1-1-1981

Research on environmental images : the perception and use of urban parks.

William H. Weitzer
University of Massachusetts Amherst

RESEARCH ON ENVIRONMENTAL IMAGES:
THE PERCEPTION AND USE OF URBAN PARKS

A Dissertation Presented

By

William Harry Weitzer

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

February 1981

Psychology

RESEARCH ON ENVIRONMENTAL IMAGES:
THE PERCEPTION AND USE OF URBAN PARKS

A Dissertation Presented

By

William Harry Weitzer

Approved as to style and content by:

D. Geoffrey Hayward

D. Geoffrey Hayward, Chairperson of Committee

Dalton Miller-Jones

C. Dalton Miller-Jones, Member

Charles E. Clifton, Jr., Member

Richard W. Wilkie

Richard W. Wilkie, Member

Charles E. Clifton, Jr., Department Head
Psychology

ACKNOWLEDGEMENTS

An acknowledgement page cannot sufficiently thank those persons who have contributed so much during my years as a graduate student. Still, I cannot help but give it a try:

On an institutional level, the University of Massachusetts funded me for two years on a University Fellowship, enabling me to progress through the graduate program on schedule. Additional funding for the dissertation research came through the Consortium for Environmental Forestry Studies, USDA Forest Service. The people of The Environmental Institute have often provided a comfortable research setting, support services, and funding opportunities. Many members of the Psychology Department faculty have been extremely supportive of my efforts to conduct applied psychological research. Also, fellow graduate students, past and present, have shared ideas which were critical to my education.

The members of my Committee have been influential, patient, and supportive throughout the two years of this research project. Dick Wilkie has provided a useful perspective from the literature in Geography and his own unique experiences. Chuck Clifton continually amazes me with his broad interests and his ability to relate to and contribute to research such as this,although it is only loosely related to Cognitive Psychology. Dalton Miller-Jones has been much more than a Committee member; as my advisor and a friend, he has been influential in decisions concerning my graduate career and much more. And, as the

Chairperson of my Committee, Jeff Hayward has contributed seemingly endless hours of assistance; more importantly, he has provided the perfect learning and working "environment" for a graduate student-colleague-friend.

Too many friends to name have contributed in countless ways. Julie Lansner has been conscientious and flawless in her typing. Beth Girshman's contributions have been timely and her spiritual assistance invaluable. And last, but actually at the top of the list, Lisa Grant has been totally supportive in innumerable ways; without her strength and assistance this task would have seemed nearly impossible.

ABSTRACT

Research on Environmental Images:
The Perception and Use of Urban Parks

(February 1981)

William H. Weitzer, B.A., University of Michigan
M.S., University of Massachusetts
Ph.D.,University of Massachusetts

This research focuses on "images" of environments. The initial definition of image is quite simple, but broad: a person's image of an environment consists of all the information concerning that place which is stored in the individual's mind. The image contains perceptions of the environment which vary in accuracy, opinions and judgments concerning that place, comparisons with other places, and quite often, inaccurate information about that environment. The goal of the dissertation is to refine the definition of image, to demonstrate the utility of this concept in environmental psychological research, and to develop planning and design implications from the research.

Two urban parks were used as the "laboratories" for the study of image. A face-to-face interview was conducted in the homes of a random sample of people who live near and use Forest Park, in Springfield, Massachusetts, or Elizabeth Park, in Hartford, Connecticut. Several types of information were collected from the sample respondents: their images of the park, interests in recreational activities, demographic characteristics, and patterns of use of outdoor recreational areas.

The data analyses focus on five research objectives: 1) a

description of users' images of urban parks; 2) differences in image between the two parks; 3) the relationship among three hypothesized aspects of image; 4) the relationship of individual characteristics to image; and 5) a test of an hypothesized model of urban park recreation which suggests that a combination of individual characteristics and image predicts park use. The results from these analyses are considered in turn:

1) The survey indicated that local residents do not know all that there is to know about their parks. Despite their lack of knowledge, their opinions of the parks are often positive. People think the parks are valuable, convenient, and accessible, but less consensus was apparent on issues concerning pride in the parks, maintenance, and vandalism.

2) Image data from the study illustrate marked differences between the public perceptions of the two parks. Despite its larger size, Forest Park is better known descriptively while Elizabeth Park is more highly valued on measures of convenience, cleanliness, safety, and pride. Also, relative to Elizabeth Park, Forest Park was perceived as providing a broader range of environments for all kinds of recreational activities.

3) Three aspects of image were identified and used in the survey instrument: descriptive, the knowledge of places and spaces held by the individual; evaluative or interpretive-general, general attitudes about places; and interpretive-specific, opinions about specific features of places. Although there may be other ways to dissect the

concept of image, these three aspects proved useful in guiding the selection of survey questions and they provided unique perspectives during the data analyses.

4) A moderate relationship between data about individuals and their images was evident in the data analyses. The correlations between demographic characteristics and image indicated that the respondent's sex, number of children, income, or distance from the park was informative about his/her image. Also, higher interests in recreational activities were linked to more informed and positive images of the parks.

5) Finally, the influence of urban park images on the patterns of use of that park were examined and the link between park image and use was clearly established. The hypothesized model was substantiated where an individual with given demographic characteristics and recreational interests is clearly influenced by his/her image of a park when choosing a site for recreation.

The results from this research effort have implications for some pressing conceptual, methodological, and topical issues in the image literature. In particular, the use of a broad definition of image, the delineation of three aspects of image, and the establishment of a link between the respondents' images and their use of urban parks stand as contributions to this literature.

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

LIST OF TABLES

LIST OF TABLES
(continued)

LIST OF FIGURES

INTRODUCTION

The goal of this dissertation is to develop a definition of what is meant by "images" of environments, to demonstrate the utility of this concept in environmental psychological research, and to develop planning and design implications from the research. The initial definition of "image"is quite simple, but broad: a person's image of an environment consists of all the information concerning that place which is stored in the individual's mind. This information includes perceptions of the environment which may be more or less accurate, opinions and judgments concerning the place, comparisons with other places, and quite often, inaccurate information about that environment.

This goal, to explore the concept of images of environments, was pursued in a research project, "Images of Urban Forests," funded by the Consortium for Environmental Forestry Studies, USDA Forest Service (D. Geoffrey Hayward, Principal Investigator). Past research on images and conceptual work by the author were utilized in examining two urban parks in central New England. While the results are of direct consequence to the specific research settings and to other urban parks, the intent of the research is also to suggest more general implications for the study of environmental images. This approach to conducting image research is discussed in the remainder of this introduction; also presented is a chapter by chapter outline of the dissertation.

A. An Approach to Image Research

The research presented in this dissertation can be viewed as an example of an approach to research in "environmental knowing." Therefore, it is important that the reader understand the framework which guided the project. To begin with, the review of the literature on images is quite broad in scope. It covers conceptual, methodological, and topical issues in environmental knowing. The intent is to lay the groundwork for any research effort in the field. In doing so, the problems which a researcher may encounter and the most pressing issues to be explored are delineated.

Using the review of literature as a foundation, the researcher procedes to select an appropriate research setting. The selection is based on the suitability of an environment for addressing specific research questions as well as constraints in the availability of funding. Once the setting has been chosen, the needs for research in that particular environment must be compared to the overall needs for image research as prescribed in the literature review. The research objectives are developed from an integration of the prior research and the needs of the research setting. As obvious as this approach may sound, the evidence from the literature is that researchers have continually failed to integrate their research from a specific setting into the larger picture.

The results from a research effort in environmental knowing will have implications for the setting involved and for the primary research objectives being addressed. However, it is equally important to relate the findings to the pressing conceptual, methodological, and topical issues brought forward in the literature review. In the discussion section of the dissertation, attempts are made to do just that.

B. Dissertation Outline

The approach for image research described above was followed in this research. A more specific outline of this dissertation provides a detailed overview of this effort:

Chapter I presents the literature review which defines images from several perspectives: a theoretical basis for image research is described; a model of the role of images is proposed; past research on this topic is reviewed; and, the pressing needs for image research are identified from these considerations.

In Chapter II, the discussion of images focuses specifically on urban parks: the appropriateness of urban parks as a research setting is discussed; a model of the urban park recreational system is reviewed and revised to include "image" as an influence in people's use of urban parks; then, five specific research objectives, based on an integration of the literature review and the needs for research on urban parks, are formulated.

Chapter III provides a review of the research methods: the two urban parks chosen for study are described; pilot work is reviewed; the survey procedures presented; and, the survey instrument is discussed in detail.

The results are presented in two chapters. Chapter IV addresses the first two research objectives: 1) to investigate the nature of images of urban parks as measured by the survey instrument; and 2) to test for differences. These initial analyses prepare the image data for the more complex analyses used in the second results chapter.

Chapter V, the second results chapter, utilizes multiple regression analyses to address the three remaining objectives: 3) to examine the relationships among the aspects of image -- descriptive, evaluative, and interpretive; 4) to explore the relationship of differences in individual characteristics to images of urban parks; and 5) to test a hypothesized model of urban park recreation which suggests that a combination of individual characteristics and image predicts urban park use.

The discussion in Chapter VI begins by summarizing the findings from the data analyses which are spread across the five research objectives. This review is followed by interpretations about images as a "barrier to use" of urban parks as well as more general contributions of the dissertation to conceptual, methodological, and topical issues from the image research literature. Finally, future directions are discussed as they pertain to follow-up research as well as urban park planning and design.

CHAPTER I

LITERATURE REVIEW

This literature review contains an examination of the environmental knowing, or "image" research. This literature is central to the focus of the dissertation -- to develop a definition of "images" of environments and to demonstrate the utility of this concept in environmental psychological research, as well as in planning and design. Following the approach outlined in the Introduction, a broad range of literature has been included in this review. In the succeeding chapter, urban parks are introduced as the research setting for the dissertation. At that point, issues from this review which are of particular relevance to urban parks are focused upon during the formation of specific research objectives.

The review of literature begins with conceptual issues in environmental knowing, including a definition of "image," an overview of the history of research in the field, and a discussion of theories of environmental knowing. A review of methods follows which presents problems in measuring images as well as a review of the types of measures prevalent in the literature. Finally, key research issues in environmental knowing are identified and discussed.

A. Conceptual Issues in Environmental Knowing

This section on conceptual issues begins with definitions of the field of environmental knowing and, more specifically, of "image." An overview of the early history of this research area highlights the variety of disciplines that have contributed to the field. Similarities between models of environmental knowing are presented and compared. Finally, a more specific definition of environmental knowledge, or "image," is offered as the conceptual basis for the dissertation.

1. Definitions. The topic of environmental knowing or environmental cognition encompasses a broad range of subjects including environmental perception, environmental imagery, attitudes about and preferences for environments, and transactions between environment and behavior. Moore and Golledge (1976) define the subject area as follows:

> Environmental cognition is the study of the subjective information, images, impressions, and beliefs that people have of the environment, the ways in which these conceptions arise from experience, and the ways in which they affect subsequent behavior with respect to the environment. (p. 3)

Implicit in this and other definitions is the notion that environmental knowing involves a dynamic process between the knower and the environment. Figure 1 can simply illustrate this transactive process:

the present environment: physical, social, cultural	⟷	the process of environmental knowing: goals, perceptions, plans, actions, evaluations	⟷	environmental knowledge: the image

Figure 1. An illustration of the relation of environment and the image.

At each stage in the process of environmental knowing, the knower refers to the current perception of the environment and the knowledge of environments from previous experiences. Goals, perceptions, plans, actions, and evaluations of the environment are based on both the present environment and the image of the environment.

Where does one begin to study the process of environmental knowing? The definition covers many areas of interest in the field of environment and behavior (see reviews by Craik, 1973; Stokols, 1978) and each area is integrally related to the entire process. In the present research, environmental knowledge or the image has been chosen as the focus of study, although it is difficult to separate an image from the transactions between images, the present environment, and the processes of environmental knowing. The premise behind such an effort is that an attempt to isolate images of the environment will shed light on the full set of processes involved in environmental knowing.

Environmental knowledge, or the image, is the term for the information which the individual brings to a situation. In perceiving the environment, formulating goals, making plans, acting, and conducting evaluations, the individual constantly consults the wealth of information about environments in his/her image. This data is not limited to spatial information, it includes physical, social, and political aspects of the environment. Boulding (1956) first popularized the image as the term for internal knowledge:

> What I am talking about is knowledge. Knowledge, perhaps is not a good word for this. Perhaps one would rather say my <u>Image</u> of the world. Knowledge has an implication of validity, of truth. What I am talking about is what I believe to be true; my

> subjective knowledge. It is this Image that largely governs my behavior. (pp. 5-6)

The use of the term image in this review is based on Boulding's broad definition. Other more limiting definitions describe the image as an icon or photographic replica of the environment, and other uses of image restrict the term to spatial information about the environment. In restricting the definition of images, the purpose is to better isolate specific functions within human-environment transactions. However, in an article reviewing the breadth of the research in the field, Ittelson (1978) supports the decision to examine the full system of influences in the study of environmental perception:

> In summary, current work in environmental perception represents a coherent body of studies which have re-defined the concept of perception to include perceptual, cognitive, imaginal, affective, and value aspects studied by a wide range of methodologies and techniques. Environmental perception is not only dependent upon the physical, interpersonal, and cultural aspects of the environment, but also upon the status of the person, including needs, actions, motives, cognitive processes, and so on. Such an approach suggests that current work in environmental perception is reflecting the trend in contemporary psychology away from compartmentalization into discrete processes and toward conceptualization of the total individual as a complex unitary system. (p. 197)

It is this broad perspective which guides the remainder of the literature review and the dissertation as a whole.

2. The early history of environmental knowing. The study of environmental knowledge can be traced to the work of Gulliver (1908), a geographer concerned with the orientation abilities of children, and Trowbridge (1913), a psychologist who examined orientation and "imaginary maps." Work on orientation and image continued through the first half of

the century, but was not as prevalent nor as popular as it is today; this is probably because images could not be directly observed and behaviorist arguments decreased the value of this research for many (see Lynch, 1960, Appendix A for a review).

Tolman (1948), a psychologist, revived interest in environmental knowing and challenged the behaviorist viewpoint that the unobservable could not be studied. He popularized the term "cognitive map" in his research on rat navigation and orientation abilities. After several trials of searching for and finding food in a maze, new paths were opened for the rats, one of which offered a more direct route to the food. Even though the rats had never before experienced the path (stimulus), their movements (response) reflected an integration of the maze information, a "cognitive map," as they used the correct new path that led most directly to the food. Firey (1945), a sociologist, and Wright (1947), a geographer, are also credited for the revival of interest in images within their respective fields.

The recent history of environmental knowing begins with The Image by Boulding (1956) in which he popularized "image" as a term for environmental knowledge (as quoted earlier). He introduces the "image" as a broad term encompassing all knowledge stored in the human mind. It is through the image that all "facts" are filtered by the individual and it is upon this interpretation which behaviors are based. Shortly after Boulding's work, Miller, Gallanter and Pribram (1960) presented a model for linking the image to actions, emphasizing the cognitive processes involved in the creation and execution of plans.

Lynch's Image of the City (1960) combined the theoretical and practical work of his predecessors by demonstrating the role of the image of the environment and its importance for humans:

> This image is the product both of immediate sensation and of memory of past experience, and it is used to interpret information and to guide action. The need to recognize and pattern our surrounding is so crucial, and has such long roots in the past, that this image has wide practical and emotional importance to the individual. (p. 4)

Lynch compared the "public images" of three cities -- Boston, Jersey City, and Los Angeles. His technique involved an interview with residents of each city with "requests for descriptions, locations, and sketches, and for the performance of imaginary trips" (p. 15). The resulting "maps" indicated agreement among the residents concerning the "legibility" of their cities. Lynch found that some cities were more "legible" than others due to a combination of five elements -- paths, edges, nodes, districts, and landmarks. Lynch's work was followed by research efforts which built upon his findings (see Kates, 1970, for a review), and since its publication it has served as a standard for subsequent research efforts in environmental knowing.

Similar to the early history of environmental knowing research, recent contributions to the field have come from a range of disciplines. Summaries of the research in the field all include Image of the City, but diverge from that point in history depending upon the perspective of the authors: anthropology (Rapoport, 1977), geography (Saarinen, 1976; Porteous, 1977), planning (Lynch, 1976), psychology (Ittelson, Proshansky, Rivlin and Winkel, 1974; Bell, Fisher, and Loomis, 1976), or sociology (Michelson, 1970). Differences in perspective are evident in the authors' choices of methods, scale of the environment, subject (individual vs. group), and overall goal of the research. In this review, contributions from each of these disciplines are used where appropriate. When sufficiently integrated, these perspectives add to a fuller understanding of the image. However, it is evident that in certain areas overlap has occurred across disciplines, but the work has yet to be compared and integrated.

3. Models of environmental knowing. The effort, up to this point, to define and describe the history of images is based on the implicit assumption that images play a role in the relationship between environment and behavior. A clearly stated model of this relationship provides a focus for any research effort on images. However, many researchers fail to explicitly state their conceptualization of this relationship.

This section cites models which were influential in the development of the model which guides the dissertation research. The bias in the selection of potential models was toward an interactional-constructivist position where:

> In these views, experience and behavior are assumed to be influenced by intraorganismic and extra-organismic factors operating in the context of ongoing transactions of the organism-in-environment. Transactions between the organism and the environment are viewed as mediated by knowledge or cognitive representations of the environment; but these representations are treated as constructed by an active organism through an interaction between inner organismic factors and external situational factors in the context of particular organism-in-environment transactions. (Moore and Golledge, 1976, p. 14)

In other words, this epistemological base opposes extreme nativist or empiricist positions, instead hypothesizing influences on behavior from the environment, heredity, and experience.

Returning to the history of environmental knowing, Boulding first described the role of the image: "The first proposition of this work, therefore, is that behavior depends on the image." (1956, p. 6). However, he elaborates on the nature of the image rather than the resulting behaviors. Miller, Galanter and Pribram provided a model based on plans, defined as "any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed" (1960, p. 16). They proposed that plans are based on the image or "all accumulated, organized knowledge that the organism has about itself and its world" (p. 17). Their model for creating and executing plans was highly influential in cognitive psychology during the 1960's.

Carr's model. The earliest elaborated model upon which the present model is based reflects the influences of cognitive psychology, but was offered by a planner. Carr (1967) expressed his goal to better plan environments through an understanding of the "city of the mind":

> For in a very real sense the city is what people think it is. The city that we know personally -- the city of the mind -- largely determines the world in which we have our life's experience through which we strive to gain many of our daily satisfactions. (p. 199)

Carr provided a model for interpreting the interaction of the environment with the mind. He outlined a five-stage process used by humans when negotiating the environment: 1) a directive phase, identifying the needs and purposes of an interaction; 2) an intelligence phase, perceiving, categorizing and recalling the elements of this and previous environments; 3) a planning phase, integrating the need for interaction with the perception of the environment; 4) an action phase, interacting with the various supports and constraints within the environment; and finally, 5) a review phase, extracting meaning from and evaluating the environmental experience. Carr did not specify how these phases are related, nor did he distinguish specifically where the environment or the image enter into the model (it is assumed at all points).

Ittelson's model. Ittelson (1973; Ittelson, Proshansky, Rivlin and Winkel, 1974; Ittelson, Franck, and O'Hanlon, 1976) added to the development of a model from a psychological perspective, exploring how one experiences the environment:

> The first and most salient characteristics is that environmental experience is an active process in which the individual utilizes his resources in order to create a situation in which he can carry out his activities with a maximum of satisfaction. (1976, p. 199)

In Ittelson's model, environmental experiences are broken into four characteristics: orientation, categories for analysis, analysis of contingencies, and purposeful action. An important emphasis that distinguishes this work from Carr's is that these characteristics are not viewed as independent, rather they continuously interact with one another.

Kaplan's model. S. Kaplan, also a psychologist, addresses the relation between image and behavior in evolutionary terms (1976, 1978). He suggests that the survival of humans was based on the species' information-processing abilities:

> The human environment is highly diverse, rich, and uncertain; the amount of potential information is overwhelming. At the same time, the human is faced with limited time to decide and limited capacity for holding information. The cognitive map is the

> structure that holds the information a person has about the environment. (1978, p. 55)

The resulting cognitive map contains information which is stored in a web-like array, connecting elements which are sequentially or conceptually close. Its capacities, as suggested by Kaplan, are: object recognition, anticipation, abstraction and generalization, and responsible innovation (or problem-solving).

<u>Rapoport's model.</u> Another model worthy of consideration was derived by Rapoport (1977) through his anthropological work. He proposes that an individual's perceived world is a subjective view of the "real" world which has been filtered through that person's image. From his perspective, that image is composed of two "filters," a cultural and a personal image. Rapoport's model of environmental knowing includes four processes which are involved in the transaction between the "real" environment and the perceived environment:

> 1) Processes which are largely perceptual although they involve some measure of cognition and memory.
> 2) Encoding processes stressing memory, learning, taxonomies, imagery and some values...
> 3) Affective processes of preference and evaluation based largely on values and images...leading to
> 4) Action. (p. 33)

<u>Other models.</u> These models present compatible views of the relationship between image, environment and behavior. Other models were considered for inclusion, but were not as useful to the model developed in this section. For example, arousal theories (Bell, Fisher and Loomis, 1978) are not in conflict with this model, but are more relevant to personal space and crowding. Other more behaviorist models (Hershberger, 1974; Downs, in Saarinen, 1976) are too linear, involving a stimulus-

image-response format which does not adequately allow for human-environment transactions.

Comparing models. Each model presented here is based on an interactional-constructivist framework where the individual is involved in a continuous and inseparable transaction with the environment. The behavior of the individual is influenced by the present environment and information brought to the environment by the individual, as illustrated earlier in Figure 1 and repeated here.

the environment ⟷ the process of environmental knowing ⟷ environmental knowledge: the image

Figure 2. Simplified illustration of the relation of environment and the image.

The stages of the processes of environmental knowing do differ among the models. However, the close relationship between the models is illustrated in Figure 3 where the five stages initially proposed by Carr are linked to comparable stages in the other theories. This research assumes that the processes of environmental knowing can indeed be described in stages, as these authors have done; however, distinctions between the stages are, at times, difficult to make. The scope of this dissertation does not include the goal of distinguishing the processes of environmental knowing, preferring instead to investigate environmental knowledge, in other words, the image.

	Carr	Ittelson	Kaplan	Rapoport
a)	directive	-----------	-----------	perceptual processes
b)	intelligence	orientation/ categories for analysis	objective recognition	encoding processes
c)	planning	analysis of contingencies	anticipation	affective processes
d)	action	purposeful action	responsible innovation	action
e)	review	-----------	abstraction and generalization	----------

Figure 3. A comparison of stages in the processes of environmental knowing.

The contents of the "box" labelled environmental knowledge, the image, is the focus of the remainder of this review. This image contains all the stored knowledge concerning the environment, including descriptions, evaluations, interpretations, and so on. The image is based on experience which is influenced by individual history, socio-cultural characteristics, values and preferences. Perceptions, plans, and actions in the environment are based on both the present context and the individual's image of this and related environments.

4. The nature of environmental images. Thus far in this section, environmental knowing has been defined and placed within an historical and conceptual perspective. The image, or environmental knowledge, has been identified as the focus of the dissertation. The image is knowledge of environments that is consulted during transactions with the environment. These transactions include basic perceptual and cognitive processes as well as the processes of making plans and acting in the environment.

What remains to be discussed further is the nature of environmental knowledge, which is the conceptual focus of the dissertation. Several issues are addressed which serve to define environmental images: that images do exist and can be measured; that an evolutionary perspective provides an understanding of the function of images; and that the broadly-defined concept of image can be broken down into three parts -- the descriptive, evaluative, and interpretive aspects of image.

The existence of images. The very existence of images or internal representations of the environment is debated in the literature. Images are not directly observable and thus their legitimacy for study is subject to criticism. Stea (1969) argues that regardless of one's opinions about internal representations, images can be defined and studied in terms of observable behavior:

> We can get around the Watsonian objection, which was largely that there exists no direct way for the scientist to "see" this image, by stating very simply that what we are interested in is not necessarily the map itself, but its manifestations. That is, we shall define the image "operationally" in terms of resulting behavior. (p. 65)

Moore and Golledge (1976) go one step further in suggesting that an unspecified functional equivalent to the image exists in the brain:

> Thus, as a hypothetical construct, the term cognitive representation and its approximate synonyms refers to covert, unobserved processes and organizations of elements of knowledge. It is a convenient shorthand notation for a set of entities and processes beyond the practical reach of the investigator, but which, nevertheless, there is reason to believe do exist (in the sense that there is some identifiable substrate for them), and which furthermore, are useful in accounting for other observable spatial behaviors. (p. 8)

In this dissertation concerning the nature of "mental images," this position that internal representations are hypothetical constructs is accepted. Two alternatives are presented and rejected by Moore and Golledge (1976): representations as intervening variables or as metaphors. The first, intervening variables, is based on the behaviorist stance that there is no advantage to hypothesizing about the nature of a phenomenon, such as image, which cannot be observed or directly measured. The second, metaphors, suggests that analogies (for example, "maps" in the head) are helpful in understanding internal representations. If one believes that neurological correlates to "mental images" exist, then it is advisable to hypothesize constructs which serve as more than metaphors and which attempt to explain the nature of the intervening variable. Therefore, in this dissertation, internal representations are treated as hypothetical constructs which cannot be observed yet, but which potentially function in the brain.

The function of images. In their discussion of models of environmental knowing, Kaplan and Kaplan (1978) provide an evolutionary perspective as a basis for the purpose of images. They suggest that in prehistoric times when early humans left their habitat in the trees, they wandered through largely unknown areas which were dangerously filled with predators. From this point of view, it is suggested that the adaptive capacity of the human brain allowed for the survival of the species despite the lack of physical size, strength, or speed. The survival of humans was enhanced by their abilities to store large amounts of information and still be in a position to make quick decisions. According to Kaplan and Kaplan, this human capacity that evolved was the ability to form "mental models" (i.e., images) of the environment:

> First is the human capacity and tendency to build models...it refers to a mental model, a simplified but coherent conception of some aspect of reality. A simplified but workable conception of the environment is a great help in handling a large amount of information in a hurry. (p. 6)

Applying their perspective to present-day concerns, Kaplan and Kaplan describe the importance of "mental models" to humans when negotiating environments:

> However, one issue should perhaps be raised to show how directly this solution to an evolutionary problem is expressed in human/environment relationships. If indeed humans build such mental models and use them to facilitate and speed their commerce with a complicated world, then it follows that their experience of the world is heavily influenced by

> their previously constructed model of it. Thus, the effect of an environment on people cannot be studied without knowing the model people have of it in their heads. (p. 6)

It is clear, then, that the image is dynamically important in mediating environmental transactions. The question still remains as to how images perform this function. Once more, Kaplan (1978) provides an explanation of the functioning of images. He suggests that humans collect representations of pieces of the environment and store these representations in a meaningful, organized manner:

> Going from one representation to its associated "next" representations may not seem very impressive, since it involves only a single predictive step. But from any next representation one can make still further predictions, since these representations have their associations in turn. This step-by-step pattern of associations thus defines a quite complex structure and permits predictive sequences that can be indefinitely long. And the resulting network of representations constitutes a cognitive map of the environment. (pp. 55-56)

The suggestion of an interconnected network of representations of environments is a useful heuristic. However, analyzing the components of this network is another useful approach which is specified next.

The composition of images. Having accepted a broadly-based definition for images and having discussed their evolutionary basis and function, a final step involves differentiating aspects of image. It is suggested that information about environments is stored in a network which constitutes environmental knowledge. However, it is evident that the types of information in the image may be quite different. Much of the information is relatively accurate, firsthand information. Still other pieces of information may have been obtained indirectly and may not be very accurate. Also stored in this network will be opinions about the environments and comparisons with other environments. Still another type of information would be predictions or interpretations about the environment.

