signal but was by-passed by the disaster agent.

We cannot always expect to meet the requirements of experimental design. We should, however, always try to approximate an ideal experiment, and when we cannot, we must remain aware of the nature of the reservations which must hedge our conclusions.

Quantitative Precision

Finally, we should aim at more precise specifications of the relationships among our variables. Our propositional inventory suggests that we already have a good idea of what many of the pertinent variables are. It is essential, however, that we quantify them precisely enough to allow computations of the direction and degree of relationship if we are to move beyond statements of the existence of association between variables.

The discussion under proposition 21 in Chapter Six points up clearly the limitations of statements of the existence of association. Too seldom can we generalize confidently about the direction of the association; i.e., is it positive, negative, or curvilinear? Almost never, at present, can we specify the degree of association. For prediction and control, it is in this direction that we must move.

CHAPTER 8

CONCLUSIONS AND IMPLICATIONS

The application of science to practical problems has a rich and varied tradition. Half a century ago American social scientists sometimes focused their attention on such age-old social problems as poverty, slums, and delinquency. Today, research interest in these areas has considerably attenuated. Among other things, this testifies to the effectiveness with which they were illumined by an earlier generation's mixture of enthusiasm and scientific skill.

The practical and operational implications that follow from an analysis of the civil defense warning system are of a significantly different order than those that were developed from a study of the hobo or the unadjusted girl. The warning system that has been analyzed may sometime have to be employed to signal an enemy attack that could result in wide-scale destruction. At that moment survival of society rather than amelioration would be at stake. A matter so urgent dictates that the reporting of relevant research findings be given most careful consideration. Therefore, the organizational and administrative implications which seem to follow from the studies of three different urban experiences with the civil defense warning system need to be explicitly and simply stated. Since technical details, nuances, and limitations of the data have been fully explored in the earlier chapters, they will not be repeated in this one.

In drafting procedural and organizational suggestions, added confidence is provided by the quality of research findings that have emerged during the past decade or so. Of particular interest are the studies, cited earlier, which have focused on the warning system for numerous natural and man-made disasters.

From the findings which have been presented in this report as well as from our earlier studies of human behavior in disaster, we suggest that:

1. Significant changes in the organization and operation of the warning systems that have been studied are required if the nation is to be provided with an adequate warning of an enemy air attack.

2. Continued systematic research on the warning system and the response it evokes are necessary. Performance criteria are desirable if the system and its operation are to be evaluated periodically and corrective action taken.

3. The warning devices which existed when these studies were conducted were heard. Although some improvements in their physical characteristics are necessary, even after these are accomplished major dysfunctional features in the warning system will still exist. Human and social factors appreciably affect one's definition of and response to a civil defense warning signal. These factors are interrelated and complex. Administrators and leaders who view behavior in simple terms and adopt a one-solution effort will not be successful in modifying existing unsatisfactory post-warning behavior patterns. (A new "black box" in every home and office, regardless of its physical properties, will not solve most of the defects in the warning system that have been discussed in this report.)

4. The need for simplification and standardization of official civil defense signals and training in their use throughout the nation are indicated. If local autonomy and states' rights interfere, these may be organizational features that the nation can no longer afford. (Eli Whitney's development of a rifle with standardized and interchangeable parts was accepted by the military and civilian users nearly two centuries ago. Modern requirements for standardization of another defense system component, civil defense warning signals, are equally urgent.)

5. Many of the designated civil defense leaders in the Washington agencies did not function after the warning signal was transmitted; often their advice was not sought, and sometimes their identity was unknown. Such performance is less than optimum for national survival. If this is a goal, civil defense organization and personnel and their "visibility" should be improved and maintained at the highest possible levels.

6. The value of widespread civil defense training is clearly demonstrated from our studies. In Washington more of the agencies' trained personnel responded appropriately; they sought information from designated organizational leaders and they took shelter or made themselves ready for evacuation. The positive role of organization and leadership was most marked in our comparisons of responses in the three cities. Public agencies can be required to implement civil defense training and private ones strongly encouraged. The rest of society also needs to be protected. Probably

more attention should be devoted to working with such voluntary agencies as churches, parent groups, civic clubs, and labor unions.

