

PERCEPTION AND AWARENESS OF AIR POLLUTION
IN MANHATTAN, KANSAS

by 679/

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CHAPTER I

INTRODUCTION

Environmental quality has recently become a popular issue and the term ecology is now a household word. With the greater impact man has on his total environment as a result of rising technology, an increasing population, and rising affluence, and the current public interest in these affairs, geographers are becoming increasingly motivated to research themes on environmental pollution.

The geographer's traditional interest in man and land involves a look at how man thinks and feels about his environment and how he behaves in it. As an element in this man-land relationship, environmental pollution can be placed in this tradition. This thesis deals with how citizens of a medium-sized town in Kansas, removed from major air pollution concentration areas, perceive the problem of air pollution in their community and at the national level.

This chapter investigates how environmental perception has been used in geographic research to gain a better understanding of how man relates to his environment and places the present research in this framework. To accomplish this end early statements on man and land are examined, recent trends are outlined, the utility of environmental perception is discussed, and the research plan of this thesis is presented.

I. BACKGROUND TO THE PROBLEM

Early statements on the man-land tradition in geography.

The relationship between man and environment, since it is an ambiguous concept, has been interpreted in widely differing ways. Hypotheses were forwarded that sought to explain how man and environment are related, and included environmental determinism which postulated that man was controlled by his environment, possibilism that stated that man's actions may be free or directed, but they are not limited by geographic conditions alone, and probabilism where the environment was viewed as favoring some developments and disfavoring others.¹

Interest in man-land relationships was evident in the work of many pre-1930 American geographers, particularly George Perkins Marsh,² Ellen Semple,³ and Harlan H. Barrows.⁴ Marsh's work on man and nature is particularly notable for its early statements on the importance of the effects man has on the land.

¹ G. R. Lewthwaite, "Environmentalism and Determinism: A Search for Clarification," Annals of the Association of American Geographers, 56:8, 1966.

² George Perkins Marsh, Man and Nature; or, Physical Geography as Modified by Human Action (New York: Scribner, Armstrong and Company, 1864).

³ Ellen C. Semple, Influences of the Geographic Environment (New York: Henry Holt and Company, 1911).

⁴ Harlan H. Barrows, "Geography as Human Ecology," Annals of the Association of American Geographers, 13:1-14, 1923.

Marsh noted that everywhere man was degrading his resources without realizing that he had done so. He observed, for instance, that forests contain their humidity better than cleared ground, a notion not widely held at the time. Marsh considered ecological relationships an important part of science since man consciously disrupts this balance by his actions.⁵ His emphasis on the importance of man in improving or destroying his habitat stands in marked contrast with that of E. C. Semple, who wrote nearly fifty years later.

Semple, taking a strongly environmental determinist point of view, and considering the variety of man's habitat, examined how men living in separate regions have been influenced by their environment in different ways. Discussing how natural resources vary in character according to place she observed that

geographic conditions influence the economic and social development of a people by the abundance, paucity, or general character of the natural resources, by the local ease or difficulty of securing the necessities of life, and by the possibility of industry and commerce afforded by the environment.⁶

Suggesting that we study geography as human ecology Barrows was interested in adjustment to environment rather than environmental influence.

The former approach [human ecology] is more likely to result in the recognition and proper valuation of all the factors involved, and especially to minimize the danger of

⁵ David Lowenthal, George Perkins Marsh, Versatile Vermonter (New York: Columbia University Press, 1958).

⁶ Semple, op. cit., p. 43.

assigning to the environmental factors a determinative influence which they do not exert.⁷

His early work contained an element of Semple's teaching but his later research deviated markedly from her views. This change is examined in a review of Barrows' career by Koelsch⁸ and more recently by Chappell.⁹

Recent statements on man and land. In this section the man-land relationship is discussed in regard to perception-oriented studies, permitting the importance of the concept of environmental perception to be examined for various relevant subfields of geography. The concepts introduced in these research areas are then related to the question of perception and awareness in Manhattan, Kansas.

Scholars still find much of interest in the study of man-land relationships but have found it more fruitful to recognize the diversity of so-called "geographic factors." G. F. Carter, in his introduction to Man and the Land: A Cultural Geography, noted that

when history, economics, and political science, even at the college level, refer to geographic factors, all too often

⁷ Barrows, op. cit., p. 3.

⁸ William A. Koelsch, "The Historical Geography of Harlan H. Barrows," Annals of the Association of American Geographers, 59:632-651, 1969.

⁹ John E. Chappell, Jr., "Annals Commentary: Harlan Barrows and Environmentalism," Annals of the Association of American Geographers, 61:198-201, 1971.

they take a strongly physical environmental determinist view.¹⁰ Within the field, geography is not equated with natural factors, but rather a complexity of interrelationships requires that a division of labor among scholars take place. In this manner, similar research thrusts, such as environmental quality, resource management and natural hazard research employ different approaches.

The concept of environmental perception is commonly utilized in much of the current work done in these and other sub-fields of geography. Before these fields are examined it would be well to discuss just what is meant by the term "environmental perception." In his introduction to Environmental Perception and Behavior, Lowenthal noted that geographical study could be divided into three realms: the nature of the environment; what we think and feel about the environment; and how we behave in, and alter, that environment. Lowenthal broadly included the last two realms within environmental perception. "We respond to and affect the environment, not directly, but through the medium of a personally apprehended milieu."¹¹ In a Resource Paper for the Association of American Geographers Thomas Saarinen illustrated a note from J. Sonnenfeld on a nested set of environ-

¹⁰ G. F. Carter, Man and the Land: A Cultural Geography (New York: Holt, Rinehart and Winston, 1964), p. 2.

¹¹ David Lowenthal, Environmental Perception and Behavior (University of Chicago, Department of Geography Research Paper No. 109, 1967), p. 1.

ments. The largest set consists of the entire world or the "geographical environment;" within this is the "operational environment" where man actually lives and works. The part of which man is aware is the "perceptual environment," and the finest level may be called the "behavioral environment," toward which behavior is directed.¹² These last two levels correspond to Lowenthal's second and third realms of geographic study, which are comprised of our feelings about the environment and our behavior within it.

In his paper on environmental perception, Saarinen recognized that perception is a complex concept, requiring fifty pages in the International Encyclopedia of the Social Sciences. According to Saarinen, geographers are most interested in social perception or:

the effects of social and cultural factors on man's cognitive structuring of his physical and social environment. Perception then depends on more than the stimulus present and the capability of the sense organs. It also varies with the individual's past history and present "set" of attitudes acting through values, needs, memories, moods, social circumstances, and expectations.¹³

Some of the diverse subfields indicated in the A.A.G. Resource Paper include room geography, architectural space, and mental maps.

¹² Thomas F. Saarinen, Perception of Environment, Resource Paper No. 5, Association of American Geographers, 1969, p. 5.

¹³ Ibid., p. 5.

Resource management in geography. Environmental perception plays a direct part in management since resources by their passive nature, are recognized as such only when man finds it useful to extract them. It is useful to consider this sub-field since some of the arguments on perception are similar to those used in this thesis. A perception-oriented view of resources has been summarized by Kromm, who stated that

Geographers are vitally concerned with the elements of the environment that man utilizes to support his economic well-being. These elements appropriated by man constitute the useful part of the environment and are defined as resources. Resources cannot be identified merely by the existence of certain elements in the environment -- man's perception of these elements designate which will be his resources.¹⁴

Relevant examples of perception in resource management are found in the research of Gould, Wolpert, and White. Peter Gould, in an attempt to develop an understanding of man's relationship to his environment, called for geographers to consider the Theory of Games and place emphasis on choices or strategies. In regard to perception Gould wrote that

The work of Man is all around us upon the face of our earth, and is the result of men perceiving a variety of alternatives, subsequently limiting the range of choices according to their idea of what is useful and good, and deciding upon certain strategies to gain those ends.¹⁵

¹⁴ David E. Kromm, "The Creation, Utilization, and Depletion of Resources as Cultural Phenomena," Journal of Geography, 67:462, 1968.

¹⁵ Peter R. Gould, "Man Against His Environment: A Game Theoretic Framework," Annals of the Association of American Geographers, 54:544, 1964.

Julian Wolpert has emphasized the impact of differential perception in writing about agricultural productivity, observing that a difference existed between optimal and actual production in middle Sweden. According to Wolpert, when

productivity is not at the optimal level, ... it may be assumed that one or both of the prerequisites for economic rationality [perfect knowledge and optimizing behavior] are absent.¹⁶

Actual production was a result of individual goals and individual knowledge, both functions of perception and awareness.

Gilbert F. White has found that perception creates a difference between the theoretical and practical range of choice in individual resource use. Observing that individual adjustments in resource management are a result of a choice within a range of human possibilities, White stressed that "perception of the environment is a basic feature of resource management and may drastically limit the practical range of choice."¹⁷

Natural Hazard Research. In resource management man seeks to optimize those things that are useful to him and eliminate that which is harmful to him. This concomitant situation has led to research by geographers on what are

¹⁶ Julian Wolpert, "The Decision Process of Spatial Context," Annals of the Association of American Geographers, 54:544, 1964.

¹⁷ Gilbert F. White, "The Choice of Use in Resource Management," Natural Resources Journal, 1:29, 1961.

termed natural hazards. Natural hazards were defined by Burton and Kates as "those elements in the physical environment, harmful to man and caused by forces extraneous to him."¹⁸ The first of a series of hazard zone occupancy papers by Gilbert White and his students at the University of Chicago dealt with floods.¹⁹ Other early work also dealt with natural hazards that are a result of the physical environment, such as earthquakes and tornados. Since that time consideration has been applied as well to quasi-natural hazards that are created by man but transmitted through natural processes, for example smog (literally smoke and fog), and man-made hazards that are a more direct result of human activity, such as air and water pollution.

A continued interest by geographers in hazard research led to the formation in 1967 of a formal program supported by the National Science Foundation. Directed by Gilbert White, in cooperation with Robert Kates and Ian Burton, this program has taken the form of a series of independent studies to inform geographers of work conducted on natural and quasi-natural hazards. Sixteen Working Papers have been assembled to date,

¹⁸ Ian Burton and Robert Kates, "The Perception of Natural Hazards in Resource Management," Natural Resources Journal, 3:413, 1964.