Those researchers who have limited their definition of image to one aspect or another (e.g., just descriptive knowledge, or just opinions) have implicitly carved the concept of image into pieces. In the present case, where image has been so broadly defined, it is necessary to explicitly delineate differing aspects of image. The more holistic approach of an anthropologist (Rapoport) and two geographers (Pocock and Hudson) provide two illustrations of ways of distinguishing the aspects of image.

First, Rapoport (1977) describes three areas:

> Any attempt to deal with the man-environment interaction must involve three areas -- knowing something, feeling something about it, and then doing something about it. We are thus concerned with three broad areas:
>
> 1) Cognitive -- involving perceiving, knowing and thinking, the basic processes whereby the individual knows his environment.
> 2) Affective -- involving feelings and emotions about this environment, motivations, desires and values (embodied in images).
> 3) Conative -- involving acting, doing, striving and thus having an effect on the environment in response to 1 and 2. (p. 28)

In addition, three similar, but not exactly duplicated, aspects are provided by Pocock and Hudson (1978); these are designative, appraisive, and prescriptive:

> The first response, the designative aspect, is informational in nature, concerned with description and classification -- the basic "whatness" and "whereness" of the image...
>
> The appraisive aspect is one of appraisal or assessment. It incorporates both evaluation and preference, the former including some general or external stand-

> ards, the latter reflecting a more personal type of appraisal, and affection, which is the emotional response concerned with feeling, value and meaning attached to the perceived...
>
> The third response component relates to predictions and inference of both designative and appraisive nature giving to the image a depth, continuity, pattern or meaning beyond that justified by experience of a particular scene alone. (p. 30)

The consistency between the two sets of aspects of image leads to the following formulation which combines the two points of view. It is suggested that there are three aspects of image: descriptive, the knowledge of places and spaces held by the individual; evaluative, the value that is associated with the places and spaces and the individual's preferences (or lack of preferences); and interpretive, the individual's plans, predictions, and actions based on an integration of the descriptive and evaluative components of image. Later, the dissertation research will explore the distinctiveness of these aspects and potential interrelationships. However, it is first necessary to examine the ways in which these aspects of image can be measured.

B. Issues in Measuring Images

Thus far, a definition of images has been provided, a model of their relationship to behavior presented, and their hypothetical nature discussed. The question of measuring images is the next, and perhaps most crucial step. However, the definition of images as unobservable phenomena necessitates skepticism in efforts to measure them:

> The essence of the problem is that, by definition, "environmental images" exist as psychological entities "inside our heads." They lack a physical existence -- in the usual meaning of that phrase --

> and thus cannot be measured in the way one would measure the attributes of a physical object. It is this aspect of images that lies at the core of the measurement problem which must be overcome if images are to be measured in a valid and reliable way. (Pocock and Hudson, 1978, p. 37)

Two approaches are used in discussing relevant issues in the measurement of images. First, problems common to many studies in the research literature are reviewed. These problems have no concrete solutions, rather they are theoretical issues which must be kept in mind when choosing research procedures. Then, a more concerete approach is taken in describing the variety of ways in which images have been measured. A taxonomy of image research is presented as a useful tool for delineating the differences and similarities of research methods.

<u>1. Problems in measurement.</u> Lowenthal (1972) reviews areas of concern in the measurement of environmental perception which are pertinent to all environmental knowing research. Each of these problems points to issues of critical importance to the choice of methods and the comparison of results which cross methodological approaches. The issues to be discussed are: the use of diverse paradigms in approaching the research; the use of simulated or surrogate environments; the differences between visual and semantic measures; the lack of environmental descriptors for comparing environments; and the variety of statistical analyses used in the research.

<u>Multiple paradigms.</u> The first problem which Lowenthal cites is the difference among the disciplines participating in this research:

> Scholars in different disciplines display little consensus about the nature of evidence, especially attitudinal evidence. The survey questionnaire techniques of the sociologist, the experimental work

> of the psychologist, the participant observations of the anthropologist, and the media sources of the historian, for example, all exhibit profound differences in assumptions about what constitutes "proof" of particular attitudes, the contexts in which they are held, and how widespread they are. (p. 335)

Even within the field of "environmental psychology," Craik (1976) identifies six distinct paradigms which are prevalent: ecological psychology, environmental perception, environmental assessment, personality and environment, environmental cognition, and functional adaptation. Although he finds exciting potential in the diversity of views offered by these areas of research, Craik agrees with Lowenthal's perspective on the confusing aspects of the situation and the lack of comparability across paradigms.

That contributions to the field will continue to come from many disciplines and perspectives cannot be denied. The integration and comparison of these contributions is a crucial, yet nearly impossible task.

Simulated and surrogate environments. A second problem described by Lowenthal is the lack of information about the use of environmental simulations; that is, whether models, photographs, slides, and so on elicit responses which differ from medium to medium, or from responses in the actual environment.

More and more research has been conducted confirming the relationship of simulation methods to one another and to the actual environment. For example, Howard, Chase and Rothman (1973) found high reliability correlations between four subject tasks: drawing a map, using a scale model, making magnitude estimates of distances, and making ratio estimates of distances. Zube, Pitt, and Anderson (1975) found significant correlations between field and non-field (photographs) ratings of landscapes. Winkel and Sasanoff (1970) developed a simulation method using three slide projectors simultaneously, and the Berkeley simulator (McKechnie, 1977) uses a miniature camera in a scale model to simulate a dynamic environment; both simulations were tested and the reliability of responses with actual environments was confirmed.

The evidence on the reliability of simulations and surrogates is not yet conclusive except for settings and procedures specifically tested in individual studies. Therefore, considerable attention must be addressed to the selection of the form of environmental presentations, and where possible, methods should be included to test the reliability of simulations.

Visual and semantic measures. How accurate are methods of representing the image of a subject? Are procedures based on visual or semantic measures equally valid? These questions present problems which must be addressed when choosing measures of environmental knowledge.

Little evidence exists for equating the visual display of an image to the unobservable internal representation. Some studies suggest validity on the basis of the relative accuracy of cognitive maps (Rothwell, 1976; Evans, Marrero and Butler, 1981). Holahan and Dobrowolny (1978) demonstrated a high correlation between actual behaviors and sketch-maps which can also be interpreted as a check on validity. Yet variations in response due to the setting, subjects' abilities, and procedures (e.g., instructions, size of the paper, use of base maps) all suggest that elements of the experiment affect the external representation of the subject, and therefore, challenge the validity of the research.

Semantic measures have many problems as well. Lowenthal succinctly states:

> All studies of perception and behavior that employ questionnaires or interviews rely heavily on images of environment filtered through language. Yet semantic responses explicate only a fraction of all that individuals perceive and what they do in the environment. And since languages moreover differ in their structure and vocabulary, semantic associations tend to bias responses in ways that differ from one culture to another, and indeed, from class to class and person to person. (p. 336)

Finally, the differences between visual and semantic procedures have not been explored. According to one researcher, "Based on some of our interview experiences, it appears that a mapped imagery is not consonant with knowledge of the environment elicited in a verbal form" (Orleans, 1973, p. 129). In order to explore this problem, more studies must use visual <u>and</u> semantic methods when examining images.

<u>Environmental descriptors.</u> Lowenthal's list of problems in measurement includes the lack of common lexicons of environmental descriptors:

> Virtually every investigator of environmental reactions, judgments, and preferences has constructed his own lexicon of environmental descriptors, generated either from terminology employed in the design and environmental management professions, or by the reduction of vocabularies selected by test observers...Much effort goes into constructing such lexicons, but the differences among them invalidate close comparisons of research results. (pp. 336-337)

Not only is describing the environment a difficult task, but so is comparing environments which differ on a large number of dimensions.

Statistical analyses. Often a comparison of research results is hindered by the different methods of data analyses employed. Various decisions are based on assumptions made in the research. For example, factor and cluster analyses assume an underlying dimensional structure in subject responses. Also presenting difficulties is the variety of procedures developed for analyzing sketch-maps. Each of these analytic procedures implies assumptions about the scaling of the sketch-map data (nominal, ordinal, etc.) as well as what is important in the maps (elements, distances, distortions, etc.). As Lowenthal explains in the last of his list of problems in measurement:

> Owing to their widely differing premises and experimental circumstances, however, most research programs have operated from unique statistical points of departure and have bypassed techniques developed elsewhere...A comparative elucidation of appropriate statistical techniques, parametric and nonparametric, would save both time and effort and would help researchers to achieve more sophisticated and duplicable results. (pp. 337-338)

2. Classification scheme. A large number of related and unrelated procedures have been used in attempts to measure environmental images. Therefore, a classification scheme would be useful in providing an overview of the methods used in environmental knowing. But, there are many dimensions upon which such a scheme could be based: type of subject, setting, form of stimuli presentation, response format, and so on (see Craik, 1968).

Some classification schemes are offered in the literature, but they are based on only one or two dimensions (Seamon, 1972; Spencer, 1973; Lee, 1975). Whyte (1977) provides the most sophisticated method for illustrating on two dimensions the relationship of the various methods to one another. She suggests that methods can be mapped by their relative proximity to the researcher, the respondent, and the situation. This taxonomy is useful. However, a greater degree of differentiation on a larger number of dimensions is desirable.

Golledge (1976) developed a framework which effectively handles several dimensions. First, he divides the literature on cognitive research into four methodological categories: 1) experimenter observation in naturalistic or controlled situations; 2) analysis of external representations; 3) indirect judgmental tasks; and 4) historical reconstructions. Within these categories, various procedures are rated on two additional dimensions: the amount of skill required (based on a developmental classification scheme, Hart and Moore, 1973), and the form of the external representation (in other words, the response format).

Golledge provides examples of research which fall into each procedure of each category. An example from the scheme is taken from the <u>category</u> "analysis of external representations;" one <u>procedure</u> is "subjects draw sketches or sketch-maps representing environments" which requires affective, graphic and relational <u>skills</u>; the external <u>representation form</u> is a pictorial sketch or sketch-map; and finally, <u>examples</u> from this procedure are cited, including Lynch (1960), Appleyard (1970), and Ladd (1970).

Golledge's classification scheme is used in this review in order to provide an overview of the various methods used in environmental knowing. However, a modification involves the addition of a dimension which relates the four categories to one another. This dimension is illustrated along the left of Figure 4, as each succeeding method can be viewed

Category (from closest to furthest from the environment):	Relation to the Environment	Examples
(1) Experimenter Observation in Natural or Controlled Situations	observation in the environment	Appleyard, Lynch and Myer (1964)
	observation in a simulated envrionment	Zannaras (1973)
(2) Analysis of External Representations	requesting subject to provide a representation of the environment	Appleyard and Lintell (1973) Lynch (1960)
(3) Indirect Judgmental Tasks	inferring a representation of the environment from subject responses	Donnelly, Goodey and Menzies (1973) Harrison and Sarre (1971)
(4) Historical Reconstructions	inferring representations from literature, history, etc.	Tuan (1974, 1977)

Figure 4. A taxonomy of image research.

as one step further removed from the environment. This dimension indicates that experimenter observation involves a direct contact with the environment, and that analysis of external representations is a step removed from the environment. Furthermore, inferences about these representations are even further from the actual environment, and historical analyses can be viewed as the extreme end of the continuum.

The type of research setting and the resources available to the researcher will undoubtedly influence the choice of methods. However, whenever possible it is desirable to be at the near end of this continuum, in other words, as close to the environment as possible because observed behaviors will be more accurate than those reported at a later date; also, each successive step away from the environment involves more inferences and potentially less accuracy than directly observed behaviors. These categories are discussed in order, from methods closest to the environment to those most removed from the environment, with examples of each provided.

Experimenter observation in naturalistic or controlled situations. Observing behavior in the environment is difficult to accomplish and there are problems involved in making inferences about images from overt behaviors. Still, several researchers have attempted to observe behaviors, and they rely on some form of self-report to augment these observations. Others have "observed" behavior by having subjects perform tasks in simulated, more controlled situations.

Observing behavior in the natural environment is one extreme in the classification scheme. Appleyard, Lynch, and Myer (1964) and Carr and Schissler (1970) took subjects on a freeway automobile trip, collecting data through verbal reports, drawings, and eye-movement patterns. Lynch and Rivkin (1970) led subjects through predetermined routes on a city block and obtained verbal reports while on the walk. R. Kaplan (1976) used a set path in an urban park, afterwards asking subjects to draw maps of the area. In a less "natural" setting, Kozlowski and Bryant (1976) led subjects through a "human-size maze" (an underground tunnel system) and conducted tests comparing subject performance with a self-report of orientation abilities.

Simulations of the environment are used to gain a self-report on behaviors which would occur in that environment. Jones (1972) removed environmental "cues" from a series of slides to determine their role in assisting subjects in locating a freeway. Zannaras (Golledge and Zannaras, 1971; Zannaras, 1973a, 1973b, 1976) compared subject reports of the use of "cues" in four cities for four types of displays: maps, scale models, slides and field trips. Blaut, McCleary and Blaut (1970) used air-taken photographs which simulated maps to test if first-grade children could identify elements in the photos and perform navigational tasks.

Analysis of external representations. The procedures in this category are the most popularly used methods in the field. The tasks vary from locating elements on a map to drawing maps of neighborhoods or entire cities. But, each of these methods has in common a request for information in the form of an external representation.

Related to the procedures in the previous category are studies which gather indirect information from maps. Horton and Reynolds (1971) presented subjects with a zoned map of Des Moines and instructed them to indicate their familiarity with each zone. Andrews (1973) used a map of Toronto as a base for high school students to locate landmarks. Appleyard and Lintell (1973) had subjects locate their "home territory" on neighborhood area maps.

By far, the most popular procedure is the request for a sketch-map of an area. Lynch (1960) first used this method and it has been used in an endless series of variations (for reviews of follow-up work, see Kates, 1970; and Downs and Stea, 1973). One variation includes the provision of an outline or landmarks as a base map for the subjects. In an interesting twist to this procedure, Goodey, Duffet, Gold and Spencer (1971) solicited sketch-maps from newspaper readers by providing a base map in a Birmingham (England) newspaper (although this procedure is not recommended for obtaining a statistically valid random sample).

The analysis of sketch-maps varies tremendously in conjunction with the purposes of the research. Many researchers report aggregate maps (Lynch, 1960; Saarinen, 1976), often without indicating how the aggregates were derived. Some analyses are conducted to distinguish regions or territories (Lee, 1970, 1978; Everett and Cadwallader, 1972; Greenbie, 1975). Golledge, Rivizzigno and Spector (1976; see King and Golledge, 1978, pp. 329-331) used multidimensional scaling to determine patterns of distortions in sketch-maps. Still others analyzed maps for difference across groups (Appleyard, 1976; Francescato and Mebane, 1973) or over time (Kaplan, Wapner, and Cohen, 1976; Beck, Cohen, Craik, Dwyer, McCleary and Wapner, 1973; Evans, Marrero and Butler, 1981).

A final area of research in this category does not directly ask for an external representation, but calls for judgments concerning images.

Steinitz (1968) had subjects evaluate areas on a map for three categories of meaning -- type, intensity, and significance -- and correlated subject responses with an independent evaluation of the activities in the areas. Milgram, Greenwald, Kessler, McKenna, and Waters (1972) asked subjects to place photographs in the correct borough, neighborhood, and street of New York City. Donnelly, Goodey, and Menzies (1973) chose peripheral elements of Sunderland (England) and asked subjects if these elements were, in their image, a part of Sunderland.

Indirect judgmental tasks. Procedures in this category are further removed from behaviors in the environment and do not directly examine external representations. Instead, these studies make inferences about the internal representations of the subjects. Most of these methods rely on factor or cluster analyses to simulate the underlying structure upon which subject responses are based.

Winkel, Malek, and Thiel (1969, 1970) used adjective rating scales to determine the relation of perceptions of roadside quality to experimenter manipulation of the elements in slides of a road. Lowenthal and Riel (1972a, 1972b, 1972c) conducted extensive research on the interrelation of adjective attributes in various settings with various groups. Donnelly, Goodey, and Menzies (1973) asked subjects to rate photographs of houses on a favorable-unfavorable scale and thus determined the subjects' attitudes toward various neighborhoods. Another technique relies on the sorting of visual or verbal stimuli into categories of related meaning (Hayward, 1977; Zube, Pitt, and Anderson, 1975). Finally, personal construct theory (Kelly, 1970) is the basis for an extensive line of research which attempts to delineate underlying constructs in subjects using the semantic differential technique and multidimensional scaling analyses (Downs, 1970; Harrison and Sarre, 1971; Silzer, 1972).

Historical reconstructions. Despite the fact that this category is at an extreme end of the continuum, the value of the work should not be underestimated. Trans-historical and trans-cultural insights concerning images are seldom based on quantifiable phenomena, but they serve to generate a fuller understanding of environmental knowing beyond the limitations of an experiment conducted in one time or place. A major contribution to the environmental knowing literature comes from these works and could not be provided elsewhere.

Strauss (1961) established a precedent for work of this kind with his volume on Images of the American City in which he discusses commonly held images about the attributes of cities. The writings of J. B. Jackson (Zube, 1970; Zube and Zube, 1977), appearing in Landscape from 1951-1969, are overflowing with insights about the nature of landscapes, towns, and cities. Tuan's work (1974, 1977) highlights the nonquantifiable aspects of symbols and images in the perception of environment, with particular interest paid to cross-cultural comparisons. And, a series of edited articles in Moore and Golledge's Environmental Knowing (1976, pp. 259-294) uses novels as a basis for understanding the history of environmental knowing.

In sum, the variety of methods used in studying environmental knowing offer different perspectives for viewing images. Depending upon the goal of the research and upon the constraints in the research setting, certain types of measures will be more appropriate than others. However, as a result of this diversity, a problem arises when trying to compare research efforts that have used different measures. In addition, the methods which take measurements more closely to the environment are preferred for the increased accuracy that they provide.

C. Research Issues in Environmental Knowing

The conceptual and methodological issues discussed in the first two sections of this review provide a framework for the dissertation research. In addition, prevalent questions in the environmental knowing literature have influenced the objectives of this research. These issues concern: 1) the formation of images; 2) individual differences and images; 3) the relationship of environmental features and images; 4) the link between images and behavior; and finally, 5) the application of image research. This review of research topics in environmental knowing summarizes current progress in the field so that errors can be avoided and advances utilized. Each of these issues is discussed in turn.

1. The formation of images. Although the formation of images is most often examined in terms of child development, the question is also relevant to the formation and reformulation of images in adults. These two perspectives will be addressed separately, but the possibility that similar processes are involved for both is examined.

The development of images in children. The interactional-constructivist approach briefly introduced in an earlier question dominates the literature in environment and behavior on the development of images. This is mostly due to the work of Moore (1975a, 1975b, 1976a, 1976b;

Hart and Moore, 1973), but is based on extensive work by Piaget and his colleagues (Piaget and Inhelder, 1956; Piaget, Inhelder, and Szeminska, 1960; see Hart and Moore, 1973, pp. 257-269) and is supported for the most part in reviews by Shemaykin (1962), Siegal and White (1975), and Evans (1980).

Moore explains what is involved in the constructivist position:

> In adopting this constructivist position, we are taking the position that as there is no way to apprehend the nature of what we take to be "the environment" except through the minds and actions of persons, and as there is no way to separate the nature of "reality" from the knower, from the stages in the act of coming to know this reality, and from the cultural and linguistic community, it is impossible to separate the process of knowing from the resultant knowledge. (1976b, p. 141)

The constructive process is based on the interaction of a large number of complexly related variables (Moore lists fourteen, 1976b, p. 142) which can be divided into two groups:

> Our list of variables that affect environmental cognition can be analytically collapsed into two major categories; we may say that the development of environmental cognition is a function of <u>intra-organismic factors</u> and <u>external environmental or situational demands</u>. The phrase "external environmental demands" is not meant to be limited to the strictly physical environment, thus omitting the effects of the social and cultural environments, prevailing public attitudes, mass media, and so on. (Moore, 1976b, p. 142)

Moore also emphasizes that learning is based on both actions and transactions with the environment and that not only does the <u>amount</u> of knowledge increase with development, but so does the <u>organization</u> of knowledge.

There is general agreement that children develop abilities to store more knowledge and to organize that knowledge more efficiently. Moore

(1976b) divides these abilities into three stages: an undifferentiated egocentric reference system, differentiated and partially coordinated subgroups based on fixed references, and operationally coordinated and hierarchically integrated representations. These stages are related to the three types of spatial information which develop in children as outlined by Piaget: topological, projective, and Euclidean space (Piaget and Inhelder, 1956; Piaget, Inhelder, and Szeminska, 1960). Moore's work is quite thorough and relates several other schemes to his own; these include Shemaykin's (1962) model which calls for prerepresentational, route-type, and survey-type representations, and the work of Siegal and White (1975) which emphasizes the retention of landmarks, then routes, and finally configurations or patterns.

Although there is not exact agreement concerning the developmental stages and ages at which they occur, the research in this area supports the common notion that changes occur in theoretically discrete stages. Piaget, Inhelder, and Szeminska (1960) asked children to perform tasks on models of a school which required the rotation of spatial representations. They found an egocentric orientation in the youngest group (up to age seven), a partially organized system of orientation based on landmarks for another group (seven to nine and one-half years), and a more complete knowledge of spatial organization in the older group (eight to twelve years). In a series of experiments conducted by Pick and colleagues (Pick, 1972; Hardwick, McIntyre, and Pick, 1976; Hazen, Lockman, and Pick, 1978) children's representations of smaller-scale environments were examined with similar results.

While in general agreement with theories concerning developmental stages of spatial representations, Blaut, McCleary, and Blaut (1970) presented evidence that young children can perform rather sophisticated mapping functions given certain tasks. They tested the ability of first-grade children to interpret vertical aerial photographs which approximated maps. Both children from the United States and a smaller sample of Puerto Rican children exhibited abilities to perform tracing and navigational tasks using the photos. This experiment suggests that the nature of the task in the research cited above could have been the cause of an apparent developmental difference.

The formation of adult images. Moore (1976b) suggests that the theory of development of spatial knowledge is applicable to the formation of images for both children and adults:

> The above formulation, three-stage model, and genetic-structural explanation have so far been limited in their application to the description and possible explanation of ontogenetic developmental progressions on strictly spatial environments. But the findings of a number of studies on children's and adults' environmental cognitions along with general interpretations of cognitive-developmental and individual-difference theory, have led me to believe that this formulation may be phrased in more general structural terms, and that such a developmental progression may apply not only to ontogenetic developmental changes, but also to microgenetic developmental changes, to developmental differences between individuals, and to developmental variations within the same individual...(1976b, p. 153)

Evidence for stages in the formation of adolescent images is provided by Moore (1975b) in a study of maps produced by high school students. He had judges classify sketch-maps of Worcester, Massachusetts by their level of representation of space. High interjudge agreement indicated that subjects exhibited higher levels of spatial representation for familiar areas than for unfamiliar areas.

Appleyard (1970, 1976) was also able to distinguish differences in the sketch-maps of citizens of Ciudad Guyuana, Venezuela. He found that subjects related parts of the city in one of three ways: associational, topological, or positional. These categories are quite similar to the developmental levels cited in the child literature, but the differences for adults are based on familiarity.

Evans, Marrero, and Butler (1981) conducted a longitudinal study which tested for types of changes in the microgenetic development of spatial representations. A group of students drew sketch-maps of their campus (University of California, Irvine) and another group drew maps of Bordeaux, France (while on a study abroad program) in their first two weeks in the environment and ten months later. Their findings confirm much of the theory discussed to this point: students made use of landmarks in the initial maps, but later used more nodes and paths in their sketches; also, students exhibited an increase in Euclidean accuracy in their second maps.

Although there are parallels between the formation of spatial representations in children and adults, the match between ontogenesis and microgenesis is far from complete. Siegal and White (1975) point out that, for example, children have smaller capacities for information processing and are less adept at perceiving "decision-relevant cues." Nonetheless, the considerable body of research on the development of spatial representations in children and adults offers a valuable picture of stages of development which reflect abilities to represent the environment and act in that environment.

2. The relationship between individual differences and images. There are three facets to this issue which merit close examination. First, in an experimental task, do the perceptions of the task and/or the skills of an individual affect that individual's response? This question involves a methodological concern which is basic to all research in environmental knowing. Second, are there groups of individuals with similar characteristics which share common perceptions and experiences so that their images differ from other groups' images? The question implies a concern with the factors which predicate group differences. And third, do various cultural groups perceive and store environmental knowledge differently? While the previous issues concerned groups sharing similar environments, this question involves cross-cultural comparisons. There are no exact means for completely distinguishing these facets, but for convenience, each issue will be addressed individually.

Individual differences. In the case of a map-drawing task, an individual's experience with maps, reliance on their use, and graphic abilities could have noticeable effects on the performance in that task. Other methods used in the study of images are subject to similar biases depending on the nature of the task. Little research has been conducted in this area, so it is difficult to estimate the extent of the bias introduced by individual differences in task performance.

Rothwell (1974, 1976) sets an example for incorporating measures of individual differences into mapping research. In addition to providing free hand floor plans of their apartments, he had adult subjects complete graphic and spatial ability tests and their children perform a "draw-a-map" test. He found a small but significant correlation (.14) between abilities and accuracy of maps for the adults, and a more substantial correlation (.64) between the children's abilities and their accuracy in producing maps.

In a series of three experiments, Kozlowski and Bryant (1976) used a self-report on "sense of direction" to determine individual differences. They found significant correlations between these self-reports and performance in pointing out directions on a map, estimating distances and travel times, and performing directional tasks in a maze.

Moore (1975a) administered a battery of six tests of verbal, numerical, and spatial abilities. He compared the results on these tests with the level of sketch-map drawn, based on his theory of three levels of representations. Moore concludes that general intelligence as measured by the verbal and numerical tests was not related to cognitive abilities, but that a measure of spatial relations ability was highly correlated with the ability to draw representations.

Group differences. Grouping individuals by age, sex, years of experience, income, education, and so on, is consistently done in most social science research; the literature on environmental knowing is no exception. The findings often indicate differences in responses about environmental knowledge in all groupings, although some more (e.g., income) than others (e.g., sex). A single explanation for many of these findings is that differences are caused by different experiences between groups. Various groups (e.g., lower income, younger, or female) traditionally have more limited access to a range of environments, while others (older, higher income, or male) have had a less restricted, more mobile access to environments.

Appleyard's work (1969, 1970, 1976) in Ciudad Guayana, Venezuela, has already been mentioned and will be discussed in greater detail in a later section. Relevant to the present topic is his analysis of sketch-maps of residents of the city. Appleyard attributed the differences in the maps to cognitive differences, travel mode, and familiarity. The cognitive differences are individual characteristics as discussed earlier; travel mode and familiarity are related to experience with the environment, which is defined above as an influential "group" characteristic.

Group differences based on familiarity are also reflected in the environmental knowledge of neighborhoods as Saarinen comments:

> Strikingly parochial viewpoints commonly appear when people are asked to draw maps of regions or express preferences for places. Generally, the areas closest to the location of the individual are sketched more accurately in terms of shape, and greater detail given. (1976, p. 243)

It is difficult separating neighborhood location from some other factors such as income or ethnic background, but evidence of the relationship between location of residence and images is strong. Horton and Reynolds (1971), Andrews (1973), and Orleans (1973) present evidence of this relationship, once more attributing the effect to differences in experience with the environment.