7. Studies of behavior during natural disasters have demonstrated that warning messages are often checked or validated by the recipients in a variety of ways before the messages are implemented. This was equally true in the responses to the civil defense warning signals that we have studied. Many of the checking procedures are unreliable and time-consuming. Ideally, given the critical time limitations that govern warning for a thermonuclear attack, the validation process should be eliminated. The message should become a symbol of the awesome event it announces. (Warning messages do symbolize disaster in some structured and regulated systems: e.g. the fire drill in the public school.) If, through the use of appropriate research procedures, it is determined that validation cannot be completely eliminated for some social units, it should be minimized and regulated. Possibly it can be reduced to one validation act. Two potentially excellent sources of validation are available: 1) CONELRAD, if people are taught to be aware of it and to use it; and 2) civil defense wardens and other civil defense officials, if they are properly selected and trained and their organizations are adequately staffed and "visible." Individuals who may not immediately have either of these two sources of validation available should be encouraged to respond automatically to the civil defense siren.

8. No matter how urgent the nation's demand may be for an optimum response to a message, the response will not be realized unless it is facilitated by the removal of all factors that citizens define as obstacles to its attainment. In 1959, Cook County building codes denied a home owner the right to build a fallout shelter. In some measure this could have affected the ability of the residents of Chicago to take shelter when the siren sounded in October 1959. While the Cook County code has recently been changed, it is conceivable that other restrictions still exist in several areas of the United States. (Successful merchants seldom rely on a do-it-yourself approach. When they want the public to buy a commodity they maximize its availability and often, through the use of credit, ease the "pain" which its purchase causes.)

9. The most far-reaching and well-conceived changes in the warning system will not evoke satisfactory response if the total civil defense program is not similarly improved and made creditable. Recent vigorous executive approval of the nation's civil defense represents a long-needed first essential. (The last generation has witnessed a significant increase in budgetary support and in the

specialization and professionalization of our nation's military arms. The non-military defense arm may require equally appropriate levels of support and competence.)

10. Students of human behavior recognize that its basis generally has several dimensions. Some of these are not always rationally determined. Recent critics of the public's response to the civil defense program have generally ignored these facts when they have labeled the public's civil defense effort "apathetic." Many of our findings, from the Washington study in particular, indicate that citizens were anything but indifferent. On the contrary the respondents disapproved the existing level and quality of civil defense preparations, confessed their own ignorance of appropriate protective responses to the warning signal, and requested significant improvements in civil defense organization and procedures. If properly informed, motivated, and led, there is some reason for believing that the public will support civil defense.

11. Clearly, more adequate familiarization with available research results and fuller use of the research process are indicated if we are to achieve informed administration and leadership in the civil defense warning system.

In suggesting organizational and procedural changes in a system component—the warning system of the nation's civil defense—we are reminded of the way that an early giant in societal engineering viewed the application of science to society's needs. Professor Franklin H. Giddings, during the first quarter of this century, saw this direct and positive relationship:

> Facing the facts that the physical world and biological sciences have made known to us has enabled us to live more comfortably and longer than man once did. Facing the facts that the social sciences are making known to us, and will make better known, should enable us to diminish human misery and to live more wisely than the human race has lived hereto (Giddings, 1924, pp. 37-38).

In the intervening years, numerous private and governmental administrators have sought and used the facts that cooperating social scientists have provided. We are hopeful that this report will become a part of that growing tradition.

REFERENCES

Baker, G. W. Operation 4:30: a survey of the responses to the Washington, D.C., false air raid warning. Washington: Office of Civil & Defense Mobilization, 1959. (Working Paper)

Baker, G.W., & Chapman, D.W. (Eds.) Man and society in disaster. New York: Basic Books, in press.

Barton, A.H. Social organizations under stress. Unpublished manuscript to be published in Disaster Study Series, Disaster Research Group, National Academy of Sciences—National Research Council, in press.

Beach, H.D., & Lucas, R.A. (Eds.) Individual and group behavior in a coal mine disaster. Disaster Study Number 13. Washington: National Academy of Sciences—National Research Council, 1960.

Blau, P. M. The dynamics of bureaucracy. Chicago: Univ. of Chicago Press, 1955.