¹⁹ Gilbert F. White, Human Adjustment to Floods (University of Chicago, Department of Geography Research Paper No. 29, 1945).

including a range of studies on hazard zone occupance, theoretical contributions toward the development of hypotheses, and bibliographies on specific types of hazards.

Man-made hazards. Two Working Papers have been produced for Natural Hazard Research that deal directly with man-made hazards. The first of these is a paper by John Hewings²⁰ on water quality along public beaches. Hewings was interested in the process medical officers follow in placarding swimming beaches as health hazards. He examined the information available to them, the final decision to close a beach, and the circumstances surrounding it. Based on the results of a questionnaire distributed to medical officers, Hewings found that the decisions of the medical officers were not based on sound evidence of actual levels of contamination, but that often their self-criticism focused on the administrative difficulties involved in placarding a beach -- not their inadequate health assessments.

The second paper, dealing with perception and awareness²¹ of air pollution in Toronto, is by Andris Auliciems

²⁰ John M. Hewings, "Water Quality and the Hazard to Health: Placarding Public Beaches," (University of Toronto, Natural Hazard Research, Working Paper No. 3, 1968). (Mimeographed.)

²¹ Awareness is a basic aspect of perception since in order to perceive something you must first be aware of it. Perception refers to the impression one has of a social stimulus or set of stimuli, as that impression is modified by the

and Ian Burton.²² The thrust of this paper was to explain the extent of awareness and draw implications for public policy. Attitudes on a variety of issues were examined, air pollution levels noted, and the role of the communications network investigated with consideration of its effect on government policy.

Within the past few years the situation of man-made hazards as a clear and present danger has undergone a transformation. The issue of environmental quality has become popularized and the term ecology is often heard.²³ A national

perceiver's past experience in general, his previous experience with that same or similar stimuli and the individual's state at the moment he is viewing the stimulus of interest. (see Myra R. Schiff, "Some Theoretical Aspects of Attitudes and Perception, University of Toronto, Natural Hazard Research, Working Paper No. 3, 1968).

²² Andris Auliciems and Ian Burton, "Perception and Awareness of Air Pollution in Toronto," (University of Toronto, Natural Hazard Research, Working Paper No. 13, 1970).

²³ The term ecology is derived from botany where the concern is on the relationship between a plant community and its environment. The social sciences have adapted the term to refer to interrelationships between human communities and their environment. Environmental quality does not have a clear definition; it is often divided into what is termed the quality of life and environmental pollution. The problem is in defining what is meant by quality, insuring that this definition applies to all human groups. As the impact of man on his environment increases as a result of urbanization, technology, and an increasing population, the need arises to consider the two concepts together. In a review Burton noted that environmental quality must be appraised within a social context of human behavior and response, that it involves the concept of ecology in conjunction with the economics of technology. (Ian Burton, "The Quality of the Environment: A Review, Geographical Review, 58:472-481, 1968.)

survey of the United States conducted by the Christian Science Monitor during the spring of 1969, found 86 per cent of the sample somewhat concerned or deeply concerned about environmental problems.²⁴ What was formerly an issue associated with conservationists and their publications is now given intensive coverage by the national media. According to a recent Newsweek article this trend is increasing:

Clearly, the media have found a continuing page-one story that both attracts the public's interest and guarantees its applause; publicly, at least, Mother Nature has no enemies and pollution no friends.²⁵

Air pollution as a specific man-made hazard has attracted the attention of several geographers. A Resource Paper published by the Association of American Geographers recognized three geographic aspects of the problem: where the air is polluted; how pollution originates, spreads, and is removed; and its significance to health, esthetics, economics, and climate.²⁶ The rise of urbanization has made the problem critical and the most technologically advanced areas of the world are also the areas of most severe air pollution. Because of increased pollution the work in geography has increased rapidly in recent years.

²⁴ Robert Cahn, "Poll Finds Alarm Over Pollution," Christian Science Monitor (March 11, 1969), p. 95.

²⁵ Article in Newsweek, "Eco-Journalism," (February 1, 1971), p. 43.

²⁶ Reid A. Bryson and John E. Kutzbach, Air Pollution, Resource Paper No. 2, Association of American Geographers, 1968.

Perception, awareness, and evaluation. Writing on adaptation in the Arctic and in Delaware, as a part of a special number of the Journal of Social Issues on "Man's Response to the Physical Environment," J. Sonnenfeld observed that there exist three human responses to change in environment: physiological adaptation, human adjustment to variations of weather and climate (as a result of how man perceives these variations), and movement to another place or region. These findings were a result of studies on both natives and nonnatives to determine environmental preference. Perception of environment was found to play a major role in human response.²⁷ Sonnenfeld's findings have a bearing on this thesis since he was able to isolate that several variables are important in affecting response.

Kates, in a Working Paper for Natural Hazard Research, has reviewed perception and adjustment as they related to the man and nature interaction and to hazard research in particular. Kates observed that

in the context of a single hazard considerable variation can be found in the perception of hazard, the knowledge of adjustments and the evaluation criteria applied to these adjustments.²⁸

²⁷ J. Sonnenfeld, "Variable Values in Space and Landscape: An Inquiry into the Nature of Environmental Necessity," in "Man's Response to the Physical Environment," (R. W. Kates and J. F. Wohlwill, editors), Journal of Social Issues, 22: 71-82, 1966.

²⁸ Robert W. Kates, "Natural Hazard in Human Ecological Perspective: Hypotheses and Models," (University of Toronto, Natural Hazard Research, Working Paper No. 14, 1970). (Mimeographed.)

As a foundation we can recognize the man-nature interaction in regard to a specific hazard, in this case air pollution. This interaction takes place at one of three stages: the folk pre-industrial, the modern technological industrial, or the comprehensive post industrial. For a given stage Kates considers a single hazard and conducts a study of either individuals, groups, or technical consultants.²⁹

Using a method of approach that has been utilized in two previous studies, this thesis will treat air pollution as a specific man-made hazard, examining the perception of individuals, and groups of individuals. In the paper by Hewings³⁰ there was an interest in how medical officers perceived the danger of water pollution along public beaches (arrived at through the use of a questionnaire). He discussed their awareness of the adjustments open to them by examining the types of information available and their final evaluation (how the beaches were finally placarded). Auliciems and Burton³¹ examined various surveys on public attitudes toward air pollution, the communications media for their coverage of the problem, and the consequences of this awareness for public policy. In keeping with this previous work, this thesis utilizes a

²⁹ Ibid., p. 5.

³⁰ Hewings, op. cit.

³¹ Auliciems and Burton, op. cit.

survey design to ascertain attitudes on air pollution and isolates those factors important in affecting perception.

B. STATEMENT OF THE PROBLEM

The present study examined perception and awareness of air pollution as a community and a national problem in the small town context of Manhattan, Kansas. To determine perception and awareness of air pollution among the citizens of Manhattan, the following research plan was followed:

1. A questionnaire was assembled to elicit attitudes on air pollution at the local and national levels. Questions were drawn from previous work on air pollution awareness and concern, and from questions suggested by Natural Hazard Research.³² Randomly selected samples were drawn for personal interviews and for those collected by a mail procedure.

2. Sample comparability was determined and an analysis conducted on the data for significance within and between groups for socio-economic class, location within the city, and period of residence to determine the significant factors affecting perception and awareness.

3. Community perception and awareness was compared with the findings of previous studies to determine similarities

³² Gilbert White, Robert Kates, and Ian Burton, "Suggestions for Comparative Field Observations on Natural Hazards," (University of Toronto, Natural Hazard Research, Working Paper No. 16, October 20, 1970). (Mimeographed.)

or differences.

Public attitude studies. In this section those parts of previous studies on air pollution perception and awareness that were directly employed in this thesis are examined. This includes items that were not effectively limited to only one community and that could be used to elicit attitudes on national as well as community level problems.

A study for St. Louis in 1964 examined the differential pattern of responses in four divisions of the metropolitan area. The study sought to arrive at a definition of air pollution, determine its major effects, define the seasons it is felt to be worst, and specify primary air pollution sources. Some differences in attitudes could be attributed to local conditions in each of the subdivisions, but a high degree of concern was found in all. Although not the main thrust of this survey, it was found that a relationship between pollution concentration and concern does not always follow. For instance, summer was chosen as the most dangerous season, whereas actual air pollution levels as measured in technical surveys are generally higher in winter.³³

During the winter of 1962 a survey was conducted in the small town of Clarkston, Washington (population 7,000)

³³ Southern Illinois University, Public Administration and Metropolitan Affairs Program, Public Awareness and Concern with Air Pollution in the St. Louis Metropolitan Area (Washington: Department of Health, Education and Welfare, 1965).

by the U.S. Public Health Service. Clarkston is located at the Washington-Idaho border and is near a kraft pulp mill. The purpose of this study was to determine community awareness of environmental pollution, and the degree to which such pollution is considered an individual social problem. In contrast to the St. Louis study, the Clarkston survey considered the possibility that awareness might be independent of physically defined levels of pollution.³⁴

Two studies were done on Toronto and these are treated in the Working Paper by Auliciems and Burton. One by Barnes dealt with households immediately adjacent to pollution recording and monitoring stations.³⁵ Another by Shepherd was done for Pollution Probe, an action-oriented citizens group of the University of Toronto. In both studies air pollution ranked high among the social problems listed. Effects of air pollution were surveyed and the principal sources of air pollution were ranked. It was found that people favor strong actions against polluters but there were mixed replies on the amount that the individual himself should be expected to contribute toward its

³⁴ Nahum Z. Medalia, "Community Perception of Air Quality: An Opinion Survey in Clarkston, Washington," Public Health Service Publication, No. 999-AP-10, 1965.

³⁵ Peter A. Barnes, "Community Awareness and Concern with Air Quality in Toronto: A Pilot Study," (unpublished B.A. thesis, University of Toronto, Department of Geography, 1968).

elimination.³⁶ Auliciems and Burton, in examining this evidence, pointed to the media as contributing immensely to the present awareness. They commented that care should be taken to prevent a waning of spirits and pointed to the need for well-informed citizens' organizations.