Cultural groups. Groups isolated from one another by large distances and infrequent communication have different ways of knowing the environment. Saarinen explains:

> In the process of adjusting to the environment, each culture selects from an infinite array of possibilities a certain set of categories to describe and explain what is there. These categories become part of their system of communication and thus structure for succeeding generations which aspects of the environment are attended to. (1976, p. 11)

Much of the research in this area is beyond the range of this review. Hall (1959, 1966) has highlighted the differences in non-verbal communication across cultures. Kates (1970) reviews the variance in research results on human perception in different cultures. And, Tuan's work (1974, 1977) was cited earlier as an example of comparative work in environmental perception based on a variety of sources ranging from research, to history, to novels.

The research on individual differences indicates the importance of knowing certain critical characteristics of the subjects in environmental knowing research efforts. A task requiring sophisticated skills will be confounded by the subjects' abilities to perform the task unless those abilities can be measured and used as covariates in the data analyses. All tasks are based on experiences with the environment, therefore information on the background of the subjects is also critical to distinguish groups which might exhibit differences in their responses. And, although many of the findings on individual differences can be attributed to cognitive differences or the effects of experience, measures of age, sex, income, race, and so on, cannot be eliminated as possible covariates in studies of environmental knowledge.

<u>3. The relationship of environmental features to images.</u> The results of a research project are dependent upon any number of influences. Methods, developmental stage, individual differences, and group differences have

been the focal variables to this point. The type of environment is also a key influence which warrants attention. In his discussion of the current state of environmental knowing research, Moore (1979) cites the relationship between environment and images as an area of study which is lacking in the literature:

> The role of environmental differences in environmental cognition has barely been scratched and yet is incredibly important for an <u>environmental</u> psychology and for applications to any environmental problem solving and change, for example, through architecture or urban planning. Of the hundreds of studies available on environmental cognition, only a handful explicitly look at physical or social environmental conditions in any attempt to ascertain the role of sociophysical environmental variables. (p. 63)

In reviewing research on environment and images, two goals stand out: the goal of comparing environments and elements of environments to find what distinguishes one from another; and, a further goal to extend these findings in order to understand the nature of generalized environmental images and preferences. The latter goal will be discussed after the presentation of research evidence comparing environments and elements of environments.

<u>Comparisons of environments.</u> Lynch (1960) initiated work in images of cities with his comparison of three cities -- Boston, Jersey City, and Los Angeles. He rated these cities on their "imageability," or "that quality in a physical object which gives it a high probability of evoking a strong image in any given observer" (p. 9). Lynch found this quality to be virtually absent in Jersey City, lacking in Los Angeles, and full, but confusing, in Boston.

As mentioned earlier, a considerable number of researchers have followed up on Lynch's work (see Kates, 1970). Working in the Netherlands, DeJonge (1962) concluded that image formation was easier in cities with regular street patterns. Francescato and Mebane (1973) supported DeJonge's research, finding Milan's radial street pattern easier to perceive than Rome's hilly, diverse pattern. Tzamir (1975; see Evans, 1980) manipulated a scale model of a city, varying the length and angles of paths. Subjects viewed a videotape of the model and produced sketch-maps which were consistent with Lynch's and others' findings: errors were more prevalent in maps drawn of the irregular patterns than those drawn of the regular configurations.

Approaches other than sketching maps have been used to compare the influence of overall configuration to images. Zannaras (1973a, 1973b, 1976) compared three cities in Ohio with differing patterns: a zonal distribution of land uses, a sectoral distribution, and a mixed distribution. She had subjects trace a route (on a map or scale model) from the periphery of the city to the city center. In addition, the subjects indicated relevant environmental cues as they traversed the route. The findings indicated that street patterns were highly influential in the choice of important cues, more so than any of the measured personal characteristics of the subjects.

Baird, Degerman, Paris, and Noma (1972) also diverged from the sketch-map paradigm, asking subjects to "design" hypothetical towns. The subjects placed sixteen facilities (e.g., home, school, shopping center, factory) on one of four grid patterns (linear, U-shaped, square, or circular). They found general agreement about the location of facilities for all the patterns. However, these results represented "ideal" plans rather than existing ones. When using one pattern (the square) and asking subjects to take on one of five roles (homeowner, factory owner, police chief, school superintendent, or shopping manager), they found radically different plans depending on the role.

A final direction for overall comparisons involves indirect judgmental tasks. As an example, Lowenthal and Riel (1972a, 1972b, 1972c) asked subjects in four cities (New York, Boston, Cambridge, and Columbus, Ohio) to rate stimuli in their cities on 25 environmental attribute pairs (e.g., ugly-beautiful, old-new, ordered-chaotic). Using factor analysis, they cited similarities and differences in the factor structure of the evaluations in each city. They explain the differences as a part of experiences and expectations about the environment:

> These normative configurations of environmental context make up the patterns within which experience occurs and through which it filters into behavioral response, and help to explain why we behave as we do in environments that we see as we do. (1972b, p. 36)

Comparisons of elements. Within the overall configurations of cities, types of elements receive varying amounts of attention and stand out differentially in images. The work cited earlier comparing irregular and regular street patterns (DeJonge, 1962; Francescato and Mebane, 1973; Tzamir, 1975) also reported differences in the relative importance of elements. Specifically, landmarks play a more important role in the images of cities with irregular patterns and paths are more influential in cities with regular patterns. Also cited earlier was work on the development of images which concluded that landmarks are the most easily retained aspect of environments, followed by routes, and finally configurations or patterns (Piaget and Inhelder, 1956; Piaget, Inhelder, and Szeminska, 1960; Siegal and White, 1975).

Carr and Schissler (1969) analyzed the elements which subjects recalled in a drive on an urban freeway in Boston. They found that the time in view and the relative dominance of elements increased the probability of their inclusion in memory, and therefore, the probability of their recall. Dominance was based on judges' ratings and took several factors into account: probability of known identity, ease of labeling, amount of competition from other elements, size, and uniqueness. Applying these measures to data obtained on another Boston freeway, Carr and Schissler were able to predict which elements were remembered using time in view (correlation, .55) and increase their prediction using dominance as a factor (multiple correlation, .71).

Appleyard (1969, 1976) examined the characteristics of elements in Ciudad Guayana, Venezuela to determine "why buildings are known." Correlations were calculated between subject recall of buildings in the city and independent ratings of their distinctiveness of form, visibility, use and symbolic significance. In a complexly related data set, he found that all aspects of a building were related to the probability of its recall:

> Inhabitants directed their attention to all kinds of buildings: those with dominant and imageable forms, those at decision points on the transportation system, those that were highly used, and those of community significance. No single level of interpretation of mode of viewing dominated. (1976, p. 86)

Appleyard used his findings in the planning and design of Ciudad Guayana, a topic for discussion later in this review.

Winkel, Malek, and Thiel (1969, 1970) exerted greater control in their research by manipulating the design features of slides of roads. They prepared five conditions for viewing: the road unchanged; all billboards removed; utility poles/overhead wires removed; both billboards and utility poles/wires removed; and signs, billboards, and poles/wires all removed. Subjects least noticed the absence of billboards and most often detected the removal of utility poles and overhead wires. Also collected were evaluations of the slides using bipolar adjective ratings with results indicating pronounced changes in evaluations with the removal of the elements. Jones (1972) also removed cues from a series of slides to compare subjects' abilities to navigate a road and locate a freeway. The removal of freeway structures (e.g., ramps, bridges) from the slides significantly hindered the subjects' performances, while the removal of high-rise buildings did not. A more subtle manipulation of cues would probably provide more useful findings.

General images. Results from the comparison of environments and elements are used to hypothesize about generalized images of the environment. A preference for regular street patterns, the use of landmarks, and the dependence upon certain cues implies a prior knowledge of cities on the part of subjects. Devlin (1976) explains in a study of newcomers to a small town:

> The rapidity of cognitive mapping formation suggests that these participants had prior knowledge of cities in general which they were able to call on in coming to understand this particular town. (p. 66)

She provides several examples of this generic information:

> In particular, roads reveal extensive although relatively subtle information about the likely location of various functions. A street named "Main"

> communicates many messages. Streets at a nonperpendicular angle to a major grid pattern suggest divisions, much as the railroad tracks and the river do...
>
> Generic urban information also leads to expectations of the locations of certain functions and their groups. Restaurants are likely in the vicinity of hotels and motels, grocery stores are likely near residential areas, and so on. (p. 66)

Beck and Wood (1976) followed students travelling to several cities and examined how they formed urban images. They found experience to be the key variable in the formation of generalized images:

> The more you have travelled to other cities, the more you acquire general knowledge of the way cities are organized. Jeremy Anderson first suggested that this generic knowledge leads to a greater appreciation in the seasoned traveller as to where downtown is; where north, south, east, and west are; where the train station is; and so forth. This is picked up through more practice with different kinds of patterns and ultimately leads to the generalization of generic-to-specific pattern recognition and cognition. (p. 208)

Finally, S. Kaplan (1976) proposes a model of mental activity for linking specific images of environments to a more generalized image. He describes layers of mental activities:

> The first layer would receive feature information from the sensory analyzers. This layer would presumably come to contain a model of the environment closely tied to sensory experience...
>
> The next layer presumably would receive inputs from the prior layer. It thus will come to contain a model of a model of the environment. In this way, it should be possible to develop internal representations of classes of objects and of regions of maps. Higher and higher layers would be less and less closely bound to sensory events. (p. 38)

Very little research has been conducted in this area (the work cited earlier by Baird, Degerman, Paris and Noma comes closest), because it is not clear how data about generic information can be obtained. Yet, an understanding of the generalized image of environments would be of great advantage in the application of research on imagery to designing and planning environments.

4. The relationship between images and behavior. In the preface to their volume on environmental knowing, Moore and Golledge state two goals behind the development of the field:

> The field of environmental perception and cognition developed as part of the desire, first, to understand the relations among human experience, behavior, and the large-scale sociophysical environments in which we carry out our daily lives, and, second, to contribute to improvements in the quality of life to the degree that this can be achieved through environmental interventions. (1976, p. xi)

Research in this area has not always followed through on these goals. The studies cited in the previous section were mainly concerned with the characteristics of environmental knowing and the relation of images to individual, group, or environmental variations. This section addresses the issues involved in studying the relation of image to behavior, another much needed research area cited by Moore:

> Finally there is the issue of thought and action, of the role of environmental cognition on subsequent behavior. Again, except for the few studies of market behavior and interurban migration, we have scant data on the relationship of environmental cognition and subsequent urban behavior. But the importance of predicting and understanding urban spatial behavior would argue strongly in favor of such research. (1979, p. 64)

When Boulding (1956) first defined "the image," he clearly stated the hypothetical relation of image to behavior: "The first proposition of this work, therefore, is that behavior depends on the image" (p. 6). This connection has been repeatedly emphasized in the environmental knowing literature as indicated by the quote from Moore and Golledge and echoed by countless reviewers (for examples, see Downs and Stea, 1973, p. 9; Lee, 1975, p. 178). This relationship between image and behavior is also prescribed in the theories of environmental knowing reviewed in an earlier section.

Despite the general agreement that image and behavior influence each other, Pocock and Hudson (1978) discuss the lack of research evidence linking images to action:

> Thus, having briefly explored a variety of approaches to spatial structure and behavior, a consistent pattern has emerged in that each of these makes assumptions as to peoples' knowledge and aims rather than directly investigating them...
>
> Numerous conceptual schema have been proposed linking up environmental images, learning, sources of knowledge and behaviour. But empirical studies of the links between images and behaviour are rare. Such links are usually left as an implicit assumption rather than being explicitly developed. (p. 13)

This is a serious criticism of the environmental knowing literature. Without an established relationship between images and human behavior, the application of research on environmental knowledge to environmental intervention is, for the most part, meaningless. Therefore, the utility of the research cited up to this point rests upon a theoretical assumption which lacks research evidence in its support.

Examples of research which link image to behavior are reviewed in this section, followed by studies which go one step further in applying research to planning and designing environments. However, a note of caution about the relation of image to behavior must be expressed. As theorized in the question on models, the image and the environment interact through the processes involved in environmental knowing --

planning, perceiving, acting, evaluating, and so on. This chapter deals primarily with actions at the expense of other stages which practically cannot be separated from one another. Many of these aspects of environmental knowing are examined in literatures not reviewed in this paper -- environmental values, preferences, satisfactions, and so on.

Some of the research discussed in the methods category "experimenter observation in naturalistic or controlled situations" touches upon the relation of image to behavior. The works of Appleyard, Lynch, and Myer (1964), Carr and Schissler (1969), Jones (1972), and Golledge (1973a, 1973b, 1976) examined the relation of behaviors to the perception of "cues" or "elements" in the environment. While other research involves assumptions about behaviors made from data about images, this research involves the opposite, assumptions about images from data on behavior. Therefore, this research cannot sufficiently establish the relation between knowledge and action.

Kates (1970) also attempted to infer information about environmental knowledge from actions. The example he chose was the comparison of human adjustments to hazard, drought in this instance. Kates reported on his study of farmer perceptions in Tanzania and Saarinen's work on the farmers' perceptions of drought in the Great Plains of the United States (also see Saarinen, 1976). The United States' farmers utilized adjustment strategies related to farm practices and technological solutions; the Tanzanian farmers offered fewer adjustment strategies and those that they did suggest involved a change in their lifestyle. Kates explains:

> Thus the major contrast that emerges is between a flexible pattern with an unchanging agricultural practice as opposed to a more rigid life pattern with an adaptive agricultural practice. These

> behavioural patterns are suggestive either of alternative perceptions of nature itself or of opportunity for mobility. The Tanzanian farmer seems willing to move with an uncertain nature; his American counterpart appears ready to battle it out from a fixed site. (pp. 657-658)

Lee's theory of "socio-spatial schemata" (1970, 1978) describes the process during which an individual consults his/her image and determines what actions to take:

> More obviously, however, we have to refer to our spatial schemata to be apprised of the whereabouts of the object and how much energy will need to be expended in reaching it. It is this subjective phenomenal calculation, based on a unique and personal perception of the world, that determines whether we move towards a goal. (1978, p. 60)

An example from the work reported by Lee illustrates his success in linking images and behavior. "Brennan's Law" refers to a phenomenon observed shortly after World War II in which Brennan found "that housewives prefer to use shops in a downtown direction even when these are not the nearest" (Lee, 1978, p. 64). Lee was able to replicate Brennan's findings in the field and in a laboratory setting. He explains the "law" in terms of images, or as he calls them, "socio-spatial schemata:"

> It seems necessary to have recourse to a theory such as the socio-spatial schema with a subjective metric that is partially governed by the value attached to the objects within it. Thus, the satisfactions provided by the center will impose a focal orientation in the city schema and a general foreshortening of all distances in a downtown direction. (1978, p. 64)

A recent research effort by Holahan and Dobrowolny (1978) attempted to integrate two disparate emphases in environment and behavior -- cognitive mapping and behavioral mapping. By cognitive mapping, they refer to the work begun by Lynch (1960) and continued by others (see Kates, 1970; Downs and Stea, 1973). Behavioral mapping is a procedure popularized by ecological psychologists (see Barker, 1968) and utilized by a variety of researchers (see Bechtel, 1970; Ittelson, Proshansky, and Rivlin, 1970; As, 1975). Holahan and Dobrowolny point out that:

> Unfortunately, the historical tendency within environmental psychology has been for cognitive mapping research to proceed in strict conceptual and methodological isolation. (p. 318)

Their research involved the collection and comparison of cognitive and behavioral data from students on a college campus. After sketch-maps were drawn by a group of students, they were asked a series of questions concerning where they would prefer to go on campus to sit, to talk, and to find a large number of people. To compare self-reports with actualities, collective behaviors of students (not necessarily the subjects) were obtained using a behavioral mapping technique. They found a high correlation between the accuracy of the sketch-maps and the measures of behavior:

> While the data indicate marked discrepancies between cognitive maps and the actual campus setting, they demonstrate further that such distortions, rather than reflecting random error, bear a consistent and interpretable relationship to patterns of environmental behavior. This relationship was evident for a range of apparent "errors" in mapping, including distortions in map borders, exclusions of spatial features, size discrepancies, and displacement of the campus center. (p. 331)

The work cited in this section suggests that there is a potential in the study of the relation of environmental knowing to behavior, but that current examples are few in number. Yet, the delineation of this relationship is important in establishing the validity of image research. The results of this dissertation shed light on the relationship of image to behavior. In addition, this link provides a basis for using the image in planning and designing environments, the final issue addressed in this review.

5. The application of image research. There is a critical conceptual "gap" between the professional planner or designer and the user, as described by Appleyard:

> The paradox is that as planners become more adept and sophisticated at conceptualizing the so-called objective city -- through the use of aerial photographs, maps, statistics, and mathematical modeling -- their conceptual distance from the inhabitant's subjective personal city usually increases. The trained person cannot see the city with an eye innocent of the concepts, vocabulary, and media of his profession or discipline. (1976, pp. 1-2)

The purpose behind the study of environmental knowing must be to help bridge the "gap" described by Appleyard, in other words, to apply this research to the design and planning of the environment. As Stea (1974) explains, the utility of this area of research lies in the researcher's success in interpreting findings for architects and planners:

> Similarly, to be useful to the environmental designer, cognitive mapping research must predict the behavior -- whether it be overt responses or impression formulation -- of the individuals experiencing designed environments. To date, however, most research has been descriptive; it describes how people are responding to an existing environment, but says little, directly, about how they might respond to a new environment in the future. And it is the latter issue in which the architect and urban planner are most interested. (p. 166)

In order for researchers in environmental knowing to assist planners and designers to better understand the perceptions and needs of the users, serious frictions between the researcher and the professional must be overcome. The most pressing problem is the communication of research results (predominantly quantitative or semantic information) into design solutions (generally qualitative or visual information) (Ostrander, 1974). Additional problems are cited by Ostrander (1975), including differences in time frame, criteria for acceptable data, work norms, and professional "territoriality."

As strategies for handling these problems evolve, a new relationship emerges between the researcher, the planner or designer, and the user. As Porteous (1977) views the history of planning, a change from planning <u>for</u> people to planning <u>by</u> and <u>with</u> people takes place. Once more, Moore (1979) points out the need for and benefits to applying this area of research:

> Very little has been written about the implications of environmental cognition research for environmental change. The area of study is ripe, however, with design-relevant ideas which could be formulated in terms of design principles. Such an effort would also point out gaps in information where the current state of theory and research is lacking for urban application, and what research needs to be done to better respond to the types of questions architects and planners ask. (p. 64)

Examples, varying in scale from a small park to a region, where the researcher communicates his/her estimation of the needs and perceptions of the user to the professional are presented in this section. However, none of these stand out as perfect examples of researcher-designer-user collaboration. Often only two of the three groups took part in the process. At other times, recommendations were distorted due to miscommunications, or ignored because a higher priority was placed on other considerations (e.g., economics, zoning regulations, ecological considerations; see Lynch, 1976). Still, these are the clearest cases where research on images has been applied to environmental intervention.

R. Kaplan (1978) outlined a mode of participatory planning used in the design of a small urban vest-pocket park. Landscape architects developed scale models of three possible designs for an area designated for development as a park. A series of photographs were placed on display in the nearby savings bank and the library and a questionnaire was used to elicit comments and preferences. The data were used in the creation of a final design which consisted of parts of all three proposed designs.

Hayward and Wallis (1973) proposed improvements in the Herald Square/Greeley Square area of New York City based on "perceived needs." It was their contention that: "Improvements, if they are to be perceived as such, must not simply be functional, but must also consider existing cognitive images of the area" (p. 2). They defined four psychological issues (cognitive image, affect, orientation, and tempo) as they relate to five environmental design parameters (walking space, vertical transport, visual field, amenities and sensory characteristics) and several "non-design" parameters (e.g., special events, security). In conclusion, they provided speculations of possible improvements which translated perceived needs into meaningful suggestions for planners.

Appleyard and Lintell (1972) applied their research to a larger-scale setting, a city block. They compared three residential urban streets differing in traffic volume. In interviews, varied perceptions of the residents from the "light" to "moderate" to "heavy" streets were found. For example, persons living on the "light" street had more social interactions, a greater feeling of safety, and an increased perception in the size of their "home territory." A proposal which resulted from this study was adopted by the City of San Francisco; "protected residential areas" were defined for the city:

> These are areas which will be protected from through traffic by policies such as the improvement of public transit; the concentration of traffic on the city's main arteries by increasing their capacity...; and the blocking of through traffic by devices such as rough pavement surfaces...(p. 99)

A second proposal suggests how environmental intervention can ameliorate some of the ill effects caused by traffic in streets where traffic volume cannot be reduced.

Porteous (1977) provides an example of how to apply information about the image of a "territory," in this case the "turf" of a youth gang in Victoria, British Columbia. Using sketch-map and interview results, he delineated the territory of the gang and proposed a site for a youth "drop-in center" to be located in the center of their turf. The desired result was that the gang utilize the facility (however, no data is provided as to the success of the strategy). The designation of territories has been endlessly used and often abused in the social sciences (see Saarinen, 1976, pp. 69-96; Porteous, 1977, pp. 68-90). The research in environmental knowing is no exception as sketch-maps are continually analyzed to form composite or group perceptions of a neighborhood. If the complexity of the concept of neighborhood is recognized, and the limitations of sketch-maps kept in perspective, then this technique can be cautiously applied to design and planning.

A study of the locatability of photographs of New York City was already briefly discussed. Milgram, Greenwald, Kessler, McKenna, and Waters (1972) found that subjects could better identify a photograph's location (borough, neighborhood, and street) if it was in Manhattan.

They proposed that recognition is a function of centrality of population flow and distinctiveness in social or architectural terms. The conclusion suggests an application for these findings:

> There is a moral here for the outlying boroughs. The construction of identifiable monuments in their neighborhoods, the addition of distinctive decorative touches to their houses, and the emphasis on local color would help them emerge from the gray, nondescript character they now possess into more vivid, exciting locales. (p. 200)

The work of Appleyard and his colleagues has been continually cited in this review. By far the most extensive effort using research in environmental knowing as a planning tool is their work in Ciudad Guayana, Venezuela. Beginning in 1961, representatives from the Joint Center for Urban Studies of M.I.T. and Harvard participated in the planning of this small city (30,000 people) destined to become a major urban area (an estimated 600,000 people by 1980). Portions of the planning process included research on "why buildings are known" (Appleyard, 1969) and "the styles and methods of structuring a city" (Appleyard, 1970); in both cases, planning recommendations were formulated on the basis of extensive interviews with residents of the city.

It would be impossible to do justice to the full scope of the planning effort in Ciudad Guayana in a few paragraphs. However, some excerpts from the recommendations in Appleyard's Planning a Pluralist City (1976) can serve as illustrations, beginning with an overall goal:

> If we can identify the characteristic styles and methods that each population group adopts in perceiving the city, we should be able to suggest policies for shaping a relevant form for the city. The intent is not to bring groups into line with some common model but to raise the effectiveness of each group's relation to the city on its own particular terms. (p. 226)

A specific policy proposal is as follows:

> To encourage the awareness and interest of the essential middle-income elite of the city and to assure them of stability and security. (p. 226)

Examples of ways to incorporate the policy are:

> Plan identifiable residential areas for the upper- and middle-income groups in fine locations but not isolated or inaccessible from other population groups...
>
> Provide a greater choice of quality environments throughout the city rather than only in elite areas... (p. 226)

Another policy proposal:

> To enable the less educated to structure the city more easily and learn about other social groups, job opportunities, and educational and other facilities. (p. 226)

And ways to institute the policy:

> Locate low-income residential areas near major cheap transportation routes and higher-income neighborhoods...
>
> Design the city's layout as a simple basic structure that can be schematized easily without the loss of essential elements... (pp. 226-227)

One more policy proposal example:

> To help the newcomer learn the city and to maintain the interests and involvement of the long-term inhabitants. (p. 227)

Strategies for implementation:

> Publicity about Ciudad Guayana in other parts of Venezuela should be a coherent part of the city's development program and should disseminate realistic information about the difficulties as well as the benefits of living there... (p. 227)

What the results of Appleyard's planning recommendations were is not known, so the effectiveness of this effort cannot be substantiated.

Still, the thoroughness with which he approached the study of Ciudad Guayana serves as the best example of the integration of image research with applied needs.

D. Conclusions

Environmental knowing is a growing field of study which encompasses a broad range of topics. The research evidence is far from conclusive on any specific issue, but some trends in the literature have been identified in this review. Each of the sections in this review have pointed to progress and problems in the field which must be kept in mind when evaluating a research project or formulating a research design.

Regarding conceptual issues, research in environmental knowing should be firmly based on advances in cognitive psychology and the relatively more recent history of environmental knowing. A theoretical model is essential for guiding the researcher in developing the research design and particularly in choosing measures of image. Complex methodological issues concern the problems which accompany the use of a variety of methods including the difficulties involved in comparing research results based on a variety of methods. A taxonomy of image research is provided in this review as an aid to better understand the relationship among methods of measuring image. And, several research issues are most commonly investigated in the image literature including the formation of images, the relationship of individual differences and images, and how environmental features relate to images. Two issues which are focused upon in this research are the relationship of image to behavior and the applications of image research.

Out of necessity, many fruitful areas of research have been excluded from this review, including environmental evaluation, preference, and satisfaction. Despite these omissions, it is possible to make some general statements about research on environmental knowing.

First, the information that an individual brings to a situation is his/her image. It has physical, social, and cultural referents. The image is an influence in that individual's transactions with that situation. These transactions include perceiving, formulating needs, making plans, acting, and evaluating.

There are many means available for measuring images and each method has some merit. Depending on the goal of the research, some measures are more appropriate than others. The choice of methods is a major decision which can influence the shape of the results and affects the possibilities for comparisons with other research.

The formation of images and, therefore, the measurement of environmental knowledge is affected by a complexly related group of variables involving the individual and the nature of the environment. While it is impossible to control for <u>all</u> of these factors in a research design, efforts must be made either to limit these sources of variance or to include them as covariates in the data analyses.

Finally, there is a definite potential for applying this research to the planning and design of environments <u>with caution</u>. At this stage in the development of the field it is not advisable to develop standards or to propose universal solutions. For now, each planned environmental intervention should involve a review of relevant theory and research, data collection and analysis, and a transfer of the information into terms meaningful for application.

CHAPTER II

RESEARCH CONTEXT AND OBJECTIVES

The review in Chapter I introduced a series of researchable questions derived from the image literature. These questions concern: 1) the formation of images; 2) individual differences and images; 3) the relationship of environmental features and images; 4) the link between images and behavior; and 5) the application of image research. The task of addressing each of these questions in their entirety would engage many persons in lifelong research programs. Recognizing the apparent enormity of the task, the only reasonable strategy is to address a part of one or more of these questions in each image research effort undertaken.

Not only does the complexity of the questions suggested by the image literature limit any single research effort, so does the choice of a setting (or settings) for the research. An individual's image was defined to include all the knowledge of environments stored in memory by that person. In selecting a limited range of environments for research, it is unclear what inferences can be drawn regarding the full scope of an individual's image.

With the breadth of the research questions defined and the limitations of any given study in a single setting (or multiple settings) recognized, the researcher still must choose a setting in which to address questions of relevance. This research emerged from an opportunity to study user images of urban parks; the Consortium for Environmental Forestry Studies, a regional unit associated with the USDA Forest

Service, funded a one-year research project, "Images of Urban Forests" (D. Geoffrey Hayward, Principal Investigator). The project is a study of environmental knowing which focuses on the images of two urban parks in central New England. Of special interest to the research is the relationship of environmental knowledge to behavior as exemplified by the link between urban park images and the use of the parks. This focus is designed to identify if and how a park's image serves as a "barrier to use" of that park. Several other research questions in environmental knowing are addressed by the specific research objectives which are defined at the end of this chapter.