Blum, R. H., & Klass, B. A study of public response to disaster warnings. Menlo Park, Calif.: Stanford Research Institute, 1956.

Cantril, H. Invasion from Mars: a study in the psychology of panic. Princeton: Princeton Univ. Press, 1940.

Clifford, R. A. The Rio Grande flood: a comparative study of border communities in disaster. Washington: National Academy of Sciences—National Research Council, 1956.

Cohen, A.K. Delinquent boys: the culture of the gang. Glencoe: Free Press, 1955.

Cooley, C. H. Social organization. New York: Charles Scribner's Sons, 1929.

Danzig, E. R., Thayer, P.W., & Galanter, Lila R. The effects of a threatening rumor on a disaster-stricken community. Disaster Study Number 10. Washington: National Academy of Sciences—National Research Council, 1958.

Demerath, N.J. Some general propositions: an interpretative study. Hum. Organization, 1957, 16, 28-29.

Durkheim, E. On the division of labor in society. Trans. by G. Simpson. New York: Macmillan, 1933.

Foy, E., & Harlow, A.F. The Iroquois theater fire. In R. Turner & L. Killian (Eds.), Collective behavior. Englewood Cliffs: Prentice-Hall, Inc., 1957. Pp. 96-98.

Giddings, F. H. The scientific study of human society. Chapel Hill, N.C.: Univ. of North Carolina Press, 1924, pp. 37-38. Cited by S. M. Lipset & N. Smelser, Change and controversy in recent American sociology, Brit. J. Sociol., 1961, 12 (1), P. 42.

Hanson, R. C. Evidence and procedure characteristics of "reliable" propositions in social science. Amer. J. Sociol., 1958, 63, 357-370.

Hilgard, E. R., & Marquis, D. G. Conditioning and learning. (2nd ed.) New York: Appleton-Century-Crofts, 1961.

Instituut voor Sociaal Onderzoek van het Nederlandse Volk. Studies in Holland flood disaster 1953. Washington: National Academy of Sciences—National Research Council, Committee on Disaster Studies, 1955. 4 vols.

Janis, I. L., Chapman, D. W., Gillin, J. P., & Spiegal, J. P. The problem of panic. Washington: Fed. Civil Defense Admin., Bull. TB-19-2, 1955.

Janowitz, M. The professional soldier: a social and political portrait. Glencoe: Free Press, 1960.

Katz, E. Joy in Mudville: public reaction to the surprise sounding of Chicago's air raid sirens. Chicago: National Opinion Research Center, 1960. (Working Paper)

Kaufman, H. F. Prestige classes in a New York rural community. In Memoir, Cornell University, Agricultural Experiment Station, 1944, 260, 1-46.

Killian, L. M. The significance of multiple-group membership in disaster. Amer. J. Sociol., 1952, 57, 309-314.

Kirkpatrick, C. The family as process and institution. New York: Ronald Press, 1955.

Lachman, R., Tatsuoka, M., & Bonk, W. J. Human behavior during the tsunami of May 1960. Science, 1961, 133, 1405-1409.

Lee, A.M., & Humphrey, N.D. Race riot. New York: Dryden Press, 1943.

Mack, R. W. The need for replication research in sociology. Amer. sociol. Rev., 1951, 16, 93-95.

_____, & Snyder, R. C. The analysis of social conflict: toward an overview and synthesis. J. conflict Resolution, 1957, 1, 212-248.

Mannheim, K. Ideology and utopia. New York: Harcourt, Brace, 1936.

_____ , Essays on the sociology of culture. London: Routledge & Kegan Paul Ltd., 1956.

Merton, R.K. Social theory and social structure. Glencoe: Free Press, 1957.

_____, & Kitt, A. S. Contributions to the theory of reference group behavior. In R. K. Merton & P. F. Lazarsfeld (Eds.), Continuities in social research: studies in the scope and method of "the American soldier." Glencoe: Free Press, 1950. Pp. 40-105.

Miller, N. E. Liberalization of basic s-r concepts: extensions to conflict behavior, motivation and social learning. In S. Koch (Ed.), Psychology: a study of a science. Vol. 2. New York: McGraw-Hill, 1959. Pp. 196-292.