Study area. For the United States as a whole we can discern a pattern of maximum air pollution potential along the east and west coasts and the industrialized Ohio Valley and Lake States, with decreasing danger in the interior portions of the country. The basic reason for this situation, according to Leighton, is that air supply is reduced by the occurrence of frequent inversions or by a topography allowing the air to pool in a basin; unfortunately we have constructed our largest cities in the very places where air supply is the poorest.³⁷

This study is concerned with Manhattan, Kansas, a city in an area of good air supply. With its limited manufacturing and its Great Plains location, Manhattan can be expected to experience a relatively low air pollution danger level. The

³⁶ Brian Shepherd, Written and oral communication to Auliciems and Burton, February, 1970.

³⁷ Philip A. Leighton, "Geographical Aspects of Air Pollution," Geographical Review, 56:152-174, 1966. According to Leighton air supply at the surface is limited to an extent that varies with place and time; the factors contributing to the limited surface ventilation are both meteorological and topographic. (p. 153).

small size of the town and lack of polluters would also seem to make air quality relatively uniform throughout.

CHAPTER II

METHODS AND TECHNIQUES

This study attempted to determine community perception and awareness of air pollution through use of a survey questionnaire that inquired into related public attitudes and opinions. Before proceeding it will be helpful to clarify the difference between attitudes and opinions, two terms that are often used in attitude measurement and which have various shades of meaning. An attitude, according to Oppenheim is

a state of readiness, a tendency to act or react in a certain manner when confronted with certain stimuli... an attitude is not automatically expressed but becomes overt only when the object of the attitude is perceived.¹

These attitudes are reinforced by the person's beliefs, recognized by the social psychologist as the "cognitive component." Connecting some of these ideas, Oppenheim noted a progression from individual personality to values, attitudes, and finally to personal beliefs.² Scott differentiated opinions from attitudes, defining the former as "one kind of verbal manifestation of an attitude, the expression of an evaluative appraisal or prediction concerning the ob-

¹ A. N. Oppenheim, Questionnaire Design and Attitude Measurement (New York: Basic Books, Inc., 1966), p. 106.

² Ibid., p. 110.

ject."³ It should be noted that this process of attitude formation is not static since attitudes can be expected to develop and change over time.

A. SURVEY DESIGN

Questionnaire construction. To arrive at an answer to the central question of this thesis, a questionnaire was needed that accurately measured public attitudes on local and national air pollution problems and that was also reasonably comparable with previous studies on the topic. Questions were also taken from the format suggested by Natural Hazard Research.⁴

Ian Burton, at the University of Toronto, has recently compiled a draft of a questionnaire for use in the United Kingdom dealing with awareness of air pollution which borrowed from the format suggested by Natural Hazard Research.⁵ A number of the questions are similar to those used in the present study, but there are major differences that reflect the varying

³ William A. Scott, "Attitude Measurement," The Handbook of Social Psychology, 2nd ed. by Gardner Lindzey and Elliot Aronson, II (Reading, Mass.: Addison-Wesley Publishing Company, 1969), p. 205.

⁴ White, Kates, and Burton, op. cit.

⁵ Ian Burton, et al., Air Pollution Questionnaire (unpublished draft, University of Toronto, Department of Geography, December 9, 1970). (Xerox.)

intentions of the two studies. The draft prepared by Burton was intended for use in areas where air pollution levels are at a moderate or high level, whereas this thesis was interested in a location with a low level of air pollution. Another difference is that some of the questions were open-ended, requiring a personal interview with every respondent. A copy of Burton's draft was received after the survey of attitudes in Manhattan was completed, but inspection revealed some questions that would have been of value to this thesis and they are recommended for future studies. Specifically, these were: "Do you think that air pollution here is getting better or worse?" and "Do you smoke?" The former was valuable since it inquired into attitudes on the future situation. With the latter question one could examine the extent that people associate air pollution and personal smoking habits.

The sources of individual questions used in this thesis are indicated on the appended questionnaire (see Appendix I). Eleven questions are, with slight modification, from one or more previous attitude studies, four are from the Natural Hazard Research format, and four seek information not treated in other surveys. Questions were selected or prepared in order to elicit attitudes on a range of issues involving air pollution locally and nationally.

All of the questions were directive, requiring the respondent to check appropriate blanks. Although this method loses some of the freedom of response available with open

-ended questions, it does force the respondent's replies onto the general area of interest to the researcher. Principal gains with the directive questionnaire are realized when a number of attitudes, rather than just a few are examined.⁶ This interest in a variety of attitudes is apparent in most previous work on public awareness of air pollution. Some of the attitudes of interest to this thesis and to most previous surveys included: general pollution concern, degree of air pollution impact, types of air pollution sources, and public policy concerning pollution control.

Sample selection. Two samples were drawn for data collection, one conducted by interview and one distributed through the mail. For both samples, a table of random numbers and a Polk Directory⁷ were used for selection. This was done by compiling two pages of random numbers, with three digits representing a page and one digit a column on that page. By this process every household in Manhattan had an equal chance of selection and specific addresses were listed. The location of each potential respondent was then located on a base map of the city.

⁶ Scott, op. cit., p. 211.

⁷ Manhattan City Directory, 1969 (Kansas City: R. L. Polk, 1969). Polk Directories are available for most cities and provide information on a diversity of facts that interest the geographer, including a street by street listing of house addresses. It is this address list that is used in this thesis.

For the mail questionnaire, every part of town was well represented, but for the interview-conducted questionnaire there was under-representation for the southwest side of town. Hopefully, this was sufficiently compensated for by the response to the mail questionnaire.

Interview procedure. Data for the first sample drawn was collected by means of the research interview. This type of interview was defined by Cannell and Kahn as

a two person conversation, initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focused by him on content specified by research objectives of systematic description, prediction, or explanation.⁸

The major difference between this type of survey and the mail survey is the element of conversation. Although both samples employed the same questionnaire, it was possible to focus the respondent's reply toward the area of interest to this thesis in an interview. It also allowed for spontaneous reactions of the respondent that could be quickly noted by the researcher. The strengths and weaknesses of individual questions, as well as the range of replies, becomes evident to the interviewer. Although the interview method has this advantage in flexibility, bias can be introduced through tone of voice, consistent pausing at certain points, or probing at leading questions.

⁸ Charles F. Cannell and Robert L. Kahn, "Interviewing," in Lindzey and Aronson, op. cit., p. 527.

For this research each respondent was identified on a series of comment sheets written shortly after each set of interviews. On them are recorded the interview situation, estimated income, respondent attitude, and general comments volunteered by the respondent or noted by the interviewer (see Appendix II). Interviewing was done from February 22 to March 5, 1971, during the evening hours, on Saturday, and on Sunday. Fifty respondents were included in this sample and a summary of their responses was coded and entered on a master sheet.

Mail questionnaire procedure. The problems inherent in the use of a mail questionnaire are well-documented in the literature. Its principal advantage is in the time saved, but disadvantages are evident in the lack of control it represents. It is also not possible for the researcher to assess the respondent accurately in terms of social class or interview situation. Another disadvantage is the typically poor response rate, a problem since nonresponse is not a random process.

For this sample 200 questionnaires were sent in the mail along with a letter explaining the purpose of the survey (see Appendix III) and a stamped self-addressed envelope for the completed questionnaire. Ninety were returned within two weeks and six additional responses arrived after several weeks. These have not been included in the

sample.

It is hoped that a careful consideration of the responses gathered by personal interview, especially the supplemental comments kept for each, has reduced the bias represented by a return rate of 45 per cent. Employment of two separate samples, using neither the interview nor the mail method exclusively, should provide reliability that would not be possible otherwise.

B. DATA RELIABILITY⁹

Comparability of the two samples. This section will attempt to answer some of the questions that can be raised on the reliability of treating two separate samples. On the basis of several tests of significance a decision was made on the feasibility of treating all responses as one sample in the data analysis.

Three chi-square tests have been run to determine whether there was a significant difference between the interview-conducted and the mail questionnaire methods. It is thought that the categories chosen are representative. Where necessary, classes have been combined so that at least five values appear in each cell.

⁹ Reliability refers to consistency, to obtaining the same results again. Validity involves whether the question or item really measures what it is supposed to measure. See A. N. Oppenheim, op. cit., p. 69-70.

Two key questions in this study involved the role of government in air pollution control (Question 26) and the amount of money that individuals might contribute to eliminating pollution (Question 28). No significant relationship was found between survey method and replies to these questions. No relationship existed between survey method and replies on the effect of air pollution on health (Question 25). The last pair associated involved a ranking of social problems (Question 11). Two environmental pollution problems were treated and replies judging them as unsatisfactory were considered for the United States and Manhattan. No relationship was suggested in this test.

The results of these tests indicated that there is no statistically significant difference between the results obtained by the two methods, suggesting that it was valid to treat them as one large sample. This had the effect of raising the sample size to 140.

Sample characteristics. In this section consideration is given to the profile of the combined sample. It is important that attention be focused on these characteristics since inferences drawn later are in regard to this sample, which may deviate in some manner from that obtained if a different group composed the sample. The methods used in this section on sample validation were similar to those used in the Clark-

ston study.¹⁰ Consideration was given to age and sex characteristics, date of interview, and date of mail-questionnaire receipt.¹¹

Sample characteristics are presented in Table I. The sample was largely composed of males and, although a majority were in the younger age brackets, the proportion was actually less than that for the population. This may be attributed to the presence of a university in the town.

Two tests of significance were run for date of interview and date of receipt of the mail questionnaire. For this purpose the time periods were broken into two parts and related to concern about air pollution. It was clear that there was no significant relationship between date of interview and a primary concern for air pollution (Question 8). There appeared to be some relationship between this concern and the date a questionnaire is received in the mail since it was barely possible to accept the null hypothesis of no significant difference at the .05 level.¹² This result was

¹⁰ Medalia, op. cit.

¹¹ It may also be repeated that attitude formation is not static but develops and changes over time. The case presented here does not represent a universal statement but rather raises some questions in the context of the single sample discussed in this chapter.