In this chapter, the Consortium's model of the urban forest recreational system is presented as a reference point in the recreational literature. Also discussed is a revision of the model which focuses on a section of the Consortium's original model and relates it to the environmental knowing literature. The appropriateness of urban parks as a setting for research on images is addressed. And finally, the objectives of the research are outlined. These objectives include specific questions which were asked and general hypotheses which were generated at the outset of the research.

A. The Urban Forest Recreational System

The Consortium for Environmental Forestry Studies (originally The Pinchot Institute for Environmental Forestry Studies) was created in 1970 within the Northeastern Forest Experiment Station, USDA Forest Service. The Consortium is composed of a number of working groups, most of which are dedicated to biological or ecological research. One working group does focus on the human behavioral aspects of urban recreation, the Recreation and Landscape Working Group. The document produced by that Working Group (Knopf, Moeller, More, and Twight, 1977) cites the purpose of the Consortium as:

> ...to help improve -- through environmental forestry research -- human environments in the densely populated areas of the Northeast.
>
> The tasks at hand are: (1) to identify the human benefits associated with urban forests, (2) to understand the processes by which such benefits are generated, and 3) to develop strategies for maximizing the productivity of urban forests.

<u>1. A model of the urban forest recreational system.</u> The Working Group produced a model of the "urban forest recreational system" which is reproduced in Figure 5. They describe the purpose of the model as follows:

> It illustrates relationships between needs of an urbanized society, aspirations relating to use of forested environments, supply, on-site participation, actions of forest managers, the administrative-political context within which managers operate, and benefits emanating from recreational use of the urban forest.

The Working Group notes that there are many feedback loops that could be delineated within the proposed model, but which are omitted for purposes of simplicity. Within the document, literature pertinent to each cell is presented to update the research in each area.

An examination of this model for the current research focused on recreational needs (C-1), the evaluation of recreational alternatives (C-2), and the decision to engage in urban forest recreation (C-3). The description of these cells within the model (from Knopf, Moeller, More, and Twight, 1977) is as follows:

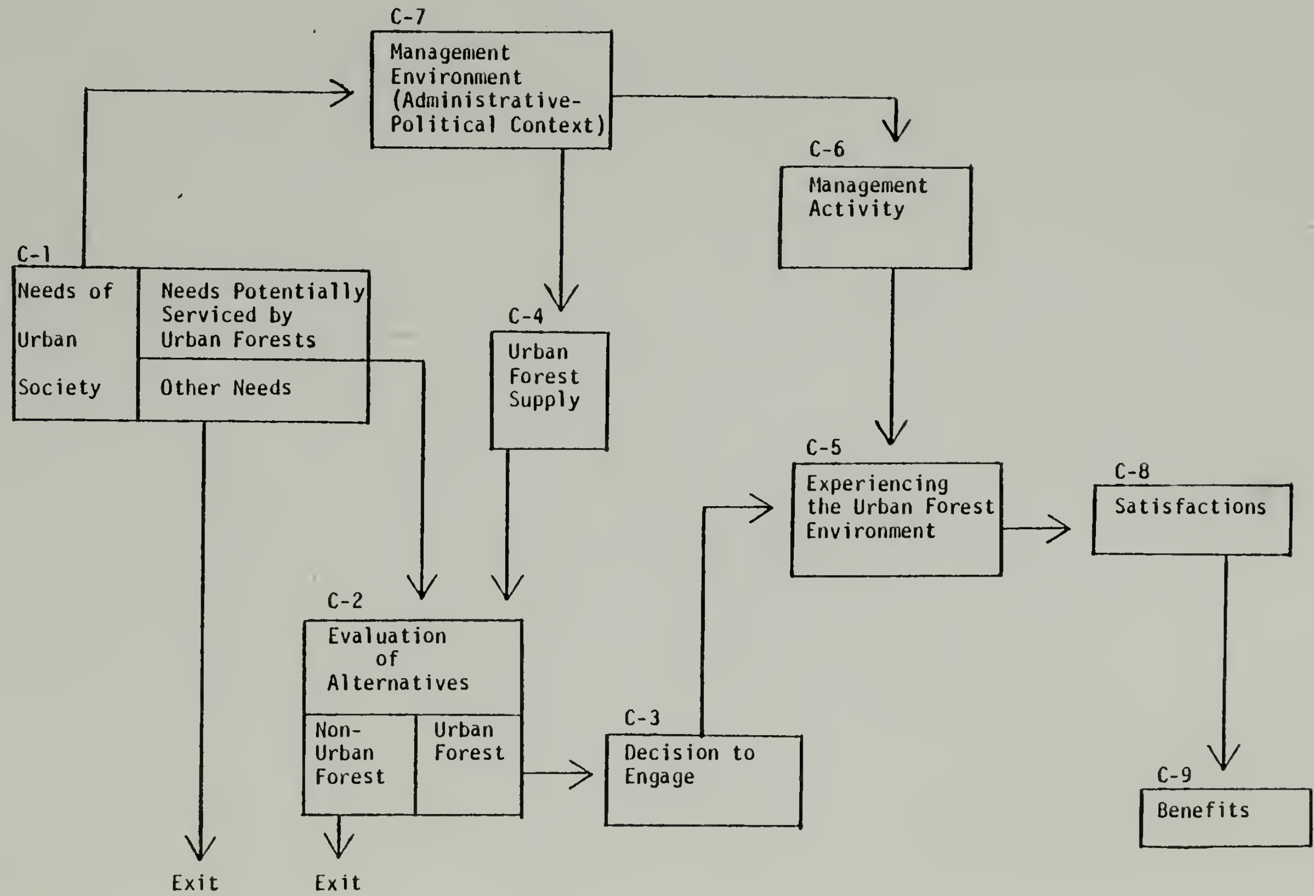

Figure 5. A model of the urban forest recreation system (Knopf, Moeller, More, and Twight, 1977).

> After variables represented by cell C-1 are defined, the next logical component of analysis is the process of choice, represented by cells C-2 and C-3. Having sets of needs (C-1), urban individuals make a search of the range of behavioral alternatives perceived as feasible (C-2). Alternatives are evaluated by their potential for allowing fulfillment of those needs. When the search and evaluation process leads to a choice of behavior not related to the urban forest, there is an exit from the model.
>
> The range of alternatives considered is highly influenced not only by needs of the individuals, but also by the range of environments perceived to be accessible. For example, consideration of the urban forest as a viable resource for recreational behavior might be limited by environmental constraints (e.g., physical proximity of resources, financial limitations), physiological constraints (e.g., mobility, health, body size, otherwise handicapped), and cognitive constraints (e.g., lack of knowledge about an opportunity, fear, attitudes on the social acceptability of specific behaviors, past satisfactions and dissatisfactions).

2. The role of image in urban forest recreation. Clearly, the evaluation of recreational alternatives, as described in the above quote, concerns what was defined earlier in this dissertation as the *image* of specific recreational locations. Although the Working Group does not reference the environmental knowing literature, that body of knowledge could contribute to an understanding of the evaluation of alternative environments and the decision to engage in use. In the research project, "Images of Urban Forests," an alternative conceptualization of cells C-1, C-2, and C-3 was proposed (Figure 6). The major modification occurs in cell C-2, where it is suggested that an evaluation of alternatives involves an examination of the image of an urban park. Other changes are the inclusion of demographics as potential factors in the decision-making

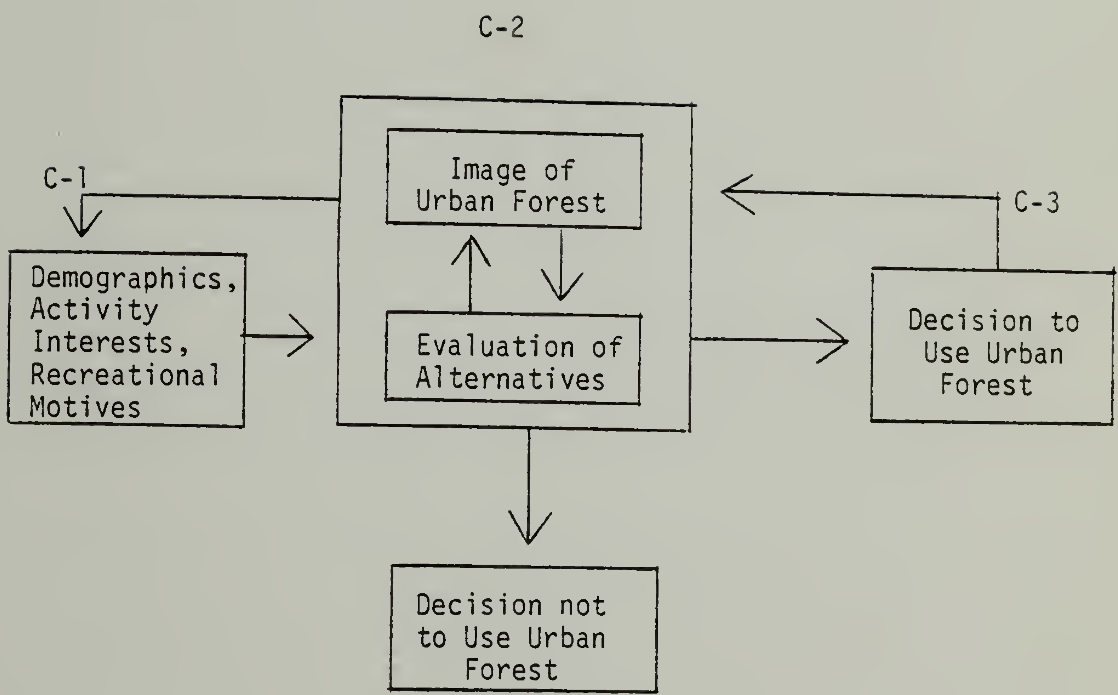

Figure 6. Model of the decision-making process.

process, the specification of recreational motives as separate from more specific interests in activities, and the addition of feedback loops in the system.

As a practical illustration of how image can affect the decision to use an urban park, suppose that a person expresses the need for solitude and decides to take a walk. Before starting the walk, the person will review possible routes and choose one. The image of the alternative routes will influence the decision of which to use. Given an environment containing an urban park, the use of that environment for a walk is not determined by its physical presence alone, rather by the image of the park held by each individual faced with a decision to use or not to use that park. Each individual surveys the knowledge of that park before making a decision whether to engage in use: What resources are contained in the park? How do I get there? What type of fellow users are in the park? Is it safe? Are there adequate benefits from its use? These and other questions are analyzed before an individual engages in behavior within the park.

The proposed role of image in this revised model is not totally new to recreational research. For example, Clawson's (1963) model of the recreational experience, and Mercer's (1971) review of the role of perception in the recreational experience both emphasize goals, images, and logic in choosing a site for recreation. In addition, image has been shown to affect potential use of outdoor recreational/tourism activities and areas (LaPage and Cormier, 1977; Hunt, 1975; Gratzer, Sutherland, and Throssel, 1978). Generally, these studies have found that users have better images than non-users and that the desire to try an activity or visit a place is higher among those who hold positive images.

B. Why Urban Parks?

What is it about urban parks that makes them appropriate settings for examining key research questions about environmental images? The suitability of these environments is derived from their apparent imageability as well as from the lack of research in what has been cited as an important research setting by recreational researchers.

1. Imageability. It is reasonable to expect much of the population of a city to hold images of urban parks. In other words, urban parks are highly imageable environments. Their distinct borders and unique features help urban parks stand out. They are generally accessible environments which include a diversity of recreational settings. Except for the very young or old and the handicapped, transportation to an urban park is not a problem. Many of the parks are large enough to handle a diversity of activities and user groups. As a result of the accessibility of urban parks and the availability of a variety of opportunities, many residents have had direct or indirect contact with the parks in their cities, and thus would be expected to have images of these parks.

In addition to the expectation that a large proportion of the population will have images of urban parks, it is also likely that the nature of these images will vary across the population. Since the inception of the first urban parks, dramatic changes have been documented in the perceived purposes of the parks and in the resulting designs (Cranz, 1978). As a result, parks in urban areas often represent a mixture of purposes due to their design in one period (for example, when passive recreation was in vogue) and their modification in other eras (later when recreational facilities were popular, or more recently when open space has become an increased priority). The diversity of purposes behind the designs of urban parks are expected to foster a diverse set of expectations or images of the parks.

Aside from the design history of urban parks fostering different images, individual histories of each park are likely to encourage differing images. Urban parks are constantly changing as the city around them changes. The characteristics of the user populations might change from young to old or old to young, from predominantly middle income to lower income or the reverse, from one racial or ethnic group to another. Persons in any group are affected by these changes as they feel more or less a part of the park. Accompanying this change in sense of belonging are likely to be changes in image about the accessibility and convenience of the park, safety and security, maintenance and cleanliness, and so on.

In sum, researchers recognize urban parks as appropriate environments for image research because of the accessibility of these parks to a large proportion of the urban population and their high visibility and imageability. Although a large proportion of the residents of a city are expected to have images of the parks, it is also anticipated that this image will vary greatly among them due to the mixture of uses in the parks and the continual changes in the user population as well as in the design of the parks.

<ins>2. Research needs.</ins> Beyond the rationale based on image considerations, urban parks are important settings for research and planning from the

point of view of recreational specialists. A vast majority of the country's population lives in large metropolitan areas. Access to parkland for recreation, learning and appreciation is already limited. Some people will, of course, have the monetary resources to visit any recreational site anywhere, but for most people their neighborhood and city parks will continue to be their primary source for urban recreation.

Yet, little research has been conducted in and about urban parks. In the National Urban Recreation Study Executive Report (National Park Service, 1978), research is cited as a key to future planning for these settings:

> Although an understanding of urban recreational needs and problems is essential to provide a rational basis for planning and decision-making, little research has been conducted specifically on urban recreation. (p. 80)

Research priorities discussed in the report include "methods to determine citizen needs and evaluate specific programs" (p. 80). More specifically, the study suggests:

> The following, more fundamental, research needs which are related to the design of more responsive user-supported recreational systems are: identification of basic personal and social benefits of recreation and of motivations for participation in recreational activities; relationship of recreational programs to the quality of urban life and community stability; effects of recreational fee systems on park user perceptions, park use, and recreational revenues. (pp. 80-81)

This concern for "more responsive user-supported recreational systems" stems from the noticeable dissatisfaction with urban parks on the part of the users. Evidence of user dissatisfaction is derived from data that indicate that urban parks are underused:

> The literature indicates that only a fraction of the potential users in a given service area regularly use neighborhood or community public parks...even under optimum conditions of excellent weather, convenient access, close proximity, and good development, maintenance, or programs, observations indicate that neighborhood parks are not as frequently used as one would expect, based on the population. (Gold, 1977, p. 371)

What are the reasons behind this non-use? As Revelle suggests:

> Today many city parks are almost empty: some because they are dull and poorly equipped, and others because they are unsafe. The very word park raises in most minds the image of a formal area nearly empty or partly filled with rather disreputable characters, and adorned by walks, benches, and "Keep Off the Grass" signs. (p. 1177)

Gold (1977) provides three more concrete hypotheses:

> (1) Those who do not use the park may have some physical, mental, or cultural differences from those who do;
> (2) The park's image and facilities do not coincide with the leisure preferences and satisfactions of the majority of potential users; and,
> (3) Some physical, environmental, or institutional restraints encourage non-use. (p. 372)

Once more it is evident that what can be called "image" has a role in determining use (or non-use) of an urban park. Studies which have examined the causes of non-use focus on the relationship of distance to use (Bengtsson, 1970; Bangs and Mahler, 1970; Mandell and Marans, 1972) and no attention has been paid to the image of urban parks as of yet. This is the conclusion of the Consortium's Working Group in their discussion on barriers to use of urban recreational opportunities:

> Beyond such research on the mediating effects of physical proximity, little attention has focused on perceived supply. As barriers to opportunity are defined, managers would be in a better position to evaluate the utility of alternate strategies for enhancing perceived resources availability. (Knopf, Moeller, More, and Twight, 1977).

In all fairness, the extensive literature on the perceptions of natural environments must be acknowledged. However, the emphasis of this research on landscape images is on visual preference (for examples, see edited volumes by Zube, Brush, and Fabos, 1975; Daniel, Zube, and Driver, 1979; Elsner and Smardon, 1979; also an annotated bibliography by Arthur and Boster, 1976). For example, Hammitt (1979) offers the position that visual information is important in our perceptions of and preferences for environments:

> While the perception of natural environments is a complex process, involving all of our senses -- our past experiences and their lasting traces in memory, it is vision that humans depend on most for relating to the environment. Sight is of crucial importance and probably influences human response to environments more directly and with greater salience than do our other senses. (p. 218)

There is no need to question the value of the visual preference research since visual perceptions may be extremely influential in recreational choices. However, if a specific type of environment is of interest, as urban parks are here, one must also consider the contextual influence of other factors -- for example, perception of safety, ease in wayfinding, quality of social contacts, and so on.

Jacobs (1975), in a review of several studies analyzing the visual landscape image, persuasively argues that these visual studies are not examining perceptual aspects of image alone:

> It is the author's belief, however, that visual models of the landscape are charged with social and cultural meaning that go beyond the mechanics of perception, and, as such, are a factor in weighing the relative value of what is perceived and its relative importance to the viewer. (p. 128)

Jacob's suggestion is that models which claim to pertain to the visual aspects of landscape perception implicitly take a broader view of image. If this is the case, then studies which focus on the visual perceptions of the environment are limited by not recognizing the broader definition of image as defended in this dissertation.

Recreational researchers recognize the importance of urban parks in satisfying the recreational needs of urban residents. However, the evidence of the lack of use of urban parks indicates that the parks are not fulfilling the needs of this population. Despite the large research literature on the perception of natural environments, there is a paucity of research that addresses the specific context of urban parks and their user populations.

C. Research Objectives

After identifying pertinent questions in the environmental knowing literature and choosing a type of environment as the research setting, the objectives for the research were defined. These objectives represent an effort to synthesize the current thinking about images with the needs for recreational research in urban parks. The overall objective of the research, reflecting this effort at integration, is:

> To adapt and expand upon available research methods in environmental knowing to assess environmental images of urban parks.

This general objective can be further refined into a series of five specific foci, each relating to one of the questions identified in the literature review. These objectives are:

1) To investigate the nature of images of urban parks as measured by the survey instrument.

2) To test for differences in image between the two parks, as well as sample differences.

3) To examine the relationships among the aspects of image -- descriptive, evaluative, and interpretive.

4) To explore the relationship of differences in individual characteristics to images of urban parks.

5) To test the model of urban forest recreation which suggests that a combination of individual characteristics and image predicts urban park use.

These objectives are discussed in more detail below. Included in the discussion of each are preliminary hypotheses which came from the early stages of the research project. Due to the exploratory nature of the research, these hypothesized relationships are quite general; still, they were useful in guiding the construction of the research instrument (as discussed in Chapter III) and in providing direction for the data analyses (Chapters IV and V).

<u>1. Investigating the nature of images.</u> This objective is the initial focus of the dissertation research. It first involves the development of methods which successfully measure the subjective knowledge of urban parks held by the respondents. An examination of the resulting data will facilitate the exploration of the nature of images of urban parks.

There are preliminary hypotheses which guide this investigation. First, it is expected that images of urban parks will vary among the respondents. This variance will be revealed in the range of responses to each measure of image, including items on descriptive knowledge, general evaluations, and more specific interpretations. In addition, it is predicted that the measures of image will reveal that the respondents' subjective knowledge of the urban parks is far from veridical; the accuracy of their images will vary from those images which are quite true to life, to images which are outdated, to images which are not and never were accurate.

The objective to investigate the nature of urban park images guides the formulation of measures of image for the survey instrument and the general summation of the data on the images of the parks. These steps serve as a foundation for the exploration of the remaining objectives as the succeeding analyses build upon the basic information generated from the first objective.

2. Testing for differences between parks. The study was conducted in two parks, Elizabeth Park in Hartford, Connecticut, and Forest Park in Springfield, Massachusetts (see Chapter III for a description of the research settings). By collecting data in two parks it is possible to compare the image of the parks on all three aspects of image. Using these comparisons, it might be possible to isolate environmental variables which are related to the differences in image.

As one example of an environmental variable, a major difference between the two parks is their size. It is expected that Elizabeth Park (120 acres) is easier to know than Forest Park (750 acres) and thus the descriptive knowledge scores should be higher for the Hartford respondents than for the Springfield group. There is also a difference in the facilities at the parks. Forest Park has a large sports activity area and an extensively wooded area surrounding a lake and several ponds. Elizabeth Park has only a small lake and limited wooded areas, fewer sports areas, and several large meadows. Evaluations of the two parks should differ on the basis of the different functions which the environmental features serve.

It is also possible that the samples from the two parks differ on dimensions other than their images of Forest and Elizabeth Parks. The sample characteristics are examined for individual differences such as demographic characteristics, interests in outdoor activities, general motives for participating in recreation, and patterns of park use. There were no preliminary indications that the samples would differ on any of these dimensions.

3. Examining the relationship among the aspects of image. The exploration into the relationship of the three aspects of images is also guided by initial hypotheses. There would be little utility to a taxonomy of aspects of image if descriptive, evaluative, and interpretive image data for the respondents were highly correlated. However, it is more likely that there will be differences across scores for the aspects of image; for example, some persons will score high on descriptive knowledge and yet negatively evaluate a park, and others who score high on knowledge might positively evaluate the park. In cases such as these, the use of a variety of methods to measure different aspects of image would be supported.

Although it is hypothesized that the aspects of image can be distinguished from one another, this is not to say that they are unrelated. It is also expected that relationships between descriptive, evaluative, and interpretive image will be revealed. Figure 7 illustrates one such potential relationship. The diagram suggests that descriptive knowledge is derived from an awareness or use of the park. By awareness or use,

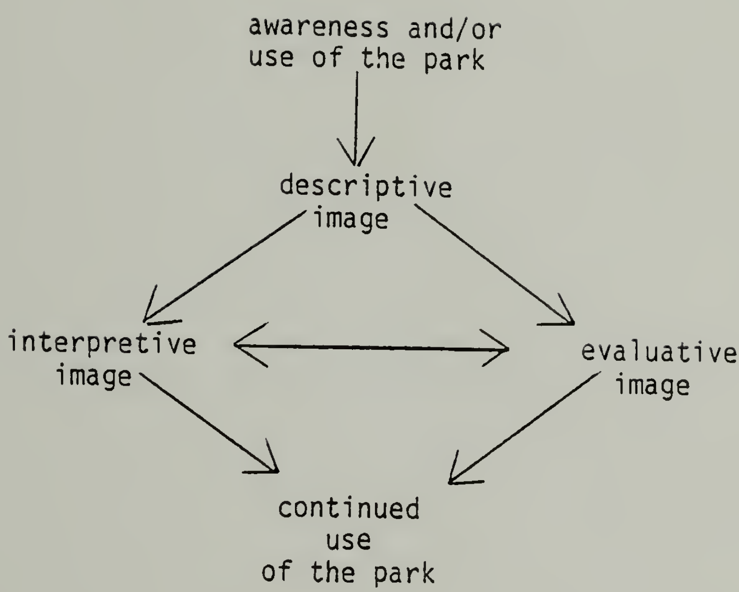

Figure 7. Hypothesized relationship of the aspects of image.

both direct and indirect sources of information are included; indirect sources of information (e.g., newspapers, neighbors, analagous experiences) might be as salient as direct sources (i.e., use) for some people. Knowledge of the park would have a relationship with evaluations as well as interpretations; an interactive relationship between evaluations and interpretations is also suggested. Finally, continued use of the park is hypothetically related to these aspects of image. These hypothesized relationships will be explored, as will other possible relationships among the aspects of image.

4. Exploring the relationship of individual characteristics to image. If images of urban parks differ among the respondents, it is likely that this variation can be explained. For example, it is expected that characteristics of the sample population can account for a significant proportion of the variance in images. These characteristics include: demographic variables, such as age, sex, income, and distance from the park; interest in specific activities, for example, baseball, walking, tennis, or fishing; and more general motives for participating in recreation, such as a desire to observe nature or to escape from daily routines. Park use could also be included in this list of characteristics, but is intentionally excluded so that the relation of image to use can be addressed separately.

The hypothesized relationships are that these individual differences will help explain differences in the descriptive knowledge, overall evaluations, and more specific interpretations about the parks. For example, distance from the park should be related to the accuracy of the respondents' knowledge such that knowledge decreases with increased distance. Also, recreational interests and motives are expected to affect the evaluation of the park with respect to how well that park satisfies those needs. As a final example, it is expected that preference for or familiarity with the park will affect the interpretations that an individual makes about the adequacy of the park facilities.

5. Testing the relationship of individual characteristics and images to park use. A model suggesting the relationship between the image of an urban park and the use of that park was developed as the focus for the research project, "Images of Urban Forests." This issue will be discussed as the final objective of the dissertation with an emphasis on what this analysis suggests for image research. The model (presented earlier as Figure 6) suggests that individual characteristics do not, by themselves, sufficiently predict park use. It is hypothesized that image serves as a mediator between individual characteristics and use and that measures of image will add significantly to the prediction of park use.

The hypothesized relationships of individual characteristics and image to urban park use are illustrated in Figure 8. The figure suggests that demographic characteristics, activity interests, and recreational motives will each predict park use to some extent. In addition, each aspect of image -- descriptive, evaluative, and interpretive -- will predict park use to some degree. However, there is no hypothesis as to which of these relationships will be stronger than the others. The figure also defines the relationship between a combination of all of these variables and use. It is suggested that the individual characteristics and the image variables account for different parts of park use variance. This would imply that a multiple regression equation using the

individual characteristics < demographics → "predict" park use
interests → "predict" park use
motives → "predict" park use

aspects of image < descriptive → "predict" park use
evaluative → "predict" park use
interpretive → "predict" park use

individual characteristics + image → "predict" park use

Figure 8. Hypothesized relationships of individual characteristics and image to park use.

two sets of variables will account for a significant larger sum of use variance than would either of the groups alone.

Actually, there is no way to determine causality in these relationships since it is most likely that correlations represent transactions between these sets of variables (for example, use affects image which, in turn, affects use, and so on). However, the variety of measures collected in the instrument will allow the documentation of the relative strength of these relationships.

D. Summary

The literature review established environmental knowledge, or "image," as the focus of the dissertation research. This chapter introduces the particular setting in which images are to be studied -- urban parks. A model of urban recreation which includes image is developed, and the need for research of this type is documented. Finally, the specific objectives for the research are delineated.

In the next chapter, the tone shifts from the theoretical discussion of images and urban parks to more practical issues. These include the choosing of research settings, sampling procedures, and survey methods.

CHAPTER III

METHODS

There are four sections to the methods chapter describing: 1) the criteria for choosing and the choice of the research settings; 2) the contributions of five pilot studies to the development of the survey procedures and the final instrument; 3) sampling and survey procedures; and 4) details of the measures used in the in-depth, home interviews.

Since there are several "instruments" discussed in the methods chapter, clarification of the terminology is warranted. The "pilot studies" were brief surveys conducted in the parks (Appendix A). Preliminary contacts with respondents by telephone were recorded on an "initial contact form" (Appendix B). If a respondent was classified as a non-user, a "phone interview" was administered (also Appendix B). The respondents who were identified as park users were eligible for the in-depth, face-to-face interviews, called the "home interview" (Appendix C).

It should be noted that the choice of research settings, the design of pilot studies and the final instrument, and the development of research procedures involved issues which were relevant to the full scope of the research project, "Images of Urban Forests." Therefore, this chapter on research methods reports on decisions made by the research team in view of the broad considerations for the entire project. However, this decision-making process was highly beneficial to all aspects of the research and did not result in any methodological problems for the more specific focus of the dissertation.