Moore, H. E. Tornadoes over Texas: a study of Waco and San Angelo in disaster. Austin: Univ. of Texas, 1958.

Mowrer, O. H. Learning theory and personality dynamics: selected papers. New York: Ronald Press, 1950.

Office of Civil and Defense Mobilization. State and local warning operations manual: procedures for warning points. Washington: Author, 1960.

Parsons, T. The social system. Glencoe: Free Press, 1951.

_____, & Bales, R. F. (Eds.) Family, socialization and interaction process. Glencoe: Free Press, 1955.

Piaget, J. The construction of reality in the child. Trans. by M. Cook. New York: Basic Books, 1954.

Rosenstock, I. M., Hochbaum, G. M., Leventhal, H., et al. The impact of Asian influenza on community life: a study in five cities. Washington: U. S. Dept. of Health, Education, & Welfare, Publ. Hlth. Serv., 1960.

Schneider, D. M. Typhoon on Yap. Hum. Organization, 1957, 16, 10-15.

Scott, W. A. Public reaction to a surprise civil defense alert. Ann Arbor: Survey Research Center, 1955.

Selznick, P. TVA and the grassroots. Berkeley: Univ. of California Press, 1949.

Shils, E. A., & Janowitz, M. Cohesion and disintegration in the Wehrmacht in World War II. Publ. opin. Quart., 1948, 12, 280-315.

Spence, K. W. Behavior theory and conditioning. New Haven: Yale Univ. Press, 1956.

Stouffer, S. A., et al. Studies in social psychology in World War II. Vols. I & II. Princeton: Princeton Univ. Press, 1949.

Taylor, R. L. La belle dame sans merci. The New Yorker, 1961, 37 (February 11), 39-70, & (February 18), 45-90.

Thomas, W. I. The unadjusted girl. Boston: Little, Brown, 1923.

Wallace, A. F. C. Tornado in Worcester: an exploratory study of individual and community behavior in an extreme situation. Disaster Study Number 3. Washington: National Academy of Sciences—National Research Council, 1956.

Waller, W., & Hill, R. The Family: a dynamic interpretation. New York: Dryden Press, 1951.

Weber, M. The theory of social and economic organization. Trans. by A. M. Henderson & T. Parsons. New York: Oxford Univ. Press, 1947.

Williams, H. B. Communication in community disasters. Unpublished Ph. D. thesis, Univ. of North Carolina, 1956.

Williams, R. M., Jr. The reduction of intergroup tensions. New York: Social Science Research Council, 1947.

Wolfenstein, Martha. Disaster: a psychological essay. Glencoe: Free Press, 1957.

Young, K., & Mack, R. W. Sociology and social life. New York: American Book, 1959.

_____, Principles of sociology: a reader in theory and research. New York: American Book, 1960.

Zelditch, M., Jr. Role differentiation in the nuclear family: a comparative study. In T. Parsons & R. F. Bales (Eds.), Family, socialization and interaction process. Glencoe: Free Press, 1955. Pp. 307-351.

Znaniecki, F. Social actions. New York: Farrar & Rinehart, 1936.

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL

The National Academy of Sciences—National Research Council is a private, nonprofit organization of scientists, dedicated to the furtherance of science and to its use for the general welfare.

The Academy itself was established in 1863 under a Congressional charter signed by President Lincoln. Empowered to provide for all activities appropriate to academies of science, it was also required by its charter to act as an adviser to the Federal Government in scientific matters. This provision accounts for the close ties that have always existed between the Academy and the Government, although the Academy is not a governmental agency.

The National Research Council was established by the Academy in 1916, at the request of President Wilson, to enable scientists generally to associate their efforts with those of the limited membership of the Academy in service to the nation, to society, and to science at home and abroad. Members of the National Research Council receive their appointments from the President of the Academy. They include representatives nominated by the major scientific and technical societies, representatives of the Federal Government, and a number of members-at-large. In addition, several thousand scientists and engineers take part in the activities of the Research Council through membership on its various boards and committees.

Receiving funds from both public and private sources, by contributions, grant, or contract, the Academy and its Research Council thus work to stimulate research and its applications, to survey the broad possibilities of science, to promote effective utilization of the scientific and technical resources of the country, to serve the Government, and to further the general interests of science.