¹² This indicates the probability level. It tells us statistically that the probability of rejecting the null hypothesis of no significant differences if it is in fact true should occur five times out of a hundred.

TABLE I
SAMPLE AGE AND SEX CHARACTERISTICS

SEX	AGE	NUMBER	SAMPLE PROPORTION	POPULATION ^a PROPORTION
Males	20 - 34	42	43.8	62.0
	35 - 54	27	28.1	22.1
	55 - 64	12	12.5	7.7
	65 +	15	15.6	8.1
	Total	96	100.0	100.0
Females	20 - 34	22	56.4	49.4
	35 - 54	7	18.0	24.9
	55 - 64	7	18.0	10.3
	65 +	3	7.7	15.5
	Total	39	100.0	100.0
Combined	20 - 34	64	47.4	55.9
	35 - 54	34	25.2	23.4
	55 - 64	19	14.1	9.0
	65 +	18	13.3	11.7
	Total	135	100.0	100.0

^a United States Bureau of the Census, Nineteenth Census of the United States: 1970.

not unexpected since interested parties often are the first to send in a questionnaire. Writing on this problem Donald concluded that

The higher the involvement, in terms of active participation, knowledge and understanding of the organization, and loyalty to it, the fewer the stimuli required to induce a response. Analysis of the incidence of non-response within otherwise completed questionnaires pointed in the same direction.¹³

Oppenheim noted that a similar problem exists with questionnaires returned late.:

To study response bias, we must make sure that we know the return date of every questionnaire, for it has been found that respondents who send in their questionnaires very late are roughly similar to nonrespondents.¹⁴

To minimize this type of problem the questionnaires were dated and ordered on the master sheet according to date received. Those questionnaires received after two weeks were not considered a part of the sample.

That no significant difference was present between the interview-conducted-questionnaire and the mail questionnaire indicated that the two samples could be combined for subsequent analysis.

¹³ Marjorie N. Donald, "Implications of Nonresponse for the Interpretation of Mail Questionnaire Data," Public Opinion Quarterly, 24:113, 1960.

¹⁴ A. N. Oppenheim, op. cit., p. 34.

CHAPTER III

SURVEY ANALYSIS

In this chapter the survey results are examined to determine the general attitudes of the sample population. A broad description of the pattern of responses is followed by several tests of significance for the independent variables to determine which are responsible for eliciting differential attitudes on air pollution within this general sample population. Four variables are recognized as important for further examination and the pattern of responses for each of these is scrutinized for a variety of attitudes.

A. GENERAL ATTITUDES OF THE SAMPLE POPULATION

The general context of air pollution. The sample was more concerned about pollution in general than any specific manifestation. Although air pollution was chosen most frequently among air, water, and soil pollution, there was a marked tendency for respondents to conceive of pollution as a single concept of environmental degradation. Further inquiry into which form was least important was not well-received and most reluctantly chose soil pollution as the least important. Many noted that this reply did not mean a lack of concern for it.

Industrialization was most frequently mentioned as the basis for air pollution. But the individual had a tendency to include a number of other factors, such as an increasing population, in his inventory. One-quarter of the sample included a high standard of living as a basis for increasing air pollution, although this was the least frequently chosen category. It was clear that the sample viewed air pollution as the result of a diversity of human activities.

Respondents were asked to choose among various components of air pollution. It was noted during the interview situation that the individual found little difficulty in recognizing exhaust gases, smoke, smog, and odor as important parts of air pollution. But most offered other alternatives such as insecticides and radiation with the intention of making their definitions somewhat more complete.

Each respondent was asked to rank ten social problems on a five point scale for the United States and Manhattan. For the purpose of this study the unsatisfactory choices were noted, with the mildly unsatisfactory category disregarded since this represented a somewhat neutral response. For the United States as a whole the sample population ranked the two environmental pollution items (air and water) as most serious, with racial problems and juvenile delinquency third and fourth respectively. Juvenile delinquency was regarded as serious in Manhattan but it is interesting that

only 36 per cent believed that it was very or moderately unsatisfactory.

A series of questions inquired about the impact of air pollution on Manhattan itself. Thirty-nine per cent of the sample population responded affirmatively to the item: "I've been bothered by air pollution somewhat." Those who responded positively to this question were further asked to indicate those ill effects of air pollution that affected them personally. Dust and odor were chosen by the majority of this group. These people were further asked to name the season in which air pollution was most serious in Manhattan. Thirty-six per cent believed that summer air pollution was the most serious, with spring and fall being chosen by 31 per cent and 27 per cent, respectively. Only 7 per cent considered winter to be a particularly hazardous season. Another question in this series inquired whether there were any other places with less air pollution where the respondent could earn as good a living. It was deleted since few respondents considered air pollution to play a significant role in this decision. Further probing questions on this issue, asked during succeeding interviews, substantiated air pollution's minor role in this regard.

Seventy-eight per cent of the sample thought that air pollution had a considerable or moderate effect on human health. Many respondents indicated that this attitude was a result of some personal experience in a large urban area. In some

cases this was a manifestation of an overall dislike for large cities.

Sources of information on air pollution. Two questions dealt directly with the communications network and additional information on this topic was noted through spontaneous responses or further questioning by the interviewer. The principal sources of information listed were the mass media of television, newspapers, and magazines. A principal exception were some university students who indicated that they received information from professors on the problem of air pollution. Another was the work done by the League of Women Voters to inform Manhattan residents about air pollution which was mentioned by several women in the sample. For the entire sample only one person replied that he seldom heard from any of the listed sources about air pollution.

Principal sources of air pollution. The automobile and industry were clearly felt to play a major role in contributing to the general level of air pollution in the United States. Ninety-two per cent and 89 per cent respectively mentioned these two. All other sources listed were chosen by 32 per cent or less of the sample. Seventy-one per cent considered the automobile a principal source of air pollution in Manhattan and all other sources were chosen by 19 per cent of the sample or less.

To some extent this demonstrated that, while people believed that air pollution was the result of many human activities and was defined by a number of different parts, that the major sources of air pollution were the automobile and industry. Possibly, this was a result of the inapplicability of the remaining alternatives. This particular question was taken from a previous study on air pollution and is discussed later.

Governmental policy and personal evaluation. Twice as many respondents believed that the federal government should take the primary leadership in air pollution control than either the state or city governments. Strongest opinions were held by those favoring the city or federal level. The consensus of those choosing the community level was that too much power has already been placed with the federal government on matters that directly affect the community level. Those advocating federal control often believed that the patchwork of governments involved would make control ineffectual since a polluting activity could move to a less stringently controlled community. No respondent chose the county government for principal control.

Respondents were asked which penalty should be applied to polluting activities as a first action and as an eventual action in cases of non-compliance. A clear majority preferred that a warning be the first action, although 14 per

cent suggested a substantial fine as a first measure. An equally large majority suggested that the polluting activity be closed down as an eventual measure, with 28 per cent preferring a substantial fine. But this action was not to be abrupt. A number of respondents noted that a time period should be allotted the polluting activity to initiate pollution control measures, but that it should be closed down if it didn't comply. The choice of a warning as a first action further supported this gradual form of enforcement.

The final question dealt with the willingness of the individual to contribute financially toward the elimination of pollution. Thirty-three per cent stated they would contribute a moderate or large amount (\$50 or more) and 29 per cent would contribute from ten to forty dollars. These responses indicate that action against pollution was desired by the sample and that strict action should be taken against those who did not comply. Furthermore, they were willing, in statement if not fact, to contribute moderate or large amounts toward the elimination of pollution.

B. ANALYSIS OF THE INDEPENDENT VARIABLES

FOR STATISTICAL SIGNIFICANCE

Ten independent variables were recognized for the purposes of this analysis: location within the city, sex, age, education, university affiliation, income, home ownership, length of residence in Manhattan, population size of

the city in which the respondent has spent most of his adult life, and involvement in air pollution study groups. It is the purpose of this section to test whether there is any statistical significance between these variables and a specific response to one of the questions obtained in the survey.

Previous studies on environmental perception have demonstrated the importance of considering factors conditioning perceptions and attitudes. In his paper on "Environmental Perceptions and Attitudes of Engineers and Public Health Officials," Sewell recognized several factors as important variables. For instance, he found that

it was mainly the younger, less experienced officials who tended to be most aware of deteriorating environmental conditions, and most skeptical about the ability of present administrative arrangements and policies to improve these conditions.¹

He also determined that those who "occupy positions in the lower echelons generally feel divorced from responsibility for making decisions."² Careful consideration of his variables yielded the conclusion that a considerable difference in perception existed for those individuals with an engineer mentality.

¹ W. R. Derrick Sewell, "Environmental Perceptions and Attitudes of Engineers and Public Health Officials," Paper presented at the Annual Meeting of the American Psychological Association, Miami Beach, Florida, September 5, 1970.

² Ibid., p. 23-24.

Joseph Sonnenfeld, continuing his interest in perceptual differences in the Arctic and Delaware, has observed that we can

distinguish between different populations -- different age groups, or different cultural groups -- in terms of how they view such elements of environment as snow, storm, and winter by evaluating their responses to a standard set of scales accompanying each concept.³

Sonnenfeld noted that although such differences can be determined it may be predicted

that consistent environmental personality types will be found among all populations, regardless of the contrast in cultural values otherwise distinguishing them, and regardless of the contrast in environments they occupy.⁴

The following sections of this chapter attempt to isolate those factors that affect perception and awareness of air pollution in Manhattan, Kansas.

Method. Question 28 inquired about willingness to make a personal contribution toward eliminating pollution, either through higher taxes or an increased cost of goods and services. It was chosen since it was not specifically oriented toward Manhattan or the United States and could readily be broken into two parts: large potential contributors, accounting for 62 per cent of the sample, and small contributors, accounting for 33 per cent. For age and length

³ Joseph Sonnenfeld, "Equivalence and Distortion of the Perceptual Environment," Environment and Behavior, 1: 84, 1969.