A. Research Settings

The initial decisions confronting the researchers concerned the choice of how many and which specific research settings were to be studied. If only one urban park were chosen, it would have been impossible to determine if the research findings were applicable beyond that single setting. However, the desirability of studying more than one setting was tempered by the cost of conducting an adequate number of interviews in each of several settings. The final decision was to select two urban parks for study.

A number of criteria for the selection of the parks were determined. A foremost concern was that the parks be similar on a number of dimensions. This criterion was necessary for drawing comparisons between the data sets. It was also established that a park should be well-used and large enough to serve a diversity of uses and users. Relatively large parks, which include forested areas, were needed since they would be diverse and foster a variety of uses. It was also desirable to pick parks in two different cities with comparable neighborhoods surrounding the park. And finally, it was necessary that the settings be in urban locations which were easily accessible to the research team, and that the cooperation of the city parks department provide an atmosphere in which the research findings would be useful.

A review of possible settings in nearby urban areas resulted in the elimination of many urban parks on the basis of the above criteria and to the eventual selection of two parks -- Forest Park in Springfield, Massachusetts, and Elizabeth Park in Hartford, Connecticut.

Forest Park, the largest park in the Springfield park system, is located at the southern edge of the city. The park grew to over 750 acres through purchases and citizen donations during the period 1884 - 1921. The map and key (Figures 9 and 10) illustrate the variety of facilities in the park which are located in several distinct areas. The athletic areas of the park are located nearest the main Springfield entrance on Sumner Avenue. Facilities for tennis, swimming, indoor ice skating, shuffleboard, basketball, baseball, soccer, and other field sports are available. Also in this vicinity are refreshment stands, maintenance facilities, a greenhouse, a deteriorating zoo, and a more successful privately-run children's zoo. Further in the interior of the park is a large children's playground, privately-maintained lawn bowling, and a rose garden. The remainder of the park, over two-thirds of its total size, consists of more natural areas dominated by woods, lakes, lily ponds, and meadows. While some activities do take place there, such as fishing, outdoor ice skating, and activities in the amphitheater, this part of the park is more nature-oriented than the athletic areas and tends toward more passive forms of recreation.

Elizabeth Park, established around the turn of the century, is not the largest park in Hartford. However, despite its 120-acre size, it is distinguished as the gem of the park system, a regional attraction. Support from sources other than the City of Hartford comes from the Friends of Elizabeth Park, an independent voluntary organization which offers funds to assist in the restoration and maintenance of the park; also, West Hartford, which borders a large proportion of the Hartford-owned park, has contributed somewhat to park maintenance efforts. Much

Figure 9
A Map of
FOREST PARK
Springfield, Mass.

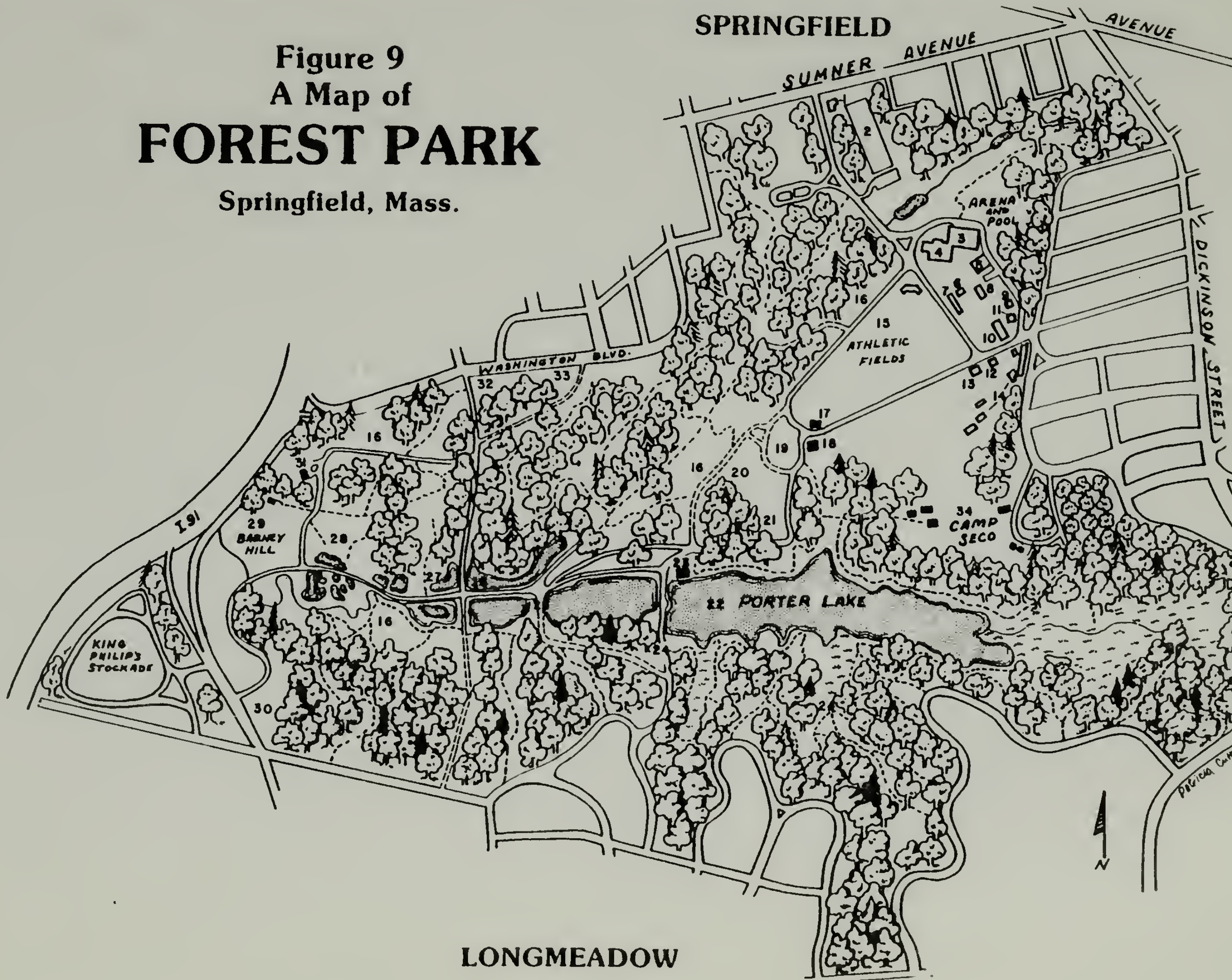

Figure 10
Key to Facilities in Forest Park

1. Pavillion
2. Tennis Courts
3. Cyr Arena
4. Swimming Pool
5. Basketball Court
6. Refreshment Building
7. Shuffleboard
8. Greenhouse
9. Kennedy Memorial
10. Bird Cages
11. Public Rest Rooms
12. Park Offices
13. Police Station
14. Maintenance Facilities
15. Athletic Fields
16. Picnic Tables
17. Concession Stand
18. Kiddieland Zoo
19. Lawn Bowling
20. Rose Garden
21. Playground
22. Porter Lake
23. Ecos Center
24. Wooded Trails
25. Duck Ponds
26. Barney Pond
27. Lily Ponds
28. Amphitheatre
29. Barney Hill
30. Quinn Field
31. Park Offices
32. Playground
33. Community Gardens
34. Camp Seco
35. Wooded Areas

of the regional appeal of Elizabeth Park is due to the well-known rose garden which was the first municipal rose garden in the country. The map and key (Figures 11 and 12) illustrate that there is a small lake which is adjacent to the rose garden, greenhouse and horticulture area. An athletic area which is next to the lake consists of lawn bowling facilities, a baseball diamond, tennis courts, and a meadow. The eastern end of the park, separated by a through street from the larger part of the park, consists of a large open space with athletic fields, basketball courts, play equipment, and a hill with a view of downtown Hartford. The western end of the park is heavily wooded with some open spaces carved out for a picnic area, playground, tennis courts, and a meadow.

Forest Park and Elizabeth Park are quite similar in a number of ways: they both provide a variety of planned activity areas; also, within their cities (and surrounding areas), they are highly regarded for the beauty of their natural areas; both parks are located at the municipal boundary between a city and one of its suburbs; both are surrounded by a diversity of housing stock with heterogeneous populations; the parks have suffered the general deterioration that is symptomatic of urban parks in the northeast, but they have not fallen into total disrepair; likewise, concerns for security and safety have been on the rise in both parks, but these issues do not seem to preclude the use of both parks by a diverse group of recreationists.

The most obvious difference between Forest and Elizabeth parks is their size and this environmental variable was deliberately selected so that its effects could be explored in the data analyses. Preliminary observations indicated that there might also be differences in the

Figure 11
A Map of
ELIZABETH PARK
Hartford, Conn.

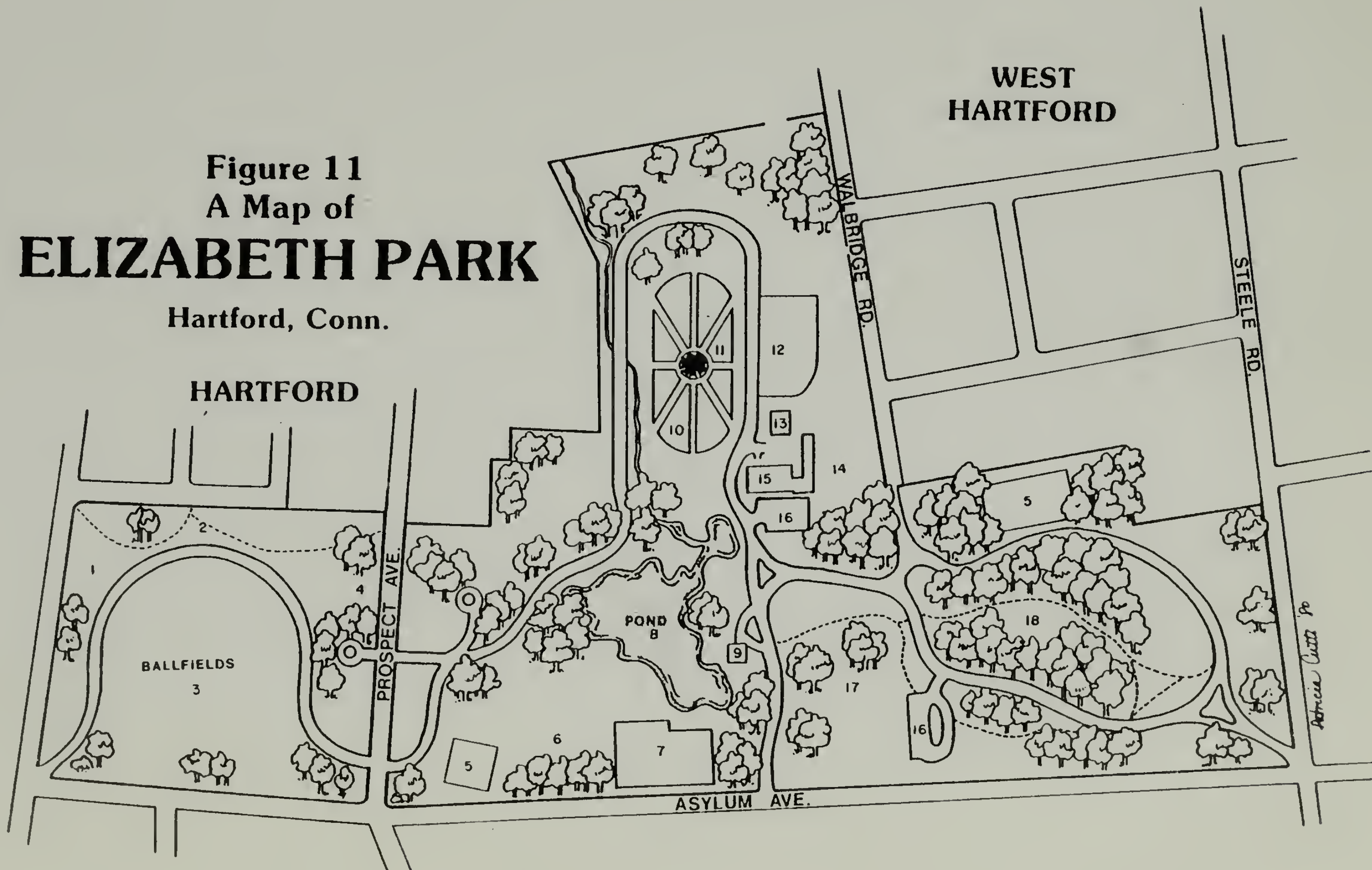

Figure 12
Key to Facilities in Elizabeth Park

1. Basketball Court
2. Play Equipment
3. Athletic Fields
4. Lookout View
5. Tennis Courts
6. Baseball Field
7. Lawn Bowling
8. Pond
9. Refreshment Building
10. Rose Gardens
11. Gazebo
12. Gardens
13. Horticulture Building
14. Maintenance Yard
15. Greenhouse
16. Parking
17. Picnic Area
18. Play Equipment

images of the parks with respect to the extent of physical deterioration and danger -- Forest Park suffering greater maintenance and security problems than Elizabeth Park. This apparent difference was also noted and explored in the data analyses.

B. Pilot Studies

Prior to the development of the survey procedures and the survey instrument, a series of five pilot studies were conducted in each of the parks. The studies were conducted on weekdays, between mid-morning and late afternoon. Persons were approached in the parks and asked if they would agree to participate in a brief interview to last several minutes. Although there is a clear sampling bias as to the day of the week and time of day that the pilots were conducted, every effort was made to approach persons varying on visible characteristics (e.g., sex, race, age, size of group, activity). The samples included up to 15 or 20 interviews in each park for each pilot with a near unanimous acceptance rate (over 95%).

The pilots served several purposes for the development of the methods. Information was collected about the types of users, their demographic characteristics, and their uses of the parks; these data were useful in making decisions about sampling procedures. Opinions and preferences about the parks were solicited and used in generating items for the home interview. In addition, items in the later pilots were used as pre-tests of procedures for the home interview to insure that they were comprehensible and that the responses to them would be interpretable. The contributions of the pilot studies are described below and copies of the five interview schedules are contained in Appendix A.

1. General items for the pilot studies. All of the pilot studies included a series of demographic questions which were used for a variety of purposes. The closest intersection to the person's home was noted on a map and these data helped in the decision concerning the range (within one mile) of the home survey sample. Data about the length of residence in the metropolitan area and in the present home were also consulted when determining criteria for inclusion in the sample. (Ultimately, length of residence was not used as a sampling criterion; instead, use of the park in the last 12 months was the sole criterion.) And, the size and characteristics (age, sex) of the group accompanying the respondent were recorded.

Most of the pilots also included questions which were of use in generating items for the instrument. The question, "Why did you come here today?," generated a list of activities which people did in the parks. "How many times have you come to the park in the last two months?," suggested the range of rates of use. Respondents were also asked to describe "good experiences," "bad experiences," "assets," and "problems" with the parks. The answers were useful in determining relevant issues to users of the parks. All but one of the pilots (#3) were used in the development of image questions for the final survey instrument.

2. Specific items for the pilot studies.

Pilot #1. In Pilot #1, respondents were provided with an outline map of the park in which they were being interviewed. They were then instructed "to sketch as many areas, places, and features of the park which you are familiar with." In general, people had a difficult time orienting to the map and were anxious about filling them in (some refused). The findings indicated that a sketch-map technique like this should not be used in the final instrument. However, which features of the parks were salient to the respondents were documented through this procedure.

Pilot #2. In Pilot #2, two issues of concern for the image section of the home interview were examined. First, labels were added to the maps (using the salient features obtained in Pilot #1) to determine if there was a procedure which might make use of the maps. Second, since images of the parks may differ by areas of the parks, people were asked to distinguish "areas" of the parks. By areas, respondents were requested to indicate how they would group together various features of the park. There was some difficulty in explaining the task, but once comprehended, the respondents were able to orient to the labeled map and complete the task. The "area maps" were analyzed to determine the level of agreement among the respondents. Then, where there was the most agreement, areas of the parks were defined (five in Elizabeth, seven in Forest).

Pilot #3. Pilot #3 was a test of how comprehensive and comprehensible were the lists of activities and motives for visiting the parks. Respondents were easily able to rate their interest in various recreational activities and their motives for participating in recreation. They found these lists to be quite complete. Therefore, this task and these lists were incorporated directly into the home interview.

Pilot #4. While Pilot #3 was conducted, color photographs of the parks were taken. Photographs were chosen as the easiest mode for communicating information about the parks for use in the in-home interviews. The photos were taken in each of the areas identified in Pilot #2. They were taken from a variety of angles in an attempt to include as many of the features of the parks (as determined in Pilot #1) as possible. Over 50 photos of each park were used in the succeeding pilot.

Pilot #4 was constructed to test for the effectiveness of the photographs in eliciting image data and to choose which photos to use in the survey instrument. Six to eight photos of an area of the park were mounted and numbered on a single board for the respondents to view. Respondents then chose the "one photo that best depicts the area." After going through three boards, the respondents were permitted to go back over the photos, choosing any others (up to two more) which were important but which they could not choose the first time around. With many of the boards, there was agreement as to the most representative picture. With other boards, there were close votes among two or three photos. Based on these data, unrepresentative shots were eliminated and the remaining photos were chosen for use in different parts of the home interview.

Pilot #5. Pilot #5 was a final test for some of the photos and items which were now planned for use in the image section of the survey instrument. Respondents estimated the location of several photos onto a base map of the park. Both of these exercises were completed by the respondents without difficulty (although not without mistakes) and, therefore, included in the survey instrument.

Another two questions in Pilot #5 asked for opinions about the parks. The first asked respondents to rate each area (as depicted by photos selected in Pilot #4) on a series of adjective scales. The second question matched photos (chosen from Pilot #4 photos) with statements about the parks (generated by Pilots #1 and #2) and asked respondents to rate their agreement or disagreement with the statements. The adjective rating of each area was eliminated from the final instrument because the respondents found it too difficult and confusing. Instead, it was decided that respondents should be asked to rate the entire park on the adjective scales. The photo-statement pairs passed with flying colors and were included in the home interview.

C. Survey Procedures

Simultaneous to the execution of the pilot studies and the design of the survey instrument, procedures for conducting the survey were developed; processes were developed for drawing the sample, making an initial contact with each potential participant, and collecting the relevant information from eligible and willing respondents.

1. Sampling. The sampling frame was established as all persons over 18 years of age living within one mile of the parks. This decision was based on data from the pilot studies which revealed that a large percentage of those interviewed in the parks lived within a one mile radius.

In addition, this distance was chosen as being close enough to the parks that the respondents would be aware of them and would not live closer to another major park.

A list of eligible individuals was obtained from voter lists (in Connecticut) or street list census books (in Massachusetts), both of which were updated within the previous year. A random sample of 500 names was drawn in each city with the bias that names drawn with no telephone listing were discarded from the sample. The elimination of unlisted persons was necessary since the next step was a telephone screening of the sample.

Postcards introducing the research project were sent to each respondent prior to the initial phone contact. Trained interviewers were then given lists of sample names and instructed to contact them by phone. Using an "initial telephone contact form" (see Appendix B), the interviewers determined the eligibility of respondents for further interviewing.

2. Outcomes. Of the four types of outcomes which were possible, the first two were terminations by the respondent or the interviewer:

1. The respondent could have refused to take part in the study. This would constitute a "refusal" (and 30% of those contacted fell into this classification).

2. The interviewer might have determined that the respondent would have been unable to complete the full interview due to factors such as a language barrier or an inability to leave the house. This was also considered a "refusal" (and represents 10% of those contacted).

If there was no refusal, the interviewer continued to determine the respondent's eligibility, and two more outcomes were possible:

3. In conducting the initial phone contact, the interviewer may have found that the respondent had not been to the park in question within the last two months or less than three times in the previous year. In this case, the interviewer conducted a brief "phone interview" (See Appendix B). This phone interview was designed to collect important information about non-users of the park without spending the time and money necessary to go to the home of the non-users and conduct full interviews. (24% of those contacted completed phone interviews.)

4. And finally, if the respondent qualified as a user of the park, and was willing to participate, a full interview was scheduled in the home of the respondent. The full home interviews took an average of 45 minutes to conduct. There were no cases of refusals by respondents after the screening and there were no incomplete interviews due to terminations by respondents. (37% of those contacted completed the home interviews.)

From the Forest Park sample, 75 non-user phone interviews and 95 in-depth home interviews were completed. For Elizabeth Park, 51 non-user interviews and 101 home interviews were conducted. Although the information concerning non-users is potentially useful, there was very little image data collected from this form. Therefore, the dissertation only reports on results obtained from an analysis of the 196 in-depth home interviews.

3. Sample characteristics. A brief look at the sample characteristics, which resulted from the survey procedures, precedes the discussion of the survey instrument. A total of 101 home interviews were completed in the area within one mile of Elizabeth Park. Since the park is on the edge of Hartford, Connecticut, this total includes residents of Hartford (45) as well as persons living in West Hartford (56). Within the Forest Park sample, 95 home interviews were conducted with individuals living

within a mile of the park. It too is located on the edge of the city, so the sample includes residents of Springfield (67) and Longmeadow (28). The fact that there are different numbers of participants in the cities is attributable in large part to the differing densities of the sample areas and also to somewhat different response rates. The distance from the respondents' homes to the closest point in the park (calculated from city maps to the nearest 200 feet) ranged from 200 feet to one mile, with a mean of 2065 in Forest Park and of 2518 to Elizabeth Park. Since the calculation of distance was measured to the nearest point in the park, the large size of Forest Park could have contributed to a mean which is "closer" than the Elizabeth Park mean.

There is a great diversity in the type of respondents as evidenced by the demographic characteristics for all 196 respondents combined. The member of the household who was interviewed was chosen at random so that relatively equal numbers of men (93) and women (103) were respondents. Ages ranged from 18 to 84 years with a median age of 42.3 years and a mean of 44.9. Size of household ranged from 1 to 12 persons with a median of 3.2 persons and a mean of 3.5. Years in present residence found persons who had lived in their homes for one year and others who had lived there for 68 years, a median score of 10.0 and a mean of 12.8. Of those who reported household income (n = 168), the median and mean were both in the \$20-25,000 per year bracket. Further discussion of demographic information is included where relevant in the results.

D. Survey Instrument

As described in the procedures, an in-depth survey conducted in the home of the respondent was chosen as the method of data collection. For the type of information which was to be obtained, survey research is recognized as an appropriate data collection strategy (Marans, 1975). An advantage to interviews conducted in the home is that respondents are not biased by the present activity or current location in the park, an influence which would be expected if the interviews were conducted on site. In addition, the home interview sample includes a range of user types (by frequency of use and activity) which would have been extremely difficult to obtain in the park. That is to say, sampling in the park would result in a bias towards selecting frequent users and those persons participating in more visible activities in generally accessible settings.

The limitations of the survey were also recognized in the choice of data collection techniques. The taxonomy of methods in environmental knowing research presented in Chapter I suggests that measures of image should be as "close" to the environment as possible. Surveys can handily provide data on the external representations of the respondent's image, a technique which is one step removed from the environment. Therefore, the information collected on environments in this and other surveys is limited by the recall abilities of the respondents and the degree to which the respondents have formulated opinions about those environments. Although an advantageous data collection technique, actual observation in the parks was eliminated from consideration due to the impracticality of conducting this type of research within the time and monetary constraints.

The interview materials included an "interview form" (see Appendix C) from which the interviewers asked questions and on which they recorded answers. For some questions, respondents were asked to record responses in the accompanying "respondent packet" (also in Appendix C). Other materials used in the interviews included photographs and maps of the parks which were used as visual aids for certain items. The instrument contains four distinguishable categories of measures: 1) the initial questions concerning demographic characteristics; 2) followed by measures of general recreational interests and motives; 3) next, the specific park under study was introduced and items measuring the park image were used; and 4) finally, measures of recreational use were collected. Each of these categories of measures is described in the following four sections.

1. Demographic characteristics. After the interviewer's introduction and the signing of the informed consent form by the respondent, the interview began with a series of questions about the respondent and his/her family (see p. 289). The information about the family includes the number of persons in the household, their age and sex, an approximation of household income and distance to the park (as calculated after the interviews using local maps). In addition to the age, sex and occupation of the respondent, the number of years he/she has spent in the metropolitan area and in that particular residence was recorded.

2. Recreational interests and motives. The respondents' interests in recreation were determined in two ways. First, a list of 38 specific

activities, all of which could be done in an urban park, was provided (p. 290). The respondents indicated their interest in these activities by rating each one on a five-point scale ranging from "not at all interested" to "extremely interested." The list of 38 possible activities in urban parks was derived from the pilot studies in consultation with the Leisure Activities Form (McKechnie, 1975), a more comprehensive list of 120 leisure activities. While many of those leisure activities were eliminated because they were irrelevant to an urban park setting, other activities were added to complete the final list (e.g., throwing frisbee, playing at a playground, picnicking), based on activities mentioned in pilot studies #1 and #2.

A second procedure for measuring recreational interests had respondents rate the importance of motives for participating in outdoor recreation on a five-point scale ranging from "not at all important" to "extremely important." The 15 items represented a range of motivations for recreation including "to be with friends," "to be in a natural setting," "to relieve boredom," and "to relax" (see p. 291). They were derived from a series of studies which identified a broad range of "motives" for participating in outdoor recreation (Knopf, 1972; Driver and Brown, 1975; Driver and Knopf, 1976, 1977). However, those studies used a larger number of items and had respondents rate the importance of these motives for the one activity in which they participate the most. In the present study, due to time limitations and an interest in more general motives for recreation, respondents rated a smaller number of motives in terms of their importance to no specific activity.

As reported earlier, both methods for obtaining information on recreational interests were tested in Pilot #3 to insure that the lists were complete and the tasks comprehensible. It also should be noted that the respondents were indicating their general recreational interests and were not directed to respond to any particular park; the park under study was not introduced until the beginning of the image measures.

3. Park image. The overall objective of the dissertation, as established in Chapter II, is "to adapt and expand upon available research methods in environmental knowing in order to assess environmental images of urban parks." Measures of image for the survey instrument were chosen after consideration of several issues: the needs of the particular setting, findings from the pilot studies, and results from the use of related methods (as reviewed in Chapter I). Ultimately, a range of measures was chosen to allow for comparisons of the effectiveness of each method and to make certain that each of the three hypothesized aspects of image -- descriptive, evaluative, and interpretive -- were measured. In addition, a variety of approaches were taken in the measurement of image to insure that responses would not be biased by the use of a single mode of question presentation and response. Each of the image measures are described below, grouped by the aspect of image which they were designed to measure.

Descriptive image. Following the telephone screening, the respondents who remained eligible for home interviews were those persons who knew of the park's existence and had been there at least once in the previous two months or three times within the previous year. Beyond that, it was not known what descriptive information was held by the respondents. To begin with, respondents were asked to make self-estimates of their familiarity with the park and the distance to the park. Then, several methods were developed to measure the amount and accuracy of the respondents' knowledge of the park: a free recall of features in the park; questions about park rules; and the identification and locational placement of photographs.

The respondents were first asked to estimate their familiarity with the park on a five-point scale, ranging from "not at all familiar" to "extremely familiar" (p. 292). It was assumed that this rating would serve as a fairly accurate assessment of park knowledge and could provide a comparative test of the effectiveness of other methods in measuring descriptive knowledge. In addition, respondents were asked to estimate the number of minutes it takes them to walk and to drive to the park (also p. 292). These responses approximate the respondents' perceived distance to the park while avoiding the difficulties in interpreting distance estimates in feet or miles. While these self-estimates are not tests of knowledge, they are included in the descriptive image category because the responses represent "descriptive" information about the parks.