⁴ Ibid., p. 97.

of residence a difference of means test was run and for all other independent variables a chi-square test was used.⁵

Results. Results of the tests of significance are indicated in Table II. No relationship was indicated between males and females on responses to the question tested. This suggested that there was no statistical significance between the pattern of responses for males and that for females and they could be treated as a single sample. To test for locational differences Manhattan was divided into five general areas, roughly corresponding to election wards, that accommodate the data. The areas needed to be fairly large since addresses were given by street intersection only and it was not possible to locate accurately an individual respondent at a single point. No significant difference was indicated according to location within the city. When the same procedure was used no significant difference was apparent according to home ownership, income, population size of the city in which the respondent had spent most of his adult life, or personal involvement with air pollution interest groups. ✓

✓ To insure that this conclusion applied to other attitudes several further tests were conducted but no significant differ-

⁵ Data for age and length of residence was of interval scale, allowing for the more powerful difference of means test. All the other independent variables were at the nominal scale, necessitating the use of contingency tables.

TABLE II

SUMMARY OF THE TESTS FOR STATISTICAL SIGNIFICANCE OF THE INDEPENDENT VARIABLES
WITH RESPONSES TO QUESTION 28^a

INDEPENDENT VARIABLE	TEST	TEST STATISTIC	DECISION
Sex	chi-square	0.9	not significant at .05 level
Location	chi-square	1.3	not significant at .05 level
Home Ownership	chi-square	2.7	not significant at .05 level
Income	chi-square	2.8	not significant at .05 level
Population Size ^b	chi-square	0.5	not significant at .05 level
Involvement ^c	chi-square	2.7	not significant at .05 level
Age	difference of means	4.1	significant at .001 level
Length of Residence ^d	difference of means	3.4	significant at .001 level
University Association ^d	chi-square	51.8	significant at .001 level
Education	chi-square	9.6	significant at .01 level

^a Question: "Considering the problem of pollution and that in the final analysis the public, you, pay for it either in taxes or cost of goods and services, how much money in total do you think you yourself would be willing to contribute per year to eliminating pollution?"

^b The population size of the city in which the respondent has spent most of his adult life.

^c Respondents that are involved, or have been involved, with any group that has studied or worked with air pollution.

^d Students and faculty.

ences were evident for any of these.

Utilizing the difference of means test it was found that the mean age of large potential contributors was 36.5 years and that of small contributors was 49.4 years, significant at the .001 level.⁶ The mean length of residence for large contributors was 11.2 years and 20.9 years for small contributors. Using the chi-square test it was determined that student and faculty responses differed significantly from that of other residents. Considering education according to three groups: a high school diploma or less, one or more years of college, and graduate work, the null hypothesis of no significant differences was rejected at the .01 level.

By this method four independent variables isolated for further analysis are age, length of residence, university association, and education. The importance of these variables is strikingly indicated in the various tests conducted. No significant difference was found between replies to Question 28 and any of the other independent variables identified above. The possibility existed that responses to some other question might indicate a significant difference for another set of variables. To control for this

⁶ This indicates the probability level. It tells us that if in fact the means of the two groups were the same we would expect to receive a difference of this magnitude by chance once in one thousand times.

several tests were run for each by utilizing replies to several other items on the questionnaire. No significant differences were found.

In this way four variables, age, length of residence, university association, and education were selected for further analysis. Intuitively, age would seem to be related to length of residence since older residents have probably been in Manhattan longer. And university association can be more clearly related to years of education. To determine the nature of the relationship for age and length of residence, a contingency table was constructed so that length of residence could be held constant and age related to size of contribution toward eliminating pollution. For this test significance was found at the .001 level. Controlling for age the relationship for length of residence was significant at the .01 level (probability level of once every hundred times).

Effects of age, length of residence, university association, and education on perception and awareness.

This section seeks first to determine how age, length of residence, university association, and education act to create differing perceptions toward air pollution. A series of attitudes are treated in regard to these four independent variables and the differing pattern of responses examined for each. Secondly, inferences are made concerning

the common features of these variables.

Attitudes on air pollution as a national problem are presented in Table III, representing for each category the number of respondents who consider air pollution to be very or moderately unsatisfactory for the United States (Question 11). People affiliated with the university showed a marked tendency to view pollution on the national level with more alarm than other residents of the city. The intuitive correlation made above of university association and education was clearly substantiated in regard to attitudes on this problem, with the college educated group strongly more concerned than those respondents with twelve years or less of education. A somewhat less clear pattern was apparent with the different age groups, although the younger categories showed a tendency to be more concerned than the older group. Length of residence clearly had a major effect on concern for the national air pollution problem. Seventy-four per cent of those in Manhattan fewer than ten years were strongly concerned as compared with 50 per cent for those here for more than ten years.

Those individuals who indicated they were bothered by local air pollution (Question 12) were considered according to the four independent variables, summarized in Table IV. Town residents were considerably less bothered by local air pollution than the students and faculty. This also appears

TABLE III

RESPONDENTS RANKING AIR POLLUTION AS VERY OR MODERATELY UNSATISFACTORY IN THE UNITED STATES,^a BY UNIVERSITY ASSOCIATION, EDUCATION, AGE, AND LENGTH OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	38	51	74.5
Other Residents	50	89	56.2
EDUCATION			
12 years or less	15	34	44.1
13 - 16 years	46	67	68.7
17 years or more	23	35	65.7
AGE			
20 - 34 years	50	66	75.8
35 - 49 years	9	20	45.0
50 - 64 years	21	32	65.6
65 + years	10	19	52.6
LENGTH OF RESIDENCE			
1 - 5 years	44	60	73.3
6 - 10 years	13	17	76.5
11 - 20 years	9	17	52.9
20 + years	20	41	48.8

^a Question 11: "How would you rate each of these for the United States?"

TABLE IV

RESPONDENTS NOT BOTHERED BY AIR POLLUTION IN MANHATTAN,^a
 BY UNIVERSITY ASSOCIATION, EDUCATION, AGE, AND LENGTH
 OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	23	51	45.1
Other Residents	60	89	67.4
EDUCATION			
12 years or less	23	34	67.7
13 - 16 years	42	67	62.7
17 years or more	16	35	45.7
AGE			
20 - 34 years	39	66	59.1
35 - 49 years	12	20	60.0
50 - 64 years	19	32	59.4
65 + years	13	19	68.4
LENGTH OF RESIDENCE			
1 - 5 years	35	60	58.3
6 - 10 years	13	17	76.5
11 - 20 years	10	17	58.8
20 + years	22	41	53.7

^a Reply (Question 12): "I haven't been bothered by air pollution at all."

to be a function of education. The pattern for age was less clear, although there was a marked tendency for the older residents to be less concerned than the younger ones. No such pattern was discernable for length of residence. If anything, those here longer were more bothered by air pollution's effects.

An interesting result is that there did not appear to be any relationship in regard to the frequency with which the various groups heard or read about the problem of air pollution. Table V shows those individuals who reported that they had heard or read frequently about the problem. It will be recalled that a majority of the respondents indicated that they receive the most information about air pollution from television, newspapers, and magazines. It would appear that frequency of reportage was a control that was distributed somewhat randomly among the various groups identified here for further analysis.

Variation in attitudes on the effect of air pollution on health is indicated in Table VI, showing those who believed that air pollution had a great effect on health. Higher response rates were evident for people affiliated with the university, with a higher education, and residents in the younger age groups. Little variation was evident according to residence length.

Those choosing the federal government for the primary

TABLE V

RESPONDENTS WHO HEAR OR READ FREQUENTLY ABOUT AIR POLLUTION,^a
BY UNIVERSITY ASSOCIATION, EDUCATION, AGE, AND LENGTH OF
RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	33	51	64.7
Other Residents	60	89	67.4
EDUCATION			
12 years or less	24	34	70.6
13 - 16 years	42	67	62.7
17 years or more	25	35	71.4
AGE			
20 - 34 years	45	66	68.2
35 - 49 years	14	20	70.0
50 - 64 years	22	32	68.8
65 + years	12	19	63.2
LENGTH OF RESIDENCE			
1 - 5 years	39	60	65.0
6 - 10 years	14	17	82.4
11 - 20 years	13	17	76.5
20 + years	27	41	65.9

^a Question 23: "How often do you hear or read from these sources about the problem of air pollution?"

TABLE VI

RESPONDENTS REPLYING THAT AIR POLLUTION HAS A CONSIDERABLE
EFFECT ON HUMAN HEALTH,^a BY UNIVERSITY ASSOCIATION, EDUCATION,
AGE, AND LENGTH OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	27	51	52.9
Other Residents	36	89	40.5
EDUCATION			
12 years or less	13	34	38.2
13 - 16 years	31	67	46.3
17 years or more	18	35	51.4
AGE			
20 - 34 years	32	66	48.5
35 - 49 years	4	20	20.0
50 - 64 years	18	32	56.3
65 + years	8	19	42.0
LENGTH OF RESIDENCE			
1 - 5 years	27	60	45.0
6 - 10 years	7	17	41.2
11 - 20 years	8	17	47.1
20 + years	19	41	46.3

^a Question 25: "What effect do you think air pollution has on human health for the United States as a whole?"

leadership in air pollution control (Question 26) tended to be associated with the university, had a higher education, and had lived in Manhattan a short time. No significant differences occurred according to age (Table VII). Attitudes on what form of eventual action should be taken against polluting activities, considering those who would close down the activity (Question 27), were high for students and faculty, those with thirteen or more years of education, and those in the younger age groups. No significant difference was apparent according to length of residence (Table VIII). Finally, responses to personal contributions (Question 28), divided into small and large categories, varied markedly with all the independent variables (Table IX). This is, of course, the case since it was the question that was used at the beginning of the chapter to isolate the significant variables considered in detail here.

This investigation has tended to confirm the validity of the variables isolated in this chapter. Consideration of these four variables has helped underline the importance of treating factors other than direct experience by focusing on differences of perception among groups of residents in a sample population. In the next section the interdependent nature of the variables considered in this chapter is treated and generalizations are offered.