Before specific information about the parks was revealed in later questions by the interviewers, the respondents were asked to list as many places or facilities in the parks as they could recall (p. 293). These data were to serve two purposes: first, it was expected that the amount of park knowledge held by the respondents would be reflected by the total number of items mentioned; and, the frequency and order of recall of each feature would reveal the relative salience of features in the park.

The next series of descriptive image questions was designed to ascertain the respondents' knowledge about rules pertaining to the park such as when it is open, how to reserve picnic tables, and whether there is a fee charged for various activities. Once more, this method was expected to provide a verbal test of the completeness and accuracy of the respondents' descriptive images.

The remaining two descriptive image measures utilized photographs in order to collect information based on a visual mode of presentation. The intent behind the use of multiple methods and a variety of presentation modes was to insure that the respondents were given ample opportunity to reveal their descriptive knowledge. It is quite possible that persons who are equally familiar with the park would best display their familiarity on different tasks.

For the first visual task, respondents were given a stack of 18 photographs, each of which they identified as being in the park or not (p. 296). Possible responses were "very certain it's in the park," "somewhat certain it's in," "not sure," "somewhat certain it's out," and "very certain it's out of the park" (i.e., not in their local park). The respondents were not informed that there were 12 photos which were actually in the park and 6 which were not.

A second set of 7 photographs, all of which were in the park, were given to the respondent. These photographs were used in conjunction with a map of the park that indicated the border of the park and the interior roads and lakes, but had no labels. Respondents, having been told that each of the photos were taken in the park, were asked to locate where the photographs were taken by writing the photo number on the map. This limited use of a mapping procedure was necessitated by the apparent difficulties in using a sketch-map procedure in an urban park (as found in Pilot #1). Both the map-photo and photo-identification tasks were successfully pre-tested (in Pilot #5).

Evaluative image. Obtaining measures of the value of the park was accomplished in two ways. First, a semantic differential test was designed using 15 adjective pairs. Respondents were asked to rate the park as a whole, indicating their evaluation of the park on a five-point scale with opposing adjectives at each extreme (p. 295). Based on lists of adjective pairs used and collected by other researchers (Calvin, Dearinger and Curtin, 1972; Bechtel, 1975; LaPage and Cormier, 1977; Gratzer, Sutherland and Throssell, 1978), the pairs that were chosen were selected because they were found to be pertinent to urban parks and relatively unambiguous. While problems with the semantic differential technique have been documented (Heise, 1969; Miron, 1972), it has also been noted as a technique that can be effectively used and is widely accepted for use in environmental psychology (Bechtel, 1975). The decision to use this method was made after a review of other possible methods in environmental knowing turned up no better ways to obtain evaluations within the constraints of the present research (c.f. Michelson, 1975; Golledge, 1976; Whyte, 1977). For example, tasks based on personal construct theory or sorting procedures are both time-consuming and difficult to analyze.

It is evident that evaluations of large parks, such as those selected for this study, might vary in the different areas of the parks. While it would have been advisable to use the semantic differential task for each area of the park (seven areas in Forest Park and five in Elizabeth Park were identified in Pilot #2), this task proved to be redundant and cumbersome (as tested in Pilot #5). As a compromise, the semantic differential task was used once for the entire park, but was supplemented by data from a map with feature labels and area designations. Respondents referred to these maps and accompanying photos (which were chosen as most representative of each area in Pilot #4), then rated the areas in order of their preference and again in order of their personal familiarity (p. 297).

Interpretive image. The interpretive aspect of image includes the respondents' plans and predictions in reference to the park. It is suggested in Chapter II that these interpretations are related to both the descriptive and evaluative aspects of image. Items for the interpretive measures were developed out of comments made by park users during the pilot studies (#1 and #2). In the final instrument, two groups of interpretive questions were used: items concerning general interpretations; and, items concerning more specific features of the park with accompanying photographs of those features.

The interpretive-general items consisted of 12 broad, park-wide statements which the respondents rated on a five-point scale ranging from "strongly agree" to "strongly disagree" (p. 292). The statements addressed a variety of issues such as safety ("The park is safe in the daytime"), maintenance ("The roads in the park are not adequately maintained"), and overall impression ("I take pride in showing the park to out-of-town visitors").

The 14 interpretive-specific statements were related to particular features of the park such as the lake ("The lake is quite an attractive feature of the park"), the rose gardens ("The city needs to pay more attention to the care of the rose gardens"), and the picnic tables ("There are problems in finding a picnic table to use") (p.298). Photos of each of these features were provided for the respondent as a visual aid while evaluating these statements on the same five-point agree-disagree scale used for the general items. The 14 statements were in seven pairs, each pair providing different perspectives on the feature depicted in the photographs. For example, "The meadows are nice places to sit in the sun" was paired with "It is difficult to relax in the meadow undisturbed." While all of the statement-pairs represented different points of view, they were not necessarily contradictory viewpoints.

Recreational use. The final information necessary for investigating the model described in Chapter II concerns patterns of recreational use. These data were collected using three types of questions. First, the respondents were asked to report the number of days in the previous year in which they used various outdoor areas: their yard, their street or block, city parks in general, the specific park under study, and recreational settings outside the city (p. 299). Then, the same list of 38 activities which was used to measure "interests" was provided for the respondents to indicate the number of days they spent doing that activity in this park (p. 300). Finally, a list of reasons which might influence a potential user to go to or not to go to a park was reviewed by the respondents. These reasons were park-related (e.g., distance to the park, condition of the facilities, safety and security), rather than being person-related (e.g., no time, age or health reasons). The respondents indicated which reasons affected their decision to go to the park (p. 301), then were asked to go back over the list and indicate the reasons which might influence their decision not to go to the park (p. 302). With the exception of some final open-ended questions (p. 303), these questions on recreational use ended the home interview.

4. Summary of the survey instrument. Figure 13 provides a summary of the measures used in the survey instrument. The four major categories of data, as defined in this section, are listed in the first column -- demographic characteristics, recreational interests and motives, park image, and recreational use. These groups of measures are broken into subcategories which further define the type of information being sought. Finally, the specific measures, which were designed for each subcategory, are listed.

E. Summary

The purpose of this chapter has been to introduce the methods developed in pursuit of the research objectives described in Chapter II. The process of selecting the two urban parks was discussed. Then, the pilot studies conducted in these parks were reviewed. Survey procedures were also described as they relate to sampling from the target population, the outcomes of contacts with potential respondents, and the characteristics of the resulting sample. Finally, the survey instrument

Figure 13. Summary of survey instrument.

CATEGORY	SUB-CATEGORY	MEASURES
A. DEMOGRAPHIC CHARACTERISTICS	Location	-distance to the park -town of residence
	Individual	-age/sex -years in home/years in the metropolitan area -occupation (hours spent away from home
	Household	-size of family -characteristics (age/sex of family members) -income
B. RECREATIONAL INTERESTS	Activities	-rating of interest in specific activities
	Reasons	-rating of importance of reasons for participating in outdoor recreation

Figure 13. Summary of survey instrument.
(continued)

CATEGORY	SUB-CATEGORY	MEASURES
C. PARK IMAGE	Descriptive	-self-estimates of familiarity, time to walk, time to drive -free recall of features -verbal knowledge questions -identification of photographs, locational placement of photographs on map
	Evaluative	-adjective ratings of entire park (semantic differential) -preference and familiarity for areas of the park
	Interpretive	-general, park-wide statements -specific statements using photographs of features
D. RECREATIONAL USE	Use	-reported days of use of outdoor facilities -reported days of use of park by activity
	Reasons	-reasons for use of park -reasons for non-use of park

was described in detail for each category of information being sought -- demographic characteristics, recreational interests and motives, park image, and recreational use.

CHAPTER IV

RESULTS, PART I: THE NATURE OF IMAGES OF URBAN PARKS

This chapter addresses the first two research objectives developed in Chapter II. The first objective was defined as:

> 1) To investigate the nature of images of urban parks as measured by the survey instrument.

The results which bear on this objective are presented in this chapter, including a discussion of the measures of image and a review of the process of preparing these data for further analyses. The second objective is:

> 2) To test for differences in image between the two parks, as well as sample differences.

Analyses are presented which compare the results from the two parks on a number of dimensions: whether the images of the parks differ; if there are differences in the individual characteristics of the two samples; and whether patterns of outdoor recreation differ for the two groups.

The objectives in this results chapter are set apart from the next chapter because they function as preliminary investigations which introduce the data in preparation for the later analyses. Based on these results, the second results chapter addresses the three remaining objectives using multiple regression equations as the primary analytic technique.

Throughout the results, the emphasis is placed on presenting the variables which play a role in the later data analyses. Therefore, to facilitate this process, many variables which play little or no role in the analyses are reserved for presentation in the appendices. In general, interpretations about the results are offered as they relate to individual research objectives. However, an overview of the results which integrates the findings from all five of the objectives is saved for the initial section in the discussion chapter.

A. Images of Urban Parks

What is the nature of the images of Forest Park and Elizabeth Park held by the respondents? How accurate is their descriptive image? What are their overall evaluations of the parks? Also, how do they interpret this information? And finally, how can these measures of image be reduced in number to facilitate the multiple regression analyses conducted for the next chapter?

These questions are addressed in this section of the first results chapter. Initially, the data concerning each of the three aspects of image -- descriptive, evaluative, and interpretive -- are discussed individually. After summarizing each aspect of image, the process of reducing the number of variables through combinations and eliminations is discussed.

1. Descriptive image. The descriptive image data reveal that the respondents vary substantially in their knowledge of the parks. This variability is evident in scores for each of the methods that were used to measure descriptive knowledge -- the free recall of features in the park, the identification of park photographs, the location of photos on a map -- and for the self-estimates of familiarity and travel time to the

park. These data illustrate that many persons hold images of the parks which are based on inaccurate and outdated information. These results also explain the data transformations used in tabulating summed descriptive image scores. Comparisons between these measures of descriptive knowledge are not discussed until the section on variable reduction.

Free recall of features. When asked to list as many features of the park as they could recall, respondents exhibited much variance in their abilities to do so. The range of items mentioned was from 3 to 28 in Forest Park, and from 2 to 14 features in Elizabeth Park (see Table 1). In Forest Park, the mean number of features recalled was 11.3 which represents 29% of the 39 features eligible for recall. In Elizabeth Park, there were only 20 items eligible for the recall task, so the mean of 7.7 features recalled includes 39% of the total number of features. Therefore, the difference between parks in the number of features named can be viewed from two perspectives: first, clearly more items were recalled in Forest Park; however, a larger proportion of the features which could be recalled was named in Elizabeth Park.

Of course, some features were mentioned more consistently than others: the ballfields, zoo, and duck pond were the most frequently mentioned features in Forest Park, while the rose gardens, tennis courts, and lake were mentioned most often in Elizabeth Park. The salience of these individual features is certainly important in understanding the image of these parks, but they have little direct bearing on the quantification of the image variables for use in later analyses. Therefore, tables which report the features in the parks in order of their frequency of recall are presented in Appendix D (Tables 25 and 26).

Table 1. Data Summary of Descriptive Image Variables.

Measure	Forest Park (N=95)					Elizabeth Park (N=101)				
	Min.	Max.	Mean	Med.	SD	Min.	Max.	Mean	Med.	SD
Free Recall of Features:										
Total Number of Features Named	3	28	11.3	10.3	4.9	2	14	7.7	7.6	2.8
Knowledge of Park Rules:										
Knowledge Score (maximum of 6)	1.5	6	3.9	4.0	1.0	.5	5	2.8	2.7	1.2
Photo Identification Task:										
Score for Park Photos (maximum of 12)	3	11	7.9	8.1	1.8	0	12	8.0	8.0	1.9
Score for Non-Park Photos (maximum of 6)	0	6	3.7	3.9	1.4	0	6	4.2	4.2	1.1
Photo Location Task:										
Location Score (maximum of 7)	1	7	4.4	4.5	1.7	.5	6.5	3.4	3.7	1.7

Knowledge of park rules. Six questions were asked to test the respondents' knowledge of park rules. For example, they were asked if there are hours when it is illegal to enter the park, if alcoholic beverages are permitted, and also, if a fee is charged for any activities in the park. These questions regarding park rules were summed into one overall knowledge score for use in the data analyses (see Appendix D, Tables 27 and 28, for distributions of scores on the individual questions). Respondents received a point for each correct answer, with a maximum score of 6. However, if the respondent knew a partially correct answer (for example, that the park closes in the evening), but could not provide the full details (that it closes at 9:30 p.m.), then one-half credit was given.

The range of the knowledge scores (see Table 1) illustrates that while some persons know the park rules well (scoring 5 or 6), many are quite unfamiliar with them (scoring as low as .5). The mean score in Forest Park for the knowledge questions is 3.9 out of a possible 6, while it is 2.8 in Elizabeth Park. These scores indicate that there is missing information about park rules among many of the respondents. The higher scores in Forest Park could be due to one or more factors: the high visibility of park rules (large informative signs can be found at two of the major entrances); the better enforcement of rules in Forest Park; since the answers are different for the two parks, perhaps some of the rules are harder to remember in Elizabeth Park; or, the difference may be simply attributed to a better knowledge of their park on the part of the Forest Park sample.

Photo identification task. Another illustration of the respondents' incomplete and inaccurate descriptive knowledge of the parks is provided by the data from the photo identification task. Table 1 also illustrates the range and variance of the scores on this test where respondents were asked to identify whether or not photos were taken in the park. These results indicate that some persons performed this task to near perfection while others were hardly able to distinguish whether a photo was taken in the park or not. On the average, two-thirds (12 of 18) photographs were correctly identified as in or not in the parks.

It should be noted that these scores were transformed from the raw scores for the photo identification task. The transformation was made because of the nature of the task which used 12 photographs which were in the park and 6 which were not. Since it is possible that different decision-making processes would be involved in correctly identifying park photos and correctly rejecting non-park photos, two different scores were created. When these summed scores were calculated for correctly identified park and non-park photos, it was found that the two scores had a significant negative correlation in Elizabeth Park (-.34, $p < .01$) and a similar trend in Forest Park (-.13, $p < .10$). Since the two tasks should not be so different as to result in negative correlations, this finding was counter to expectations.

The interpretation of the negative correlations between the two scores suggests that individual respondents who tended to identify photos as in the park were more likely to score high for the park photos and correspondingly low on the non-park photos. For those who tended to place photos out of the park, the reverse occurred. This apparent response bias was easily corrected using a simple data transformation. Mean scores for each respondent were calculated for all 18 photos. Then, for each response to a photo, it was determined whether the response was on the "in park" side of the individual's mean or on the "out park" side of the mean. The adjusted score for park photos was calculated as the number of photos that the respondent placed on the "in park" side of the mean out of the 12 park photos. The opposite procedure was used to calculate an adjusted score for the non-park photos. It is these adjusted photo identification scores which are reported in Table 1 and used in later analyses.

Photo location task. The next descriptive image task involved the location of seven photos on an unlabeled map of the park. Once more a summed score was calculated for the entire task (data on the individual photographs is in Appendix D, Tables 29 and 30). A perfect score of 7 was given if all the photos were placed in their correct locations (an overlay was used for scoring; circles around the precise locations defined the permissible margin of error). One-half point was added to the score if the respondent missed the exact location but was able to place the photo in the correct "area" of the park (using areas defined in the pilot work). Also, one-half point could be earned in instances where a photo was located incorrectly but was placed correctly on the map where a comparable feature is located (for example, a photo of a ballfield is placed near a different ballfield in the park.)

The range of scores (from 1 to 7 in Elizabeth Park, and from .5 to 6.5 in Forest Park) illustrates the varying abilities of the respondents to complete this task (see Table 1). The mean scores on the photo location tasks are 4.4 out of a possible 7 in Forest Park and 3.4 in Elizabeth Park. These scores demonstrate the moderately successful abilities of many respondents to locate the photos on the maps, but the failure of others is also evident. The differences between parks can be explained by one or more reasons: the map of Forest Park is smaller in scale which made it easier to score a correct placement; in addition, there is the possibility that the set of photos from Elizabeth Park was more difficult to place; and, it may simply be that the respondents from Forest Park knew their park better.

Self-estimates. The respondents were asked to make two sets of judgments: about their familiarity with the parks; and about the time it takes them to walk and drive there. These self-estimates are treated as descriptive knowledge, but cautiously so. They are measures of how well an individual knows the park and how far away the park is perceived, but there is no "objective" measure or "test" of these judgments. These are in contrast to the previously reviewed descriptive measures where it was possible to determine how accurate the individual's knowledge is. The results of these measures are discussed below and the data are summarized in Table 2.

The respondents can be grouped based on their self-estimates of familiarity with the park. Although provided with a five-point familiarity scale, most respondents indicated an average or above average familiarity with their local park (no respondents indicated "no familiarity" with the park). Table 2 summarizes the distribution of persons for the familiarity estimates. In both parks, the mean rating of familiar is around the label "very familiar," a value of "4."

Table 2. Data Summary of Self-Estimates.

Measure	Forest Park (N=95)					Elizabeth Park (N=101)				
	Min.	Max.	Mean	Med.	SD	Min.	Max.	Mean	Med.	SD
Estimate of Familiarity:										
Based on a scale from 1 ("not at all") to 5 ("extremely")	2	5	4.1	4.3	.9	2	5	4.2	4.4	.8
Estimates of Travel Time:										
Minutes to Walk	1	60	14.9	14.7	9.8	1	75	15.4	14.7	12.9
Minutes to Drive	1	10	4.6	4.7	2.3	1	15	4.2	4.5	2.9

To repeat, the judgment of familiarity with a park cannot be "tested" for accuracy. The self-estimate may be a measure of use of the park (past or present), or of the desire to use the park, or even of the respondent's pride in the park. Still, a self-estimate of familiarity may be informative about how that respondent views and uses the park. Therefore, the familiarity variable is maintained for use in later analyses with the above considerations in mind.

The respondents were also asked to estimate the time of travel (in minutes) from their homes to the park by walking and driving. The data in Table 2 reveal that means for both parks are similar, around 15 minutes to walk and 4.5 minutes to drive to the parks. Also, a large range of responses were evident in the two parks, from 1 to 75 minutes to walk and from 1 to 15 minutes to drive. Again, the interpretation of these measures as descriptive knowledge is somewhat arbitrary. They can be viewed as tests of the respondents' knowledge of the location and accessibility of the parks. However, as discussed below, they might be more readily viewed as approximations of distance to the parks.

An approximate test of the accuracy of these estimates can be accomplished by examining the relation of travel time to distance. The correlations between actual distance and perceived travel time provide tests of this relationship: the Pearson's r between minutes to walk and distance is .72 for Forest Park and .63 for Elizabeth Park; the correlations between minutes to drive and distance are .43 for Forest Park and .51 for Elizabeth Park. All of the correlations are significant ($p < .01$) and it is unlikely that they would be much larger for two reasons: first, even though persons may live the same distance from a park, their travel time could actually be different due to different paces of walking or driving; also, the method used for calculating distance as the distance from the home to the nearest point in the park (using city maps) results in a degree of error since it does not necessarily take into account the individual's true point of entry into the park.

Due to the strong relationship of the self-estimates of travel time to actual distance and the problems encountered in treating these variables as "tests" of descriptive knowledge, these items are dropped from the later analyses. It is assumed that distance to the park, which is grouped with the demographic variables, will adequately represent the travel time variables.

2. Evaluative image. The most essential measure of the evaluative image was composed of 15 adjective pairs rated in a semantic differential task. Since the parks are large and opinions may differ depending upon which part of the park the respondent was rating, it would have been helpful if the respondents had completed this task in reference to each area within the park. However, it was evident from a test of this procedure in a pilot study (#5) that the task of rating each park area on each of the adjective pairs was too tedious. Therefore, the respondents rated the park as a whole when completing the semantic differential task. A second task was used to investigate the differences in evaluations by area. Respondents were simply asked to rank the areas of the park according to their preference and their familiarity with each area. A map of the park with the areas circled and a representative photo of each area were provided as visual aids.

Adjective evaluations. The results of the adjective evaluation task are presented in Tables 3 and 4 where the adjective pairs are listed in order of how far they were rated from a neutral score of "3." Thus, in Forest Park, the most extreme mean scores were for these adjectives: valuable, convenient, accessible, like, and wooded. In Elizabeth Park, equally extreme average scores were found for: convenient, like, valuable, accessible, pleasant, natural, and interesting. On the other extreme, some adjective pairs had mean scores which were quite close to neutral, in other words there was no clear preference for one or the other adjective in the pair. In Forest Park, safe-dangerous and crowded-uncrowded were the pairs where the most ambivalence was revealed; in Elizabeth Park, the pairs closest to neutral were not littered-littered and crowded-uncrowded.

The adjective evaluation scores suggest that, for the most part, both of these parks are valued highly by the respondents for the convenience and accessibility of their natural environments. However, there is a degree of disagreement among the respondents about other evaluations of the parks, such as their safety, cleanliness, and crowdedness; this is illustrated by the "neutral" means and large variances for these pairs. These data are of interest on their own, but will also be useful in later analyses such as comparisons of the parks' images and predictions of park use.

Area preference and familiarity. The respondents were asked to rank order each area in the park based first on their preference, then on their familiarity. The preference and familiarity for each of the areas in Forest Park and Elizabeth Park are summarized in Tables 5 and 6. In

Table 3. Adjective Evaluation Scores. Forest Park (N=95)

Adjectives[1]	Mean	"Distance" from Underlined Adj.[2]	SD
valuable-worthless	1.52	.52	.94
convenient-inconvenient	1.55	.55	1.08
inaccessible-accessible	4.37	.63	1.14
like-dislike	1.64	.64	.96
artificial-natural	4.34	.66	.90
wooded-not wooded	1.71	.71	.98
unpleasant-pleasant	3.91	1.09	1.04
boring-interesting	3.73	1.27	1.11
not littered-littered	3.64	1.36	1.09
tense-relaxed	3.62	1.38	1.13
active-passive	2.52	1.52	1.00
noisy-quiet	3.42	1.58	.94
dirty-clean	2.61	1.61	.96
crowded-uncrowded	2.82	1.82	1.10
safe-dangerous	3.08	1.92	1.18

[1] The first adjective listed is represented by a 1, the opposing adjective is represented by a 5. The mean represents the average for each pair.

[2] The adjective pairs are listed in order of how favorably they were rated. For example, in Forest Park, valuable was the most favorably rated adjective (mean "distance" from valuable was .52), and in Elizabeth Park, convenient was the most favorably rated adjective (mean "distance" from convenient was .20).

Table 4. Adjective Evaluation Scores.
Elizabeth Park (N=101)

Adjectives[1]	Mean	"Distance" from Underlined Adj.[2]	SD
convenient-inconvenient	1.20	.20	.77
like-dislike	1.26	.26	.61
valuable-worthless	1.26	.26	.69
inaccessible-accessible	4.62	.38	.86
unpleasant-pleasant	4.60	.40	.69
artificial-natural	4.48	.52	.74
boring-interesting	4.28	.72	.91
tense-relaxed	4.27	.73	.96
wooded-not wooded	2.14	1.14	.94
dirty-clean	3.72	1.28	1.08
noisy-quiet	3.66	1.34	1.09
active-passive	2.44	1.44	1.12
safe-dangerous	2.48	1.48	1.01
crowded-uncrowded	3.40	1.60	.99
not littered-littered	2.69	1.69	1.25

[1]The first adjective listed is represented by a 1, the opposing adjective is represented by a 5. The mean representes the average for each pair.

[2]The adjective pairs are listed in order of how favorably they were rated. For example, in Forest Park, valuable was the most favorably rated adjective (mean "distance" from valuable was .52), and in Elizabeth Park, convenient was the most favorably rated adjective (mean "distance" from convenient was .20).

Forest Park, the lake and lily pond areas, two largely "natural" areas, are clearly preferred by the respondents. In Elizabeth Park, the rose garden and lake areas, two somewhat "natural" areas, are the most preferred. These results are in concert with the prevalent notion that natural environments are the most attractive. However, it is interesting to note that patterns of the familiarity rankings do differ somewhat. In Forest Park, the zoo area is by far the more familiar even though it was not preferred. In addition, areas in Forest Park where activities take place (e.g., athletics and central) had higher average rankings for familiarity than they did for preference. In Elizabeth Park there was greater agreement between preference and familiarity for areas. This is due in part to the dominant location and popularity of the rose garden and lake areas which may overshadow the evaluations of the remaining areas.

Relationship of adjective evaluations to preference/familiarity ranks. The relationships between the adjective evaluations and the area preference/familiarity ranks are not very useful. In general, the results show that the respondents, as they were instructed, were evaluating the parks as a whole rather than in reference to their most preferred or familiar areas. This finding was revealed by Spearman rank-order correlations between preference/familiarity ranks for each area for all adjective pairs. In Forest Park, the 7 areas by 15 adjective pairs produced 105 coefficients each for familiarity and preference scores; and only 15 (14.3%) and 13 (12.4%) were significant ($p < .05$) for preference and familiarity respectively. In Elizabeth Park, the 5 areas by 15 adjective pairs produced 75 coefficients; 17 (22.7%) were significant for

Table 5. Area Preference/Familiarity Scores
Forest Park (N=95)

Area[1]	Preferences by Avg. Rank and % of 1st Choice		Familiarity by Avg. Rank and % of 1st Choice	
Lake Area: the largest area of the park; dominated by a large lake and dense woods; contains an isolated day camp.	2.5	33.0%	3.4	16.0%
Lily Ponds: an extension of the lake area with planned land-scaping, lily ponds, and a mix of wooded and open spaces.	2.7	28.9%	3.2	16.8%
Central Area: in the center of the park; includes a mix of activities such as a playground, rose gardens, lawn bowling, and a kiddie zoo.	4.0	11.3%	3.3	16.0%
Monument: an isolated area with dense woods, but atop a hill is a monument (crypt), park offices, and a view of a large meadow.	4.1	9.3%	4.7	8.4%
Zoo Area: this area was once dominated by the zoo (now closed); also has a swimming pool, skating rink, shuffleboard, greenhouses, and more.	4.1	5.2%	2.9	18.5%
Athletics: dominated by a large open space with many athletic fields and a brick stadium at one corner.	5.0	5.2%	4.0	12.6%
Pavillion: an old pavillion stands at the entrance to the park; tennis courts are adjacent; woods are moderately dense.	5.2	7.2%	4.7	11.8%

[1]Areas were derived from responses to pilot studies described earlier. Areas listed in order of preference (according to average ranking).

Table 6. Area Preference/Familiarity Scores. Elizabeth Park (N=101)

Area[1]	Preferences by Avg. Rank and % of 1st Choice		Familiarity by Avg. Rank and % of 1st Choice	
Rose Gardens: regionally famous gardens surrounded by open meadow areas and horticultural center.	1.7	54.4%	1.7	54.5%
Lake Area: a small lake with small islands and bridges; surrounded by woods, refreshment stand and open areas.	2.1	26.2%	2.2	19.8%
West Area: the most isolated and heavily wooded area; some clearings for tennis courts, picnic tables, playground, and a meadow.	3.2	7.8%	3.6	5.0%
Athletics: an active area with tennis courts, ballfield, lawn bowling, and a meadow.	3.8	6.8%	3.4	12.9%
East Area: cut off from park by a through street; contains lookout over downtown and athletic fields.	4.0	4.9%	3.8	7.9%

[1]Areas were derived from responses to pilot studies described earlier. Areas listed in order of preference (according to average ranking).

preference rankings, and 9 (12.0%) for familiarity ranks. While there is no established test for determining how significant these proportions of significant correlations are, it is clear that the number of significant correlations could easily have occurred by chance. The exception might be the 22.7% significant correlations for area preferences in Elizabeth Park. However, the skewed preferences for the rose garden and lake areas (as seen in Table 6) influence the statistical reliability of these coefficients.