TABLE VII

RESPONDENTS OFFERING PRIMARY LEADERSHIP IN AIR POLLUTION
CONTROL TO THE FEDERAL GOVERNMENT,^a BY UNIVERSITY ASSOCIATION,
EDUCATION, AGE, AND LENGTH OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	26	51	51.0
Other Residents	39	89	43.8
EDUCATION			
12 years or less	13	34	38.2
13 - 16 years	29	67	43.3
17 years or more	23	35	65.7
AGE			
20 - 34 years	30	66	45.5
35 - 49 years	12	20	60.0
50 - 64 years	13	32	40.6
65 + years	19	41	46.3
LENGTH OF RESIDENCE			
1 - 5 years	31	60	51.7
6 - 10 years	10	17	58.8
11 - 20 years	4	17	23.5
20 + years	19	41	46.3

^a Question 26: "Which one governmental level should take the primary leadership in air pollution control?"

TABLE VIII

RESPONDENTS SUGGESTING CLOSING DOWN THE POLLUTING ACTIVITY
AS AN EVENTUAL ACTION,^a BY UNIVERSITY ASSOCIATION, EDUCATION,
AGE, AND LENGTH OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	39	51	76.5
Other Residents	48	89	53.9
EDUCATION			
12 years or less	14	34	41.2
13 - 16 years	41	67	61.2
17 years or more	29	35	82.9
AGE			
20 - 34 years	45	66	68.2
35 - 49 years	16	20	80.0
50 - 64 years	20	32	62.5
65 + years	8	19	42.1
LENGTH OF RESIDENCE			
1 - 5 years	37	60	61.7
6 - 10 years	11	17	64.7
11 - 20 years	12	17	70.6
20 + years	23	41	56.1

^a Question 27: "Which of these is the strongest measure you would accept as reasonable for eventual action?"

TABLE IX

RESPONDENTS WHO WOULD CONTRIBUTE OVER TEN DOLLARS PER YEAR
TOWARD ELIMINATING POLLUTION,^a BY UNIVERSITY ASSOCIATION,
EDUCATION, AGE, AND LENGTH OF RESIDENCE

	NUMBER	TOTAL	PROPORTION (%)
UNIVERSITY ASSOCIATION			
Students and Faculty	38	51	74.5
Other Residents	48	89	53.9
EDUCATION			
12 years or less	16	34	47.1
13 - 16 years	40	67	59.7
17 years or more	26	35	74.3
AGE			
20 - 34 years	51	66	77.3
35 - 49 years	14	20	70.0
50 - 64 years	17	32	53.1
65 + years	7	19	36.8
LENGTH OF RESIDENCE			
1 - 5 years	43	60	71.7
6 - 10 years	14	17	82.4
11 - 20 years	11	17	64.7
20 + years	18	41	43.9

^a Question 28: "Considering the problem of pollution and that in the final analysis the public, you, pay for it either in taxes or cost of goods and services, how much money in total do you think you yourself would be willing to contribute per year to eliminating pollution?"

Students and faculty as compared with town residents.

In general, those respondents who perceived air pollution as a serious problem were young, had a college education, were affiliated with the university, and had been in Manhattan for a short time. The interrelated nature of these variables was apparent. Although there were a roughly equivalent number of students and faculty in the sample, 26 and 25 respectively, their combined mean age was only 31.7 years. For town residents the mean age was 45.6 years. The students and faculty had a mean residence period of 7.8 years, compared with 17.7 years for town residents. The mean number of years of education for the university people and town residents was 17.1 and 13.9 respectively (Table X). Conclusions obtained from the preceding tests and subsequent examination revealed that it was meaningful to talk in terms of the perceptions of university people and that of other residents in Manhattan.

It was noted earlier in this chapter that previous studies on environmental perception have used a similar technique to find meaningful classifications into which perceptions could be classed. Sewell found significant differences in perception among various groups of engineers and public health officials and focused on the holistic viewpoint and the engineer mentality. Sonnenfeld was able to demonstrate differences among groups in regard to sen-

TABLE X

DIFFERENCE OF MEANS TEST FOR STATISTICAL SIGNIFICANCE BETWEEN STUDENT-FACULTY RESPONDENTS AND OTHER RESPONDENTS IN THE SAMPLE, ACCORDING TO AGE, EDUCATION, AND LENGTH OF RESIDENCE

	MEAN (Years)	TEST STATISTIC	DECISION
AGE			
Student and Faculty	31.7	4.28	Significant at
Other Residents	45.6		.001 level
EDUCATION			
Student and Faculty	17.1	4.80	Significant at
Other Residents	13.9		.001 level
LENGTH OF RESIDENCE			
Student and Faculty	7.8	3.75	Significant at
Other Residents	17.7		.001 level

sitivity to environment, but noted further in his study of perceptions in the Arctic and Delaware that

there were also many similarities, and it could be that certain preferences and attitudes toward environment will prove universal.⁷

Hopefully, the categories arrived at in this chapter help explain some of the differences in perception at work and suggest that the generalizations are not lacking in meaning.

⁷Sonnenfeld, "Equivalence and Distortion of the Perceptual Environment," op. cit., p. 97.

CHAPTER IV

COMPARISON WITH PREVIOUS STUDIES

In this chapter previous research on air pollution awareness is reviewed to arrive at some idea of how perception appeared to vary according to time and local conditions. Those variables isolated in this thesis are compared with those determined in previous perception studies and the value of environmental perception as a tool in determining man's relationship to his environment is discussed, with emphasis on the host of variables that geographers find important in explaining differences in perception.

A. COMPARISON WITH PREVIOUS ENVIRONMENTAL PERCEPTION STUDIES

In the last chapter it was determined that in general people associated with the university perceived air pollution as more serious than other residents. It was thought that the generalizations necessary in classification served to establish meaningful categories. The problems involved in classifying perceptual phenomena are well-documented in the literature. Sonnenfeld has observed that often the methods used in studies of environmental perception are different but that it is important that we identify the major variables affecting perception, noting that

these efforts to probe variability in environmental perceptions do vary; but the variability that characterizes different populations is predictable only to the extent that the major variables of environmental perception and response are understood.¹

Sonnenfeld made use, for instance, of the semantic differential technique.² This involved pairs of items that could be classed into physical and biotic categories. The item pairs were then subjected to various sample populations to determine differences in perception. Using this method he was able to classify perceptions between populations, different age groups, and different cultural groups. Combining various groups he was able to make a case for the possible existence of environmental personality types.

Saarinen used the Thematic Apperception Test³ to determine differences in perception among various groups of farmers in areas of drought hazard. Differences in perception were recognized for a number of variables including age, type of operation, and personality characteristics. From these variables he concluded that perception varied

¹ Joseph Sonnenfeld, "Environmental Perception and Adaptation Level in the Arctic," in David Lowenthal, Environmental Perception and Behavior, op. cit., p. 52.

² The semantic differential technique involves the use of paired items. Choices exhibit preconceived ideas and feelings held by the individual.

³ The TAT test involves showing a series of pictures to a subject and encouraging him to tell stories about them.

principally according to the degree of aridity, amount of drought experience, and personality differences.

These two examples serve to indicate the variety of approaches used in geography to find categories for which there were differences in perception of some specific environmental phenomena. Brookfield has discussed the problems inherent in this classification of perceptions. He recognized that the real world and the perceived world are often at considerable variance. Provision of categories into which perceptions can be ordered

enables us to clarify fairly readily the distinction between those parts which can be expected to bear good rapport to the real environment, and those in which misinformation and ignorance may be expected most readily to introduce distortion. Length of residence in an environment is a further variable, as effectively demonstrated by Burton, Kates, Saarinen and others in their studies of hazard perception.⁴

Brookfield noted that this rapport between the real and the perceived environment varies according to experience with the phenomena being perceived, since

within the immediate surroundings of a person or group of persons there will be classes of environmental perception that depend mainly on experience, while in other aspects experience is an insignificant element; in so far as the relations between man and the supernatural are concerned; the part played by experience is everywhere minimal.⁵

⁴ H. C. Brookfield, "On the Environment as Perceived," Progress in Geography, 1:69, 1969.

⁵ Ibid., p. 68.

The air pollution hazard was minimal in Manhattan and awareness of air pollution could not be readily attributed to direct experience with it in the city itself. That experience is not a necessary precondition of perception was indicated in the previous chapter in regard to those who reported that they were actually bothered by air pollution in Manhattan.⁶ Subsequent classification of attitudes by means of statistical tests revealed that students and faculty perceived local air pollution as more of a problem than the other residents. Sonnenfeld touched on this problem of identifying the role of experience in environmental perception, noting that

one may feel concerned and even incensed about the plight of the redwoods of California even though one has no expectation of ever seeing them; similarly with game animals on the verge of extinction in Africa, or⁷ the expanding garbage dumps on the ice of Antarctica.

Problems exist, therefore, not only in classifying perceptions according to meaningful categories but also in determining the role of experience in affecting man's perception of some element in the environment. Although this

⁶ Although it has been observed by previous authors that direct experience is not a necessary precondition of perception some scholars prefer to accept experience as an assumption in their work. A clear statement is provided by Schiff, "Some Theoretical Aspects of Attitudes and Perception," op. cit.

⁷ Sonnenfeld, "Equivalence and Distortion of the Perceptual Environment," op. cit., p. 83-84.

thesis dealt with a site where direct experience with air pollution played a minimal role, several studies have treated air pollution awareness in cities where a problem did exist and where experience with pollution would seem to play a more significant role. Three cities where such studies were conducted are treated in turn in the next section and compared with the results obtained for Manhattan.

B. COMPARISON WITH PREVIOUS ATTITUDE STUDIES

St. Louis. The study conducted on St. Louis was completed in 1964 for the Department of Health, Education and Welfare by the National Opinion Research Center.⁸ Several differences in perception between Manhattan and St. Louis appeared to be related to the date of survey. A striking difference occurred with the definitional aspects of air pollution. A decided majority volunteered odor and smoke as the principal components of air pollution, with lesser numbers offering other elements (see Table XI). The Manhattan sample was presented with this entire list of components found for St. Louis and asked to choose the likely alternatives. Whereas exhaust gases were chosen by a majority of the Manhattan sample, only 16 per cent of the St. Louis residents volunteered this as a principal component

⁸ Southern Illinois University, op. cit.

of air pollution. The authors of this study for St. Louis concluded that smoke and odor are phenomena that can be perceived directly, whereas the other possibilities are not so apparent.⁹

There is an interesting parallel here with the observation made by Brookfield that experience is not a necessary element of perception. This possibility was noted in the St. Louis study.:

The extent to which the meaning of air pollution is based on direct experience of the respondent with the phenomena and the extent to which the meaning is based on learned definitions of the term are not evident.¹⁰

Some of this variation might be explained by the lack of other sources in Manhattan, making the automobile more noticeable. Examination of Table XI reveals that smoke and odor were perceived more directly in St. Louis whereas smoke and exhaust gases were more apparent in Manhattan. More likely this extreme difference may be attributed to the time element involved, because people have become increasingly aware of the automobile as a principal source of air pollution. This possibility is considered later.