In sum, the measures of evaluative image differ in their potential utility for further analyses. The lack of relationship between the adjective pairs and the preference/familiarity rankings suggests that the respondents were evaluating the parks in general. The preference/familiarity rankings suggests that the respondents were evaluating the parks in general. The preference/familiarity rankings of individual areas are difficult to interpret in more complex analyses and thus their utility for later sections is limited. On the other hand, the semantic differential task provides data which are quite useful for the later analyses.

3. Interpretive image. Two formats were used in an attempt to measure interpretive image. To begin with, 12 general statements were evaluated from a park-wide perspective by the respondents on a five-point agree-disagree scale. For reasons similar to those described in the evaluative image section (the concern for the difference between park-wide vs. area-based judgments), a second set of statements were used to measure more specific aspects of interpretive image. These statements were accompanied

by photographs of park features to encourage the respondents to evaluate them in relation to that specific aspect of the park.

Interpretive-general. Scores for the 12 interpretive-general items are summarized in Tables 7 and 8. They are listed in order from highest agreement to highest disagreement, based on the mean score for each statement. Items in the middle range (i.e., mean scores close to 3.00) are statements for which some agreement and some disagreement was expressed by the respondents, and therefore, the average interpretations are near "neutral."

Looking at those items where the mean score is within 1.00 of the extreme, there was a consensus about some negative aspects of Forest Park. In this regard, the results indicate that respondents found vandalism to be common in the park and that the park is not safe in the evenings. There was also strong agreement that there are large numbers of teenage users in the park (which might be a "negative" interpretation as well) and that the park is easily accessible. Using the same criterion for measuring consensus in Elizabeth Park, there are two positive items which stand out. Respondents found Elizabeth Park to be easily accessible and were proud to show the park to out-of-town visitors.

The data from the interpretive-specific statements are summarized in the same manner as were the interpretive-general statements (Tables 9 and 10). In Forest Park, the strongest agreement by the respondents was with the attractive qualities of the lake, and greatest disagreement was the statement indicating that the zoo is in decent repair (note that this item was applicable to Forest Park only). In Elizabeth Park, there was

Table 7. Interpretive General Scores.
Forest Park (N=95)

Statements[1]	Mean	"Distance" from Strongly Agree[2]	SD
Forest Park is used by a large number of teenagers	1.76	.76	.66
I find Forest Park to be easily accessible.	1.84	.84	.90
Signs of vandalism are common in Forest Park.	2.00	1.00	1.01
I like to drive through the park, even if I don't stop there.	2.34	1.34	1.16
Forest Park is safe in the daytime.	2.61	1.61	1.07
I take pride in showing Forest Park to out-of-town visitors.	2.95	1.95	1.19
I enjoy driving to Forest Park, stopping the car, and just sitting.	3.00	2.00	1.20
The city sponsors interesting activities in Forest Park.	3.01	2.01	1.07
The roads in the park are not adequately maintained.	3.37	2.37	.92
A large proportion of the users of the park are older people.	3.63	2.63	.94
There is very little litter in Forest Park.	3.83	2.83	.90
In the evening, it is safe to walk in Forest Park.	4.01	3.01	1.09

[1]Strong agreement is indicated by a 1, agreement by a 2, neutral a 3, disagreement a 4, and strong disagreement a 5.

[2]The statements are listed in the order of how much agreement there was with the statement. For example, there was the greatest amount of agreement with the first statement, "Forest Park is used by a large number of teenagers"; there was the greatest amount of disagreement with the last statement, "In the evening, it is safe to walk in Forest Park."

Table 8. Interpretive General Scores.
Elizabeth Park (N=101)

Statements[1]	Mean	"Distance" from Strongly Agree[2]	SD
I find Elizabeth Park to be easily accessible.	1.63	.63	.92
I take pride in showing Elizabeth Park to out-of-town visitors.	1.99	.99	.88
Elizabeth Park is safe in the daytime.	2.14	1.14	.79
I like to drive through the park even if I don't stop there.	2.44	1.44	1.15
Elizabeth Park is used by a large number of teenagers.	2.48	1.48	.81
There is very little litter in Elizabeth Park.	2.63	1.63	1.04
The city sponsors interesting activities in Elizabeth Park.	2.90	1.90	.87
I enjoy driving to Elizabeth Park, stopping the car, and just sitting.	2.93	1.93	.99
The roads in the park are not adequately maintained.	3.03	2.03	1.18
Signs of vandalism are common in Elizabeth Park.	3.41	2.41	.87
A large proportion of the users of the park are older people.	3.41	2.41	.95
In the evenings, it is safe to walk in Elizabeth Park.	3.73	2.73	1.09

[1]Strong agreement indicated by a 1, agreement by a 2, neutral a 3, disagreement a 4, and strong disagreement a 5.

[2]The statements are listed in order of how much agreement there was with the statement. For example, there was the greatest amount of agreement with the first statement, "I find Elizabeth Park to be easily accessible"; there was the greatest amount of disagreement with the last statement, "in the evenings, it is safe to walk in Elizabeth Park."

Table 9. Interpretive Specific Scores.
Forest Park (N=95)

Statements[1,2]	Mean	"Distance" from Strongly Agree[3]	SD
The lake is quite an attractive feature of the park.	1.52	.52	.71
The meadows are nice places to sit in the sun.	2.07	1.07	.82
It would be easier to walk through the woods if there were more paths.	2.32	1.32	1.09
Some of the roads in the park should be closed to traffic.	2.63	1.63	1.29
The picnic area is often too noisy.	2.81	1.81	.90
The rose gardens are beautiful.	2.83	1.83	1.29
The zoo is kept in decent repair.[4]	4.01	3.01	1.02

[1] Statements were accompanied by photographs depicting the features in each statement. Statements were paired with other statements which have been dropped for the analyses because it is likely that the responses to the second statements in the pairs were affected by the first response.

[2] Strong agreement with the statement is indicated by a 1, agreement by a 2, neutral a 3, disagreement a 4, and strong disagreement a 5.

[3] The statements are listed in order of how much agreement there was with the statement. For example, there was greatest amount of agreement in Forest Park with the first statement, "The lake is quite an attractive feature of the park"; there was the greatest amount of disagreement in Elizabeth Park with the last statement, "The picnic area is often too noisy."

[4] The zoo statement is applicable to Forest Park only.

Table 10. Interpretive Specific Scores.
Elizabeth Park (N=101)

Statements[1,2]	Mean	"Distance" from Strongly Agree[3]	SD
The rose gardens are beautiful.	1.50	.50	.89
The lake is quite an attractive feature of the park.	1.74	.74	.90
The meadows are nice places to sit in the sun.	1.82	.82	.59
It would be easier to walk through the woods if there were more paths.	2.74	1.74	1.10
Some of the roads in the park should be closed to traffic.	2.88	1.88	1.18
The picnic area is often too noisy.	3.23	2.23	.77

[1]Statements were accompanied by photographs depicting the features in each statement. Statements were paired with other statements which have been dropped for the analyses because it is likely that the responses to the second statements in the pairs were affected by the first response.

[2]Strong agreement with the statement is indicated by a 1, agreement by a 2, neutral a 3, disagreement a 4, and strong disagreement a 5.

[3]The statements are listed in order of how much agreement there was with the statement. For example, there was greatest amount of agreement in Forest Park with the first statement, "The lake is quite an attractive feature of the park"; there was the greatest amount of disagreement in Elizabeth Park with the last statement, "The picnic area is often too noisy."

strong agreement with three positive statements about the beauty of the rose gardens, the attractiveness of the lake, and the comfort in the meadows.

These responses are informative about user attitudes toward specific features of the parks. As such, the data have an immediate utility for the park planners in Forest Park or Elizabeth Park. However, if one is interested in applying these findings to a larger number of urban parks, the specific nature of these data is a drawback. Therefore, it is with caution that interpretive-specific items are used when the goal of the data analysis is to produce generalizable results.

4. Preparing the image variables for comparative and predictive analyses. At this point in the analysis of the image data, it is clear that a large number of loosely related variables are available as measures of image. However, before these measures of image can be of use in the remaining data analyses, it is necessary to reduce the number of variables.

There are pressing reasons for the need to combine and/or eliminate image varibles. In the next chapter, multiple regression will be discussed as the most appropriate analytic technique for addressing the final three research objectives. For these multiple regression analyses, variable reduction is desirable and necessary when confronted with a large number of variables and a relatively small number of cases. In forming multiple regression equations, it is essential that as few independent variables as possible be offered in predicting the dependent variable(s) in order to avoid "capitalizing on chance." Also, since the goal of the research is to develop generalizable measures of image, it is again desirable to form groups of variables that can be used in analyses for both parks, as well as in other parks, rather than using idiosyncratic solutions for each park under study.

Variable reduction procedures. Developing a strategy for combining and/or eliminating items in order to reduce the total number of image variables was the most difficult task in the data analyses. It would be advantageous to decide on such a strategy using an *a priori* theoretical basis for the elimination and combination of variables. However, the exploratory nature of the research produced a "grab bag" of variables without a clear basis for choosing or grouping variables (that is, beyond the distinctions between descriptive, evaluative, and interpretive aspects of image). Multivariate techniques such as factor analysis, cluster analysis, and multidimensional scaling are possible reduction devices, but the small number of cases limits the potential of these procedures to generate consistent and meaningful solutions. Stepwise multiple regression is another statistical method of eliminating variables; still, if too many independent variables are offered in predicting the dependent variable(s) using a stepwise procedure, significant multiple R values are almost certain to appear due to "capitalizing on chance."

Having exhausted these other possibilities, a two-step strategy was developed to combine and eliminate image variables based on item intercorrelations and meanings. The correlation matrices within each of the aspects of image were carefully examined for possible combinations (the matrices appear in Appendix D, Tables 31 through 35). Items which appeared to have common connotations were added into grouped scores if there was no evidence from the correlation matrices to counter these decisions.

A second step was developed in this process to provide a statistical test of the newly formed variable groupings. While conducting multiple regression analyses, the first time a combined variable was used, a single "representative" item was also used in a separate, "parallel" analysis. This item, selected as the one most consistently correlated with other items in the group, was used as a check of the reliability of the combinations. The results of the "parallel" analyses were that in no instance could the single items improve upon the analyses using the combined variables.

The reduced number of variables designated for use in the multiple regression analyses are listed in Table 11 and are discussed below. The descriptive, evaluative, and interpretive (general and specific) measures of image have been distinguished on a theoretical basis and remain separated at this point. Within each of these categories, decisions were made to combine certain variables and eliminate others using the strategy outlined above.

Combining the descriptive variables. The descriptive image tasks were moderately correlated with one another (see Table 31, Appendix D) and a procedure which combines them appeared to be quite reasonable. Since the tasks tested for different types of abilities (e.g., verbal knowledge, visual identification, spatial knowledge) a combined score was useful in reducing the error variance that may exist where an individual had difficulty with one task but demonstrated knowledge in each of the others. Therefore, the scores for knowledge of park rules, identifi-

Table 11. Variable Reduction of Image Measures.

Category	Name of Combined Variable	Image Measure and Representative Variable[1]
DESCRIPTIVE MEASURES	Description	knowledge score park photo score non-park photo score location score
	Free Recall	total number of features named
	Familiarity	self-estimate of familiarity
EVALUATIVE MEASURES	Evaluation	like-dislike boring-interesting not pleasant-pleasant valuable-worthless
	Cleanliness	safe-dangerous dirty-clean not littered-littered
	Convenience	not accessible-accessible convenient-inconvenient
	Naturalness	artificial-natural wooded-not wooded

[1]The underlined items are those chosen as most representative of the combined variable and used in the "parallel" analyses.

Table 11. Variable Reduction of Image Measures.
(continued)

Category	Name of Combined Variable	Image Measure and Representative Variable[1]
INTERPRETIVE-GENERAL MEASURES	Safety	Int12: In the evenings, it is safe to walk in the park. Int18: Signs of vandalism are common in the park. Int19: The park is safe in the daytime. Int21: There is very little litter in the park.
	Driving	Int17: I like to drive through the park, even if I don't stop there. Int22: The roads in the park are not adequately maintained. Int23: I enjoy driving to the park, stopping the car, and just sitting.
	Pride	Int14: The city sponsors interesting activities in the park. Int20: I take pride in showing the park to out-of-town visitors.
INTERPRETIVE-SPECIFIC MEASURES	Lake	Int35: The lake is quite an attractive feature of the park.
	Woods	Int36: It would be easier to walk through the woods if there were more paths.
	Roses	Int37: The rose gardens are beautiful.
	Picnic Area	Int38: The picnic areais often too noisy.
	Meadows	Int39: The meadows are nice places to sit in the sun.
	Roads	Int40: Some of the roads in the park should be closed to traffic.

[1]The underlined items are those chosen as most representative of the combined variable and used in the "parallel" analyses.

cation of park photos and non-park photos, and photo locations on maps were combined to create a descriptive knowledge score. The scores were created by a simple summation of the individual scores with minor adjustments to compensate for scaling differences.

The number of features named in the free recall was used separately because of questions about the accuracy of this variable as a measure of descriptive knowledge. The lack of correlation between this measure and the others as well as the sense that total number of items recalled is a unique form of descriptive knowledge led to this decision. Also, the self-estimate of familiarity was separated from the other measures of descriptive knowledge because this variable is distinct from the "tests" of knowledge. As discussed earlier, minutes to walk and minutes to drive were dropped from the list of variables because they are related to actual distance to the park; distance is used in later analyses as a demographic variable.

Combining the evaluative variables. As would be expected, many of the evaluations using adjective pairs are highly correlated with one another. The correlation matrix (Table 32) reveals similar patterns for both Forest Park and Elizabeth Park. It is clear that certain pairs of adjectives represent general evaluations of the parks -- for example, like-dislike, pleasant-unpleasant, valuable-worthless -- and thus are correlated with many or most of the other pairs. Of the remaining pairs, some are more selectively correlated with pairs of related meaning -- for example, dirty-clean with littered-not littered, also tense-relaxed with boring-interesting. Still other pairs show little if any correlation with any other pairs -- for example, wooded-not wooded, crowded-not crowded.

The first combined group for the evaluative variables was formed from the adjective pairs which were correlated with most of the other pairs. Ratings of like-dislike, boring-interesting, not pleasant-pleasant, and valuable-worthless are viewed as general attitudes about the park and summed into one variable. Three other groups were formed out of sums of scores from pairs which were highly correlated and related in meaning: safe-dangerous, dirty-clean, and not littered-littered were combined; not accessible-accessible and convenient-inconvenient formed a variable; and artificial-natural was added to wooded-not wooded. The remaining adjective pairs were eliminated from the analyses as they were ambiguous in meaning and exhibited no clear correlational patterns.

Combining the interpretive-general variables. The correlations among the interpretive-general variables reveal patterns of relationships between the responses to these statements. The correlation matrix (Table 33) indicates that some of the general statements are correlated with many of the remaining 11 statements and may be indicating a generalized opinion about the park. In particular, the statements about the park's safety in the daytime, signs of vandalism in the park, and evidence of litter fall into this category. Other statements appear to be less related to general opinions, including statements about the accessibility of the park and the maintenance of the roads.

These interpretive-general statements were readily summed into groups: four statements concerning safety in the day and in the night, vandalism, and litter were combined to make one general score; three items which refer to the roads and driving formed a variable; and a statement concerning city-sponsored activities and another about showing the park to visitors constituted another interpretive-general score. Three interpretive-general statements with no clear pattern of correlations were eliminated from the later analyses.

Combining the interpretive-specific variables. The correlation matrix for the interpretive-specific statements (Table 34) reveals an altogether different story from the interpretive-general variables. Only a small number of correlations are significant for these variables and no pattern is evident where any one statement correlates with the five remaining interpretive-specific statements. The intended design of these items to elicit specific attitudes about particular features of the park is reflected by the fact that these data are not correlated.

One-half of the interpretive-specific statements had already been dropped when the second of the pairs of statements had been eliminated due to the confounding influence of the first statement in the pair. Further variable reduction was difficult considering the lack of correlation between the variables and the fact that respondents were responding to specific features of the park for each statement. Therefore, six items were held out for use in the later analyses, only eliminating the statement about the zoo because it is relevant to Forest Park alone, and because it is desirable to treat both parks identically during the analyses.

The apparently unique nature of the interpretive-specific items led to a further decision to use them sparingly in later analyses. In particular, the statements are quite detailed in their reference to particular features of a specific park (for example, the maintenance of the roads) so that comparisons of these data between the two parks and generalizations to other parks are hindered. Therefore, these items are utilized with caution in the later analyses.

Comparing the interpretive-general and interpretive-specific variables. A final set of relevant correlations are those between the interpretive-general and interpretive-specific items (Table 35), where the number of significant correlations between the general and specific items appears to be limited. However, a notable exception to this is found in Elizabeth Park where the response to the specific statement regarding the attractiveness of the lake is significantly correlated with 8 out of the 12 interpretive-general statements. This finding might suggest that this specific feature is highly influential in the formation of an overall opinion about the park. Yet, for the most part, the general and specific interpretations are unrelated. This lack of a consistent relationship suggests that the two types of items may not be measuring the same aspect of image after all. Whether distinguishing the two groups is useful when conceptualizing image will be explored in later analyses.

The effects of combining the image variables. While the decisions involved in reducing and combining variables were quite difficult and somewhat arbitrary, they were not made to increase the chances of significant findings. In fact, the reduction of the number of variables through this procedure creates a bias in the analyses away from finding significance since fewer variables are available for predicting the dependent variable(s). The risks involved in the process had to be taken to insure that the later analyses were statistically valid tests of the utility of the image data. A more reliable procedure for variable reduction would have been desirable, but the nature of exploratory research with so few cases and too many variables leaves no more satisfactory procedure.

5. Summary. This research objective, to investigate the nature of images of urban parks, has been pursued with an emphasis on preparing the image data for the later data analysis. To this end, the items measuring descriptive, evaluative, and interpretive image were reviewed. The results indicate that the respondents vary in their images of the parks and that many of them have inaccurate and outdated knowledge and attitudes concerning the parks. Finally, the image items were grouped into a smaller number of meaningful combinations. These combinations are used in the later analyses which address the four remaining research objectives.

B. Park Image and Sample Differences

The remainder of the first results chapter examines differences in the data between the samples from the two parks. This research objective has in common with the first objective the focus on preparing the data for interpreting the analyses in the next chapter. First, differences between the images of the parks are explored. Not only are these differences of interest, it is also assumed that image differences between Forest Park and Elizabeth Park will shed light on findings from other analyses. Then, the possibility that the samples may differ on individual characteristics is examined. Demographic characteristics, activity interests, and recreational motives are also viewed as variables which may help explain the analyses in Chapter V. Finally, the patterns of use of the two parks are compared for further insights into park and sample differences.

1. Differences in park images. To this point, the data from the two parks have remained separated, on the assumption that their images differ. This assumption was based on the researchers' observations in the parks and conversations with park officials and users. Since the image variables have now been reduced to a more manageable and statistically reliable number, tests for differences in user images can be conducted.

A series of t-tests were run on each of the grouped image variables in each of the image categories -- descriptive, evaluative, and interpretive (general and specific). Individual t-tests were deemed appropriate since there remains little shared variance between the reduced or grouped variables (see Table 40 in Appendix D), and therefore "capitalizing on chance" is minimized. The results of the statistical tests are summarized in Table 12 and discussed below.

Descriptive image. In the cases of two out of three of the descriptive variables, highly significant differences between user images of the two parks were found. Scores on the combined measure "description" were higher for Forest Park and there was a greater number of "features named" for Forest Park; however, the larger size of Forest Park probably explains this difference. No such ready explanation exists for the significant difference on the "description" variable. As a matter of fact, the larger size and number of features in Forest Park suggest that the descriptive tasks would be more difficult in that park than in Elizabeth

Table 12. Differences Between Parks: Image Data.

Variable	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[1]	t-Value
Descriptive:								
Description:	93	28.13	5.96	93	24.73	5.17	pooled	4.15**
Features Named	95	11.31	4.91	101	7.65	2.83	separate	6.33**
Familiarity	91	4.12	.88	101	4.21	.84	pooled	- .70
Evaluative:								
Evaluation	95	- 4.48	3.22	100	-6.38	2.11	separate	4.83**
Cleanliness	95	4.12	2.48	100	1.46	2.62	separate	7.26**
Convenience	95	- 2.82	1.86	100	-3.44	1.36	separate	2.64**
Naturalness	95	- 2.63	1.48	101	-2.34	1.31	pooled	- 1.48

* $p < .05$
**$p < .01$
[1]F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

Table 12. Differences Between Parks:
(continued) Image Data.

Variable	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[1]	t-Value
Interpretive-General:								
Safety	95	8.45	2.99	101	5.10	2.59	pooled	8.41**
Driving	95	1.97	2.21	101	2.34	2.12	pooled	- 1.19
Pride	95	5.96	1.87	101	4.85	1.29	separate	4.79**
Interpretive-Specific:								
Lake	95	1.52	.71	101	1.74	.90	separate	- 1.96
Woods	95	2.32	1.09	101	2.74	1.10	pooled	- 2.72**
Roses	95	2.83	1.29	101	1.50	.89	separate	8.41**
Picnic Area	95	2.81	.90	101	3.23	.77	pooled	- 3.48**
Meadows	95	2.07	.82	101	1.82	.59	separate	2.47*
Roads	93	2.63	1.29	101	2.88	1.18	pooled	- 1.39

* $p < .05$
**$p < .01$
[1]F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

Park. Still it should be noted that since the tasks were based on photographs and questions about the individual parks, it could be that the Forest Park items were easier than those in Elizabeth Park (although there is no evidence to suggest that this was so). There were no significant differences between the self-estimates of "familiarity" for the two parks. This finding does not contradict the previous differences since the estimate is not a "test" of knowledge.

Evaluative image. The evaluations of the parks differ dramatically on three out of four of the combined evaluative variables. The largest differences were found in the evaluation of "cleanliness" where Elizabeth Park rated much "cleaner" than Forest Park. Also, the overall "evaluation" of Elizabeth Park was more positive as was the rating of the park's "convenience." No differences occurred for the combined variable "naturalness;" this indicates that the users found both parks to be natural and wooded.

Interpretive-general image. Once more there were significant differences between the parks on the interpretive-general items. Out of the three grouped variables, only the "driving" item showed no difference, indicating that there is no difference in users' attitudes about "driving" through and enjoying their parks from their cars. Elizabeth Park rated much higher on measures of "safety" and "pride" concerning the park. Again, these more positive evaluations and interpretations about Elizabeth Park relative to Forest Park were anticipated from the pilot observations.

Interpretive-specific image. Park differences were evident for the interpretive-specific items as well. However, since these items used photos depicting specific features of each park, comparisons must be interpreted with caution. The significant differences were found in four out of six cases: Forest Park users expressed a need for more paths through the "woods;" Elizabeth Park users were extremely positive about the "roses" relative to their Forest Park counterparts; the Forest Park "picnic areas" were rated noisier than in Elizabeth Park; and a moderately significant difference was that Elizabeth Park's meadows were more positively valued for sitting in the sun.

Summary. The differences between Elizabeth Park and Forest Park that were apparent from the pilot studies in the parks are substantiated in the comparison of the image variables. Respondents from Forest Park indicated a greater amount of knowledge about their park, but they were more negative in their evaluations and interpretations about the park than the respondents from the Elizabeth Park area. The value of these findings will be to assist in the formation of interpretations of later analyses where the parks are once again separated. If the multiple regression equations differ for the two parks, these documented differences in image will shed light on the source of the discrepancies. In addition, these findings can contribute to park planning and design efforts, an issue addressed in the discussion chapter.

2. Sample differences on individual characteristics. Findings concerning differences in users' images of the two parks were cited above as important in interpreting later data analyses. There are other variables which could also play a role in the interpretation of the multiple regression equations to be presented in the next chapter. These data

cannot be linked to the nature of the parks, rather they are related to the sample population living around the park. There are three types of information which were collected and used for this purpose: demographic characteristics, interests in particular outdoor activities, and general recreational motives. Each set of variables is reviewed below to lay the groundwork for later analyses.

Demographic characteristics. Far fewer demographic variables were found to differ significantly between the two parks than were found when examining the image data. The statistical tests are illustrated in Table 13. The average family size of the Forest Park sample was significantly larger as was the number of adults in the household. Income was higher on the average in Elizabeth Park; however, many persons failed to answer the income questions and those who did used approximate categories when reporting. And finally, distance from the park was significantly larger for the Elizabeth Park sample; but, this could be due to the method of measurement (a calculation of the closest distance to any point in the park); since Forest Park is larger and irregular in shape, it is likely that the boundaries come closer to more persons in the sample.

Activity interests. Variable groups for the activity interests were provided for the analyses from the larger research project, "Images of Urban Forests." The groups used by the project as a whole, and therefore used for the dissertation, are listed in Table 14 -- "unorganized sport," "relaxation," "organized sport," "nature observation," and "non-strenuous sport." T-tests between the samples for the two parks are summarized in Table 15. It is clear that, for the most part, the Elizabeth and Forest Park respondents expressed similar interests in each

Table 13. Differences Between Parks: Demographic Data.

Variable	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[1]	t-Value
Number Adults	95	2.56	1.05	100	2.23	1.06	pooled	2.17*
Number Childs	95	1.24	1.29	100	.96	1.36	pooled	1.49
Family Size	95	3.79	1.78	101	3.19	1.92	pooled	2.27*
Age of Youngest Child	55	2.16	1.03	45	2.29	1.06	pooled	- .60
Age of Oldest Child	55	2.80	1.16	45	2.84	1.07	pooled	- .20
Age of Respondent	93	43.20	15.67	97	46.54	15.83	pooled	-1.46
Years in Home	93	13.99	13.11	101	11.68	10.25	separate	1.37
Years in Area	93	28.49	20.14	101	27.62	21.76	pooled	.29
Income Group	80	4.16	2.03	88	4.93	2.19	pooled	-2.36*
Distance to Park (100's of Feet)	95	20.65	14.27	101	25.19	12.94	pooled	-2.33*

* $p < .05$
**$p < .01$

[1]F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

Table 14. Grouping Activity Interest and Recreational Motive Data.

Group 1: UNORGANIZED SPORT
- Sledding
- Bicycling
- Volleyball
- Tennis
- Frisbee
- Jogging

Group 2: RELAXATION
- Reading
- Sitting
- Walking
- Picnicking
- Sunbathing

Group 3: ORGANIZED SPORT
- Football
- Watching Sports
- Baseball
- Basketball

Group 4: NATURE OBSERVATION
- Birdwatching
- Looking at flowers
- Gardening
- Observing wildlife
- Feeding wildlife

Group 5: NON-STRENUOUS SPORT
- Horseshoes
- Lawn bowling
- Shuffleboard

Table 14. Grouping Activity Interest and Recreational Motive Data.
(continued)

Group 1: PHYSICAL ACTIVITY
For the exercise.
To relax.
To enjoy the scenery.
Because of the open space.

Group 2: ENJOY NATURE
To be in a natural setting.
To look at wildlife.
To enjoy the quiet.
To enjoy the scenery.

Group 3: SOCIAL ACTIVITY
To be with friends.
To observe other people.
Because my family enjoys it.

Group 4: ESCAPE
To get out of the house for awhile.
To get away from my job for awhile.
To relieve boredom.
To get away from crowded situations.

activity category. The only exception is the "relaxation" category for which greater interest was expressed by the Elizabeth Park sample. Again, the possible influence of this difference will be monitored in later analyses.