A striking similarity existed between the findings for St. Louis and Manhattan in regard to seasonality of air

⁹ Ibid., p. 24.

¹⁰ Ibid.

TABLE XI

PRINCIPAL ELEMENTS OF AIR POLLUTION, MANHATTAN AND ST. LOUIS
(SELECTED RESPONSES, %)

	Manhattan ^a	St. Louis ^b
Exhaust gases	97.1	15.6
Smoke	87.1	45.9
Odor	59.3	56.0

^a Question: "How many of the following do you include in your definition of air pollution?"

^b Question: "The term 'air pollution' is used occasionally nowadays. What does it mean to you?" (open-ended).

TABLE XII

SEASONALITY OF AIR POLLUTION, MANHATTAN, ST. LOUIS, AND
TORONTO (%)

	Manhattan ^a	St. Louis ^b	Toronto ^c
Summer	36.4	31.0	59.8
Spring	30.9	16.5	45.8
Fall	27.3	17.0	33.7
No Season	9.1	--	--
Winter	7.3	11.0	25.6
All Seasons	7.3	--	14.8

^a Question: "If, in your opinion, there is air pollution in Manhattan, when is it most serious?"

^b Question: "As you see it, is there any air pollution here in this neighborhood? If yes: What seasons of the year is air pollution a problem?"

^c Question: "In your opinion, is air pollution worse in any particular season?"

pollution (Table XII). Summer was clearly perceived as the most severe season for both places and winter was believed to be the least hazardous season. The consistency of responses on this issue indicated that a clear difference existed between what was perceived and what was experienced since the direction of attitudes was strong in the cases of both summer and winter pollution. Brookfield has noted that the perceived world tends to differ from the real world as a function of distance from the individual, but

It must be noted, however, and forcibly, that this distinction is by no means wholly in terms of discrete and concentric zones.¹¹

In the case of seasonality the individual relates directly with his surroundings yet summer is judged more serious than winter in terms of air pollution danger. Here perception deviates markedly from actual physical air pollution level. In regard to this point, Auliciems and Burton have recognized the importance of considering the perceived environment, noting that

Variations in the quality of the air are not easily noticed by the human senses and, even when they are, the process of adjustment and acceptance has been rapid.¹²

The results for both Manhattan and St. Louis lend support to this observation.

¹¹ Brookfield, op. cit., p. 68.

¹² Auliciems and Burton, op. cit., p. 10.

Toronto. A survey of attitudes on air pollution was conducted by Barnes¹³ for Toronto in 1968. This study inquired about specific ill effects of air pollution and the question format was adapted for Manhattan. For the most part those effects perceived as important by Toronto citizens were also those mentioned by Manhattan residents. But discoloration of buildings, laundry, etc. and poor visibility were considered more often in Toronto than Manhattan (see Table XIII). This situation presents an interesting point in regard to the role of direct experience in perception. It may be observed that the two items not believed to be important in Manhattan (discoloration and poor visibility) are those items which are the most visibly apparent where they do occur. Auliciems and Burton examined Barnes' findings and noted that

the fact that respondents are willing to say that they suffer irritation of the eyes or respiratory tract, and attribute this to air pollution, indicates again the high degree of public awareness and points again to the conclusion that the awareness is the result of factors other than or in addition to direct sensory experience.¹⁴

The fact that the question used in this thesis was specifically limited to ill effects of air pollution in Manhattan supports this tentative interpretation offered by Auliciems

¹³ Barnes, op. cit.

¹⁴ Auliciems and Burton, op. cit., p. 17.

TABLE XIII

ILL EFFECTS OF AIR POLLUTION, MANHATTAN AND TORONTO (%)

	Manhattan ^a	Toronto ^b
Particulate matter/dust	67.2	56.5
Odor	61.8	54.5
Respiratory irritation	30.9	30.0
Aesthetic damage	30.9	--
Irritation of eyes	29.1	29.5
Discolorings of buildings, laundry, etc.	9.1	33.2
Poor visibility or haze	9.1	21.5

^a Question: "Are there any ill effects of air pollution that affect you personally in Manhattan?"

^b Question: "Are there any ill effects of air pollution that affect you personally?"

TABLE XIV

PRINCIPAL SOURCES OF AIR POLLUTION, MANHATTAN AND TORONTO
(SELECTED RESPONSES, %)

	MANHATTAN		TORONTO	
	National	Community	City	Neighborhood
Automobile	92.1	70.7	89.5	80.0
Industry	89.3	18.6	88.0	44.5
Municipal Incinerators	32.1	16.4	36.0	29.5

^a Question: "Which of the following do you feel play a major role in contributing to the general level of air pollution in the United States? In Manhattan?"

^b Question: "Which of the following do you feel play a major role in contributing to the general level of air pollution in Toronto/neighbourhood?"

and Burton.

Examination of Table XII reveals that the seasonality of air pollution noted above for Manhattan and St. Louis also applied to Toronto, thus further strengthening the conclusion that perception plays a significant role. It would seem reasonable to suggest that perception is not simply a result of a deterioration in the atmosphere but indicates that in the summer people are more sensitive to air quality as a result of a change in their own activities rather than a change in the quality of the air itself.

A question used in the Toronto study to determine the principal sources of air pollution was applied to Manhattan where a majority of respondents believed that the automobile and industry were the most important sources of air pollution. These results are of interest since it will be remembered that few St. Louis residents volunteered exhaust gases as principal components of air pollution. This might indicate that people are increasingly aware of the automobile as a major source of pollution, perhaps as a result of current government action in regard to automotive pollution, since Barnes conducted his survey in 1968 and the Manhattan data were collected in 1971.

Clarkston, Washington. It was noted earlier in this chapter that previous studies on environmental perception found that it was useful to set up categories into

which similar perceptions could be classed. The Clarkston survey, conducted in the winter of 1961/62 was of interest since it determined that concern for air pollution varied according to profession, length of residence, and civic pride.¹⁵ This was supplemental to a technical survey of air quality conducted for the twin cities of Clarkston, Washington and Lewiston, Idaho. It was determined in this study that 91 per cent of the sample were aware of an odor problem, 74 per cent were bothered by visibility, and 62 per cent reported nose-throat irritation.

One-quarter of the sample worried about the effects of air pollution on their health and one-third on their property. The authors of the study had observed that it was not valid to assume a simple correlation between air pollution incidence and concern:

The extent of worry in both cases is underestimated if one takes account only of respondents who answered "Yes" to this item. Four respondents said they didn't worry about health effects of air pollution because "it wouldn't do any good," while six said they did not worry about property effects of air pollution "since they had painted their houses."¹⁶

This finding further served to demonstrate the need to consider the perceived environment since awareness in this case appeared to be the result of factors other than or in

¹⁵ Medalia, op. cit.

¹⁶ Ibid., p. 20.

addition to direct experience with air pollution.

Suggestions for future research. This research on perception and awareness of air pollution in Manhattan, Kansas has considered questions similar to those raised in previous work on environmental perception and hazard research in particular. Further research needs to be done on isolating those factors that affect perception in a variety of settings and the role of experience needs careful consideration. Hopefully, the current studies of Natural Hazard Research will investigate these questions. Subsequent investigations may determine whether there there can be identified common features that transcend the differences found among groups, in this case the possibility of the existence of a "pollution syndrome" should be investigated. Environmental pollution is increasingly recognized as a major problem, but before effective solutions can be reached it is important that we determine how awareness of it as a problem varies among groups of citizens and among decision-makers. Previous work has indicated that such differences do occur but more research is needed. These are significant issues because of the implications they have regarding national priorities. Since we act as we perceive, it is important that geographers sharpen their tools sufficiently that they understand how perceptions vary throughout the population and among those in a position to make decisions involving

future environments. In this regard it would appear that applications in the subfield of resource management are appropriate. The air may be considered a resource and the perception-oriented concepts of a theoretical and a practical range of choice in resource use developed by Gilbert White may be examined for individuals, groups of individuals, and decision-makers. This possibility, because of policy implications, seems especially interesting.

CHAPTER V

SUMMARY AND CONCLUSIONS

A. SUMMARY

Geography enjoys a rich tradition in the study of how man relates to his environment and geographers still find much of interest in this study. But they have found that no simple relationship exists between man and environment -- a diversity of considerations must be treated before we can make any definitive statements about human use of the environment.

Environmental perception is currently studied in conjunction with research into man's use of the land since the correspondence between the real world and the perceived world is not perfect, according to Lowenthal we "respond to and affect the environment, not directly, but through the medium of a personally apprehended milieu."¹ Several geographers have found environmental perception to be a valuable tool that helps explain how man adjusts to an uncertain environment. From these initial efforts a formal program was initiated to investigate how men adjust to hazardous

¹ Lowenthal, Environmental Perception and Behavior, op. cit., p. 1.

environments. More recently this interest has been extended to those elements in the environment that are harmful to man and created by him.

Continuing in the spirit of this research, an investigation was made of how people in the small town of Manhattan, Kansas perceive air pollution as a hazard. Attitudes were assembled through a questionnaire, and the results were analyzed for differences in perception among groups of residents. It was found that significant differences exist among the perceptions of residents, and in keeping with previous work on environmental perception four categories were recognized into which similar perceptions could be classed.

The next step of the thesis was to find the role of direct experience with air pollution in affecting perception, and this involved a comparison with previous studies on awareness of air pollution. Comparisons were also made with previous statements on perception of environment to establish the importance of perception in explaining similarities and differences. It was indicated that awareness of air pollution as a hazard appeared to be increasing with time but that it was not a function of direct experience with the phenomena since other factors must be considered in addition to experience.

B. CONCLUSIONS

Environmental perception provided a useful means to arrive at a better understanding of how man related to his environment. This thesis has investigated air pollution as a specific hazardous element in the environment and demonstrated that perception was not a simple function of air pollution level and direct experience with it. Other factors needed to be considered and these included age, length of residence, education, and university association. For Manhattan the most important variable was university association -- students and faculty were much more concerned about air pollution as a problem than other residents of Manhattan. Comparison with previous studies indicated that awareness appeared to be increasing with time and pointed out the need for further research on this topic.

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APPENDIX I

SAMPLE QUESTIONNAIRE AND RESULTS (%)

2. Sex:		
	Male	71.1
	Female	28.9
4. Home:		
	Own	63.6
	Rent	35.7
5. Education, mean number of years		15.0
6. Age, mean number of years		41.5
7. Number of persons in household, mean number of persons		2.9
8. Of the following types of pollution in the United States, which are you most concerned about?		
	Air pollution	31.4
	Water pollution	22.9
	All pollution	19.3
	Air and water pollution	18.6
	Other combinations	5.0
	Soil pollution	2.1
9. For the U.S. as a whole, do you believe air pollution is <u>principally</u> a result of:		
	Industrialization	59.3
	An increasing population	49.3
	Waste in product production	49.3
	People's carelessness	45.0
	Lack of enforcement of existing laws	38.6
	High standard of living	24.3

¹ Questions 8, 11, 13, 14, 24, 27, and 28 were taken from the Working Paper done for Natural Hazard Research by Auliciems and Burton concerning perception and awareness of air pollution in Toronto. Questions 10, 12, and 22 were drawn from the Southern Illinois University research on St. Louis. The remaining questions were not directly comparable with previous research.

10. How many of the following do you include in your definition of air pollution?

Exhaust gases	97.1
Smoke	87.1
Fog or smog	64.3
Odor (fumes)	59.3
Insecticides	53.6
Dust and dirt	40.0
Radiation	37.9
General contamination	12.1
Other unhealthy conditions	11.4
Pollens	9.3
Other	2.1
No reply	1.4

11. How would you rate each of these for the United States?
How would you rate Manhattan in terms of these problems?^a

	United States	Manhattan
Water pollution	67.1	20.7
Air pollution	63.6	18.6
Racial problems	62.9	27.1
Juvenile delinquency	59.3	36.4
General congestion of population	53.6	7.9
Traffic congestion	50.0	14.3
Noise levels	42.1	13.6
Employment levels	37.1	30.7
Garbage collection and disposal	32.1	27.1
Recreational areas and programs	13.6	15.0

^a Those rating each problem as very or moderately unsatisfactory.

12. Are you ever bothered by air pollution in Manhattan?
- | | |
|---|------|
| I haven't been bothered by air pollution at all | 60.0 |
| I've been bothered by air pollution somewhat | 37.1 |
| I've been bothered by air pollution quite a bit | 2.1 |
| No reply | 0.7 |
13. [If yes,] do any of the following ill effects of air pollution affect you personally in Manhattan?
- | | |
|--|------|
| Particulate matter/dust | 67.2 |
| Odor | 61.8 |
| Respiratory irritation | 30.9 |
| Aesthetic damage | 30.9 |
| Irritation of eyes | 29.1 |
| Discolorings of buildings, laundry, etc. | 9.1 |
| Poor visibility or haze | 9.1 |
14. If, in your opinion, there is air pollution in Manhattan, when is it most serious?
- | | |
|-------------|------|
| Summer | 36.4 |
| Spring | 30.9 |
| Fall | 27.3 |
| No season | 9.1 |
| Winter | 7.3 |
| All seasons | 7.3 |
16. How many years have you lived in Manhattan? (mean number of years):
- 15.0
17. What is the population size of the city in which you have spent most of your adult life?
- | | |
|-------------------|------|
| Less than 10,000 | 20.0 |
| 10,000 - 50,000 | 55.7 |
| 50,000 - 100,000 | 5.0 |
| 100,000 - 500,000 | 10.7 |
| Over 500,000 | 6.4 |

18. Do you think you will live in Manhattan many more years?
that is, five or more years)
- | | |
|------------|------|
| Yes | 53.6 |
| No | 25.7 |
| Doubtful | 12.1 |
| Don't know | 7.1 |
19. If the answer is doubtful or no, where do you think
you would move?
- | | |
|---------------------|------|
| Another state | 59.6 |
| A small city | 36.5 |
| Elsewhere in Kansas | 25.0 |
| A large city | 25.0 |
20. When you want to talk over an important community problem,
to whom do you speak?
- | | |
|---------------------------|------|
| Friend | 38.6 |
| Family | 34.3 |
| Local government official | 25.0 |
| Special group or person | 20.7 |
| No one | 7.1 |
| No reply | 4.3 |
21. What is your total annual income?
- | | |
|---------------------|------|
| Less than \$5,000 | 31.4 |
| \$5,000 - \$10,000 | 25.7 |
| \$10,000 - \$20,000 | 35.0 |
| \$20,000 and over | 5.0 |
22. From which of the following have you learned the most
about air pollution?
- | | |
|---|------|
| Television | 75.7 |
| Newspapers | 74.3 |
| Magazines | 60.7 |
| A friend or relative | 11.4 |
| Someone in local government | 6.4 |
| Someone in a community-wide
organization | 5.0 |

A doctor	2.1
Someone in a neighborhood organization	0.0
No reply	3.6

23. How often do you hear or read from these sources about the problem of air pollution?

Frequently	67.9
Occasionally	29.3
Seldom	0.7
No reply	2.1

24. Which of the following do you feel play a major role in contributing to the general level of air pollution in the United States? In Manhattan?

	United States	Manhattan
Automobile	92.1	70.7
Industry	89.3	18.6
Municipal incinerators	32.1	16.4
Oil burners	24.3	3.6
Natural pollution	17.1	17.1
Other	12.9	9.3
Apartment incinerators	12.1	8.6
Open burning of leaves	6.4	13.6
Locomotives	6.4	1.4
None of these	0.0	0.7
No reply	0.7	0.7

25. What effect do you think air pollution has on human health for the United States as a whole?

A considerable effect	45.0
A moderate effect	32.9
A minor effect	11.4
Don't know	7.9
No reply	2.9

26. Which one governmental level should take the primary leadership in air pollution control?

Federal government	48.6
State government	25.0
City government	22.1
County government	0.0
No reply	4.3

27. Which penalties against pollution would you suggest as a first action? Which of these is the strongest measure you would accept as reasonable for eventual action?

	First Action	Eventual Action
A warning	64.3	1.4
A token fine	15.7	4.3
A stiff substantial fine	13.6	27.9
Closing down the polluting activity	4.3	62.9

28. Considering the problem of pollution and that in the final analysis the public, you, pay for it either in taxes or cost of goods and services, how much money in total do you think you yourself would be willing to contribute per year to eliminating pollution?

Moderate or large amount (\$50 plus)	32.9
\$10 - \$40	28.6
Small amount (\$10 or less)	17.1
None or noncommittal	15.0

29. Are you involved, or have you been involved, with any group that has studied or worked with air pollution?

No	85.7
Yes	13.6
No reply	0.7

APPENDIX II

ADDITIONAL COMMENTS SHEET

Number of Respondent ____.

Date _____.

Location _____.

Sex ____.

Interview Situation: Alone ____ Group _____.

Estimated Income in Relation to Mean for Group:

High ____ Medium ____ Low ____.

Respondent's Attitude:

Hostile

Neutral

Helpful

Unreliable

Reliable

Comments:

APPENDIX III

LETTER OF INTRODUCTION INCLUDED WITH THE MAIL QUESTIONNAIRE

February 22, 1971

Dear Sir:

We increasingly hear about environmental problems and I am interested in how the people in our community view the question of air pollution. For my M.A. thesis in geography I am requesting your help.

The enclosed questionnaire deals with public attitudes concerning air pollution. Replies to this questionnaire will be used in a master's thesis on this topic. With the form you will find a stamped self-addressed envelope for you to return the completed questionnaire. Please note that the questionnaire is to be filled out by an individual and without the help of others in the household.

All responses will be kept confidential, but if you desire more information or would like to make additional comments you may reach me at the Department of Geography at K.S.U. (532-6993) or at my home telephone number (539-3017).

Your assistance on this study will be appreciated.

Sincerely,

William A. Ziegler

PERCEPTION AND AWARENESS OF AIR POLLUTION
IN MANHATTAN, KANSAS

by

WILLIAM A. ZIEGLER

B. A., University of Cincinnati, 1969

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS

Department of Geography

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1971

In their study on the relationship between man and environment, geographers have found it necessary to treat a variety of considerations before any definitive statements about human use of the environment are made. Environmental perception has been a useful tool in geographic research since it hypothesizes that man views the world not as it is but as it is perceived. Several geographers have used environmental perception in research on man's response to uncertain environments, and a formal program was instituted in 1967 that investigated how man adjusted to hazardous environments. More recently, this interest was extended to consideration of man-made hazards that are harmful to man and caused by him. This thesis investigated how people in the small town of Manhattan, Kansas perceived air pollution as a hazard.

Attitudes were collected through a questionnaire that inquired into a range of beliefs concerning air pollution and information was gathered by interview and mail questionnaire procedures. The data collected by these methods was analyzed for differences in perception among groups of residents -- it was found that those who were most concerned about air pollution tended to be young, had a higher education, were short-time residents, and were associated with the university. Subsequent examination revealed that it was meaningful to speak in terms of the perceptions of stu-

dents and faculty as compared with those of other residents of Manhattan.

Previous studies on air pollution awareness have been conducted on other cities. This thesis examined survey findings for St. Louis, Toronto, and Clarkston, Washington and demonstrated that perceptions were not merely a result of direct experience with air pollution but that other factors must also be considered.

This research concluded that environmental perception provides a useful tool in geography and can lead us toward a better understanding of man's use of the environment. It was hoped that geographers would avail themselves of this research method in the future.