Recreational motives. The grouping of the recreational motive variables was also provided through the context of the larger project and is listed in Table 14. Four groups of motives were identified -- for "physical activity," to "enjoy nature," for "social activity," and to "escape." Once more, t-tests were conducted to compare the motives for the two samples (Table 16). Significant differences were found for two of the four grouped motive variables and for the mean motive variable as well. A trend for all motive variables was toward higher ratings for the Elizabeth Park sample. A possible explanation for the difference is that a bias existed for higher responses on the motive scale for that group. Still, it is conceivable that the Elizabeth Park sample had stronger preferences for recreational motives, in particular, for the social and exercise categories. During later analyses, the importance of these grouped variables to the multiple regression equations will be monitored.

3. Differences in patterns of use. The final comparison to be examined in this chapter concerns how often the parks are used and for what purposes. The purpose of this procedure is to expose any park or sample differences which may be of interest for interpretations of later analyses. The differences between the two samples on these measures could be park-related (like the differences in park image) or person-related (similar to the individual differences). The derivation of the

Table 15. Differences Between Samples: Activity Interests.

Variable	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[1]	t-Value
Unorganized Sport	92	2.58	.96	100	2.72	.90	pooled	-1.03
Relaxation	95	3.08	.87	101	3.38	.90	pooled	-2.44*
Organized Sport	91	2.43	1.09	100	2.49	1.07	pooled	- .38
Nature Observation	94	2.75	.98	101	2.87	.91	pooled	- .89
Non-Strenuous Sport	95	1.60	.80	101	1.62	.75	pooled	- .22
Mean Rating (for all activities)	88	2.49	.59	100	2.63	.54	pooled	-1.69

* $p < .05$
**$p < .01$

[1] F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

Table 16. Differences Between Samples: Recreational Motives.

Variable	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[1]	t-Value
Escape	94	2.86	1.04	101	3.08	1.06	pooled	-1.47
Enjoy Nature	95	3.70	.97	98	3.92	.78	separate	-1.75
Social Activity	94	2.94	1.00	98	3.26	1.01	pooled	-2.25*
Physical Activity	95	3.92	.92	101	4.16	.76	pooled	-1.98*
Mean Rating (for all motives)	93	3.36	.73	94	3.59	.68	pooled	-2.19*

* $p < .05$
**$p < .01$

[1]F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

measures of use must be discussed first; then, a comparison of the patterns of use of Forest Park and Elizabeth Park is conducted.

Measures of use. Several measures of park use are used in the analyses in order to gain as much information as possible about patterns of use. Respondents estimated the number of days over the previous twelve months that they had spent in Forest or Elizabeth Park participating in each of 36 activities. Since the same list of activities was used for the interest questions, the five groups which were formed from those items (see Table 14) were used again. Therefore, for each respondent the number of days spent in activities in a group were summed up. While accomplishing this transformation, it was apparent that too few respondents estimated any day's participation in "non-strenuous sports" (four persons in Forest Park, two in Elizabeth Park). Therefore, it was necessary to drop this activity group from the analyses. The remaining groups -- "unorganized sports," "relaxation," "organized sports," and "nature observation" -- contained more than enough cases to serve as dependent variables.

Also used as measures of park use were estimates of the total number of days of use of Forest Park and Elizabeth Park. First, the estimates for each of the 36 individual activities were summed and labeled "all days." As a second source, the respondents were asked to make one overall estimate of the days spent in the park during the previous twelve months, a measure called "park days." Both of these variables are used in the analyses because an examination of the mean scores (Table 17) and the correlations (Table 37, Appendix D) reveals that there are significant differences between them. When summing the estimates of activity days,

Table 17. Differences Between Parks: Patterns of Use.

Variable[1]	FOREST PARK Cases	Mean	SD	ELIZABETH PARK Cases	Mean	SD	Variance[2]	t-Value
Days Spent in "Unorganized Sport"	95	16.86	28.88	101	16.64	32.78	pooled	.05
Days Spent in "Relaxation"	95	23.47	45.66	101	20.04	30.70	separate	.62
Days Spent in "Organized Sport"	95	7.44	14.36	101	3.31	8.00	separate	2.51*
Days Spent in "Nature Observation"	95	19.72	40.68	101	22.75	44.62	pooled	-.50
Summed Estimate of "All Days"	95	100.16	120.78	101	82.96	108.15	pooled	1.05
Overall Estimate of "Park Days"	95	40.58	64.37	101	43.85	69.64	pooled	-.34

[1] Use variables are derived from estimates of park use over the previous 12 months.

[2] F-test indicates whether variances are equivalent, and therefore, whether separate or pooled variance estimates are appropriate.

* $p < .05$

** $p < .01$

"all days," a mean of 100 days is achieved in Forest Park and 83 days in Elizabeth Park. However, the sample estimates of total days, "park days," are much lower; in Forest Park the mean estimate for total park use is 41, and in Elizabeth Park it is 44. The correlation between "all days" and "park days" is .74 in Forest Park and .82 in Elizabeth Park. While these are quite significant correlations, 35% to 50% of the variance in these estimates is unique and remains to be accounted for.

Patterns of use. The six measures of use, four activity groups and two total estimates, were used in a test of differences in the patterns of use between Forest Park and Elizabeth Park (Table 17). The results reveal striking similarities between mean days of use for most of the measures. Only days spent participating in organized sports is significantly different between the parks; the mean days for Forest Park are 7.44, while only 3.31 for Elizabeth Park. This is understandable in Forest Park where the large areas designated for these activities provide many opportunities to participate in organized sports. In Elizabeth Park, on the other hand, more passive forms of recreation are facilitated as evidenced by the larger, but not statistically significant, number of days spent in nature observation.

The differences in the patterns of use between the parks for groups of activities balance out so that neither measure of total days, "all days" or "park days," is significantly different. However, the "all days" means do show a trend toward more activity days in Forest Park. This trend could be due to the larger number of activities facilitated in Forest Park which would lead to more estimates of participation in the 36 activities on the list. Since the total estimates of "park days" are nearly identical, this explanation appears to be sound. Therefore, with the exception of participation in organized sports, it can be concluded that the patterns of use of Forest and Elizabeth Park are quite similar for the two samples.

C. Summary

In this results chapter, the first two research objectives have been explored: to investigate the nature of images of urban parks; and, to compare the park images and sample characteristics. To this end, a review of the image data from the survey illustrated the diversity of responses for each hypothesized aspect of image. In order to accurately ascertain the utility of these measures of image, the number of image variables was reduced based on theoretical concerns and the correlation matrices. Following this variable reduction, an examination of the image data from the two parks revealed that the samples held significantly different images of their respective parks. How these differing images may affect the use of the parks will be explored in the next results chapter.

An additional purpose to this chapter was to prepare the variables (as well as the reader) for the multiple regression analyses summarized in the second results chapter. The reduction of the image variables, the comparison of park images, the test for sample differences on individual characteristics, and the comparison of patterns of park use were placed in this chapter to facilitate this goal.

CHAPTER V

RESULTS, PART II: TESTS OF THE UTILITY OF MEASURES OF IMAGE

This results chapter presents analyses which address the three remaining research objectives:

3) To examine the relationships among the aspects of image -- descriptive, evaluative, and interpretive.

4) To explore the relationship of differences in individual characteristics to images of urban parks.

5) To test the model of urban forest recreation which suggests that a combination of individual characteristics and image predicts urban park use.

A common thread to these objectives is their focus on assessing the utility of the data about images. To begin with, the examination of the relationship among the aspects of image offers evidence that different dimensions of image are being measured by the descriptive, evaluative, and interpretive image survey items. Then, the role of individual characteristics in fostering these differences is explored with the finding that the image measures are related to these characteristics, but moderately so. Finally, the uniqueness of image (and of each aspect) is further tested by predicting park use from these variables.

Also in common to these objectives is that each is addressed using the same analytic technique -- multiple regression analysis. The analyses in the first chapter were presented to prepare the variables and to facilitate the consistent use of one statistical technique and a single format for all the tables in the present chapter. A brief discussion of multiple regression analysis is contained in the first section of this chapter. After the review of multiple regression analysis, each of the three objectives is addressed individually in the following sections. An integrative summary of the results from all the objectives is reserved for the first section of the discussion chapter.

A. Multiple Regression Analysis

Multiple regression analysis was found to be the most appropriate statistical technique for addressing important questions in the research project. The technique uses one or more independent variables (predictors) in creating an equation to predict a single dependent variable. The resulting "Multiple R" is an indicator of how significantly the equation predicts the dependent variable. In addition, the analysis reveals the total proportion of the variance of the dependent variable which can be accounted for by the equation _and_ what proportion of the variance each variable adds when entered into the equation. This procedure is extremely useful as it allows the researcher to compare the utility of the various predictors within a specific equation. For this research, this capability will permit comparisons of the utility of measures of image, demographics, interests and motives, as well as further comparisons of differences between the parks.

Two methods for the multiple regression analyses were appropriate for use in this results chapter. First, a stepwise procedure is used to determine which of a group of potential variables can best satisfy the criterion for entering a multiple regression equation, and what proportion of the variance of the predicted variable is accounted for by the variables. The criterion for entry has been uniformly set so that the "F to enter" (computed at each step) for the predictor variable will be greater than 3.0. This is a relatively strict requirement which bars variables from entering which might add to the overall significance, but minimally so. An example of the stepwise procedure is the use of nine demographic variables to predict each of the image variables, or offering six interest variables to predict the image of variables, or using the five motive variables to predict each of the image variables.

A second format for the multiple regression analyses involves a forced hierarchical procedure. For these analyses, the variables which were accepted in the stepwise procedures described above are forced to enter into equations one group at a time. This method provides for a comparison of the utility of the different groups of predictors. For example, it was previously stated that stepwise analyses will demonstrate which demographic variables, which interest variables and which motive variables can predict image. Forcing each group of variables to enter in a single equation will allow for comparisons between these variable groups.

The multiple regression techniques used here are not the perfect solution to data analyses for this research. The most prominent difficulty is "capitalizing on chance" -- the high probability that a significant Multiple R will occur in the prediction of a variable if a large number of variables are offered. In the previous chapter this problem was discussed and countered by the reduction of the number of variables in preparation for the multiple regression analyses. The stepwise and forced hierarchical procedures are also helpful since they provide for comparisons of the relative utility of the groups of variables. Therefore, the interpretation of significance need not be based solely on the size of the Multiple R; the interpretations are also based on considerations of the relative size of the Multiple R.

A further consideration in the interpretation of multiple regression equations concerns the specific variables which enter during the stepwise procedure. If two or more potential predictor variables are similarly correlated with the dependent variable, the variable which has the highest simple correlation will be entered by the computer and it is possible that the other variable will never appear in the equation. The problem is that the remaining variable may have been rejected on the basis of a trivial difference in the simple correlations and yet might have an informative relationship that will never be apparent. Also, variables that enter in later steps may have quite small simple correlations with the predicted variable, but add enough unique variance to enter the equation. Therefore, drawing interpretations concerning which variables enter a multiple regression equation may lead to misdirected conclusions. One safeguard is to examine the change in the "Multiple R^2" which is a statement of the additional variance that the variable accounts for when entering an equation.

A final note about the techniques used in this chapter concerns certain theoretical assumptions which will guide the order of entry of predictor variables. Based on considerations described for each set of equations, certain variables may be offered first in the stepwise or forced hierarchical procedures. These considerations evolve from theoretical assumptions about the precedence of some variables over others. For example, demographic variables are considered as given and more or less stable; therefore, they are offered as predictor variables before interests and motives which are more subject to change. Other decisions such as these will be described where appropriate.

B. Relationships of the Aspects of Image

1. Overview. Three aspects of image -- descriptive, evaluative, and interpretive -- were defined in the literature review and the survey instrument was designed to measure each of them. Are these aspects of image distinguishable from one another? In what ways are they related to each other? How well can the measures of evaluative image be predicted from the other image variables? How well can the interpretive-general or interpretive-specific variables be predicted by other measures of image?

These questions are addressed in analyses which examine the relationship of descriptive, evaluative and interpretive image. In the previous chapter, the variance of responses for measures of each aspect of image was illustrated. However, the distinction between the aspects of images is still primarily defended on a theoretical basis. The multiple regression analyses in this section probe the interrelationship of the aspects of image and test for the proportion of variance shared in common by the variables.

The purpose of these analyses is to determine if there is any utility in distinguishing between these aspects of image. If they are highly correlated with one another, there would be little reason to collect measures of each aspect of image. Instead, items could be used which collect information on only one of the aspects and the resulting data would be sufficient to measure image. However, if one or more of the aspects of image cannot be predicted from the others, then there is evidence that they are distinguishable dimensions of image. In this case, the collection of information on several aspects of image would be necessary in order to sufficiently measure image.

Correlations of the aspects of image. The correlations between the measures of descriptive, evaluative, and interpretive image contain interesting patterns (the correlation matrix is in Appendix D, Table 36). While the descriptive image variables are significantly correlated with one another, there is much less evidence of a relationship between the descriptive and the other measures of image. The evaluative and interpretive-general variable groups also exhibit high intra-correlations, but unlike the descriptive, these two groups of variables are correlated with one another as well. The interpretive-specific variables stand alone with few significant intra-correlations and only a scattered pattern of correlations with the remaining image variables.

Thus, a preliminary examination of the correlations suggests that it will be easier to distinguish the descriptive from the evaluative and interpretive-general variables. It might also be found that the interpretive-specific variables are distinct from the other measures of image. However, separating the evaluative from the interpretive-general variables may prove much more difficult. The multiple regression equations in this section will investigate these possibilities; it is possible that analyses in later sections will also reveal additional information. Therefore, conclusions drawn in this section are subject to revision in the discussion chapter when all the results are examined in making more general conclusions.

<u>Regression equations testing the relationship of the aspects of image.</u> In formulating the multiple regression equations, two decisions were made based on theoretical concerns. First, no attempt was made to "predict" the descriptive image variables. Logic dictates that a knowledge of a place serves more appropriately as a predictor of attitudes rather than the reverse. Therefore, in each of the multiple regression analyses, the descriptive image variables are offered as the first predictors, followed by the remaining groups of variables.

A second theoretical consideration concerns the low priority given the interpretive-specific items. It was suggested earlier that these items have limited utility when generalizing about urban parks because the items are based on photographs of specific features in each park. The lack of significant correlations between the interpretive-specific and other variables offers support to the assumptions about the unique nature of these variables. Therefore, the interpretive-specific variables are not offered in the stepwise multiple regression analyses until the other groups of predictor variables have been given a chance to enter.

Three tables summarize the multiple regression equations which probe the relationship of the aspects of image: 1) evaluative image variables are predicted from the descriptive, interpretive-general, and interpretive-specific variables (Table 18); then, 2) interpretive-general variables are predicted using descriptive, evaluative, and interpretive-specific variables (Table 19); and, 3) the interpretive-specific variables are predicted from the descriptive, evaluative, and interpretive-general variables (Table 20).

2. Predicting evaluative image from other image variables. The first set of multiple regression analyses is designed to predict evaluative image, as derived from the semantic differential items, from the descriptive and interpretive image data. The stepwise procedure allows predictor variables to enter the equation one at a time if they satisfy the criterion for entry. The goal of these analyses is to determine which, if any, variables predict evaluative image and how much variance they predict.

It is evident from Table 18 that several of the evaluative image variables can be significantly predicted using the other image variables. For the most part, it is the interpretive-general variables ("safety," "driving," and "pride") which dominate the entries as predictor variables. These equations provide further evidence of the close relationship between the interpretive-general and the evaluative variables. Distinguishing these two aspects of image may be difficult given these results.

In Forest Park, the Multiple R's range from .31 (10% of the variance) to .63 (40% of the variance). In Elizabeth Park, they range from .23 to .72 (from 5% to 52% of the variance). "Evaluation" and "cleanliness" are most prominently predicted by the other variables in both parks. This also holds true for "convenience" in Forest Park, but not in Elizabeth Park. "Naturalness" is not nearly as related to the other image variables as the first three evaluative variables are.

Table 18. Predicting Evaluative Image Using Other Image Variables.

Park	Evaluative Image (Mult. R)**	Order of Entry* (R^2 △)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Evaluation (.63)	1 (.36)	Pride	Interp-Gen.	Most variance accounted for in FP, 40%.
		2 (.04)	Driving	Interp-Gen.	
	Cleanliness (.62)	1 (.29)	Safety	Interp-Gen.	
		2 (.09)	Driving	Interp-Gen.	
	Convenience (.57)	1 (.28)	Pride	Interp-Gen.	
		2 (.04)	Roses	Interp-Spec.	
	Naturalness (.31)	1 (.05)	Free Recall	Descriptive	Only 10% of the variance accounted for.
		2 (.05)	Picnic Area	Interp-Spec.	
Elizabeth:	Evaluation (.69)	1 (.07)	Free Recall	Descriptive	Mix of variables account for 49% of variance.
		2 (.17)	Pride	Interp-Gen.	
		3 (.09)	Safety	Interp-Gen.	
		4 (.04)	Familiarity	Descriptive	
		5 (.06)	Lake	Interp-Spec.	
		6 (.03)	Roses	Interp-Spec.	
		7 (.03)	Woods	Interp-Spec.	
	Cleanliness (.72)	1 (.45)	Safety	Interp-Gen.	Most variance accounted for in EP, 52%.
		2 (.02)	Driving	Interp-Gen.	
		3 (.03)	Lake	Interp-Spec.	
		4 (.02)	Roads	Interp-Spec.	
	Convenience (.23)	1 (.05)	Description	Descriptive	Much smaller R than in FP.
	Naturalness (.26)	1 (.07)	Pride	Interp-Gen.	Only 7% of the variance accounted for.

*Variables offered in a hierarchical manner: 1)descriptive, 2)interpretive-general, and 3)interpretive-specific. Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.

Certain interpretations can be derived from this table. The descriptive image variables rarely appear as predictor variables even though they were considered first in the stepwise hierarchical procedure. When they do appear, they account for small percentages of variance (see the measures of $R^2 \Delta$). Clearly the descriptive image items are measuring something different from the evaluative items. Whether there is a different utility to the two aspects of image needs to be further clarified.

The most prominent difference between the two parks is the large Multiple R in predicting "convenience" in Forest Park (.57) in comparison to the parallel equation in Elizabeth Park (.23). The significant contribution of the interpretive-general variable "pride" in Forest Park (28% of the variance) accounts for this difference. One explanation is that pride in Forest Park is related to living within the vicinity of the park while in Elizabeth Park, pride is not a matter of "convenience," but more related to the overall "evaluation" and "naturalness."

<u>3. Predicting interpretive-general image from image variables.</u> The next set of equations examine how well the interpretive-general scores, derived from responses to general statements about the park, can be predicted from the descriptive, evaluative, and interpretive-specific. The stepwise procedure is identical to that used for the previous multiple regression equations. The goal of these analyses is also the same: to determine which, if any, variables predict interpretive-general image and how much variance they account for.

Extremely high Multiple R's are in evidence for this set of equations. The summary in Table 19 illustrates, once more, the relationship

Table 19. Predicting Interpretive-General Image Using Other Image Variables.

Park	Interpretive Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Safety (.59)	1 (.29)	Cleanliness	Evaluative	Slightly smaller R than in EP.
		2 (.03)	Convenience	Evaluative	
		3 (.03)	Roads	Interp-Spec.	
	Driving (.43)	1 (.15)	Cleanliness	Evaluative	Slightly smaller R than in EP.
		2 (.03)	Woods	Interp-Spec.	
	Pride (.71)	1 (.36)	Evaluation	Evaluative	Most variance accounted for in FP, 50%.
		2 (.11)	Convenience	Evaluative	
		3 (.03)	Woods	Interp-Spec.	
Elizabeth:	Safety (.71)	1 (.45)	Cleanliness	Evaluative	Most variance accounted for in EP, 51%.
		2 (.02)	Meadows	Interp-Spec.	
		3 (.02)	Familiarity	Descriptive	
		4 (.02)	Woods	Interp-Spec.	
	Driving (.51)	1 (.06)	Evaluation	Evaluative	Contributions from all types of image variables are evident.
		2 (.04)	Description	Descriptive	
		3 (.07)	Lake	Interp-Spec.	
		4 (.06)	Roads	Interp-Spec.	
		5 (.03)	Woods	Interp-Spec.	
	Pride (.41)	1 (.17)	Evaluation	Evaluative	Much smaller R than in FP.

*Variables offered in a hierarchical manner: 1)descriptive, 2)evaluative, and 3)interpretive-specific.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.

of the interpretive-general items to the evaluative variables. Again, evidence is provided which suggests that it may be difficult to distinguish these two aspects of image.

The Multiple R's range from .43 to .71 (from 18% to 50% of the variance) in Forest Park, and from .41 to .71 (17% to 51%) in Elizabeth Park. One exception to the general rule that evaluative and interpretive-general image predict one another is in the case of the interpretive-general item "driving" in Elizabeth Park; a significant proportion of the variance is predicted, but from a variety of sources including evaluative, descriptive, and interpretive-specific variables. Certain other park differences are evident; "safety" and "driving" have slightly higher Multiple R's in Elizabeth Park than in Forest Park, and the reverse is true for "pride."

One clear interpretation is that additional evidence is brought forward that the descriptive image variables are not related to other image variables and that the interpretive-general and evaluative image variables may not be distinguishable. These two "aspects" may only be a measure of a single "aspect" of image. Perhaps, the hypothesized third aspect of image is better represented by the interpretive-specific items.

In terms of park differences, there appears to be a more consistent view of "safety" and "driving" in Elizabeth Park which makes it easier to predict these variables than in Forest Park. An explanation is that Elizabeth Park is safer and thus is more consistently perceived as such. As for "driving," if one is interested in driving through Elizabeth Park, it is a conscious choice, while in Forest Park driving through might be for pleasure or for a matter of convenience (taking a short cut). Therefore, the data from Forest Park on "driving" may be less consistent and less predictable. Finally, the higher prediction of "pride" in Forest Park can be explained by the relation of "convenience" to "pride," an interpretation discussed in the previous section.

4. Predicting interpretive-specific image from image variables. The final set of analyses examining the relationship among the aspects of image form equations which predict the interpretive-specific items from the descriptive, evaluative, and interpretive-general variables. Using the same stepwise procedure as before, the goal of these analyses is to determine which, if any, variables predict interpretive-specific image and how much variance they predict.

On the average, the predictions of the interpretive-specific variables, summarized in Table 20, are much lower than for the equations reported in the previous two tables. These results indicate that there is little relationship between the interpretive-specific image and the other aspects of image.

The Multiple R's for tne equations which were formed in Forest Park range from .21 to .41 (from 4% to 17% of the variance), and in Elizabeth Park from .20 to .57 (4% to 32%). In two cases, no variables satisfied the minimum requirement for entry in the multiple regression equations, and in another, a variable was entered but the overall Multiple R was not significant ($p < .10$). The minimal influence of the descriptive variables is once again evident as the evaluative and interpretive-general variables dominate in the final equations. Many differences between the two parks are evident: a better understanding (in other words, better

Table 20. Predicting Interpretive-Specific Image Using Other Image Variables.

Park	Interpretive Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Lake	No Variables Entered			
	Woods (.41)	1 (.05)	Familiarity	Descriptive	Not evident in EP. Most variance here, 17%.
		2 (.12)	Pride	Evaluative	
	Roses (.21)	1 (.04)	Convenience	Evaluative	Only 4% of variance.
	Picnic Area (.27)	1 (.04)	Natural	Evaluative	
		2 (.04)	Free Recall	Descriptive	
	Meadows	No Variables Entered			
	Roads (.23)	1 (.05)	Safety	Evaluative	Only 5% of variance.
Elizabeth:	Lake (.57)	1 (.21)	Evaluation	Evaluative	Lake has central prominence in EP. Most variance here, 32%.
		2 (.06)	Driving	Interp-Gen.	
		3 (.05)	Safety	Interp-Gen.	
	Woods	No Variables Entered			
	Roses (.40)	1 (.04)	Familiarity	Descriptive	Roses prominent in EP. Not evident in FP.
		2 (.12)	Evaluation	Evaluative	
	Picnic Area (.20)	1 (.04)	Evaluation	Evaluative	Multiple R not significant.
	Meadows (.26)	1 (.07)	Safety	Interp-Gen.	Not evident in FP.
	Roads (.24)	1 (.06)	Driving	Interp-Gen.	

*Variables offered in a hierarchical manner: 1)descriptive, 2)evaluative and interpretive-general.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p<.05$ unless otherwise noted.

prediction) is afforded in Elizabeth Park on the "lake," "roses," and "meadows" items; in Forest Park, a larger Multiple R is found for the "woods" variable.

The interpretive-specific variables appear to offer a somewhat distinct view of the parks given the lower proportion of variance accounted for in these equations. The suggestion is that a third aspect of image may be more adequately represented by these unique interpretive-specific items than by the interpretive-general variables. Still, the utility of the interpretive-specific variables is an open question and is examined in later analyses. In addition, the evidence continues to mount for the uniqueness of the descriptive image variables as they fail to predict other aspects of image.

An explanation for the greater significance for the "lake" and "roses" in Elizabeth Park is that these areas are centrally prominent to that park and therefore highly related to the overall "evaluation" of the park. The slight relationship of "meadows" to "safety" reflects a more consistent attitude about Elizabeth Park's safety which is not found in Forest Park. The "woods" in Forest Park are a much more dominant feature, and evidently a source of "pride" which accounts for this difference between the two parks.

5. Summary. The first set of multiple regression analyses provides initial evidence concerning the interrelationship of the hypothesized aspects of image. Most clearly established is the uniqueness of the variables designed to measure the descriptive aspect of image. Also evidenced, but to a lesser degree, is a distinctiveness to the interpre-

tive-specific image data; an anticipated artifact of the specific nature of those variables. Still unclear is whether the data from the items designed to measure evaluative image differ significantly from those attempting to measure the interpretive-general image of these parks. It remains to be seen if later analyses can shed light on this preliminary finding that these two groups of variables may only be measuring a single "aspect" of image. Also, it is possible that the interpretive-specific variables are more representative of a third "aspect" of image. Finally, the utility of the measures of image is suggested by the interpretations offered concerning the differences between the multiple regression equations for the two parks.

C. Relationships of Individual Characteristics to Image

1. Overview. Are differences in park image related to differences in individual characteristics? How well do demographic characteristics, activity interests, and recreational motives predict measures of park image?

The questions addressing the relationship of individual characteristics to image are important for the interpretation of all the data analyses. If individual differences are closely related to image variables, then it may be clearer what types of people form what types of images. Also, such relationships would suggest that correlations between image and park use are mediated by individual characteristics.

Measures of individual characteristics. For the purposes of this research, individual differences are defined in three categories: demographic characteristics, activity interests, and recreational motives.

These variables were previously introduced in the section testing for user differences between the samples for the parks (Tables 13 through 16).

The demographic data include information about the size of the respondents' families, their ages, the number of years they have lived in the metropolitan area and in their present homes, the distance from the respondents' homes to the park, and reports of income.

The activity interests data consist of aggregate scores for expressed interests in a range of recreational activities. The activities are grouped into five categories (see Table 14): "unorganized sport," "relaxation," "organized sport," "nature observation," and "non-strenuous sport." Also used as a predictor variable is the average recreational interest expressed for all activities combined.

The recreational motives data also consist of aggregates of individual statements about reasons for participating in outdoor recreation. The five measures of recreational motives used in the analyses are (see Table 14): for "physical activity," for "social activity," for "escape," for "enjoying nature," and an average measure of all motive items combined.

Regression equations testing the relationship of individual characteristics to image. Two sets of multiple regression analyses were conducted for this section. First, separate stepwise regression procedures were used for each group of individual characteristics -- the demographic, the interest, and then the motive variables -- to predict all of the image variables. For these analyses, all the variables within the group were offered simultaneously with the exception of the average interest and average motive variables; these average variables were held out of the analyses until the more specific interest or motive variables had a chance to enter the equation.

The second set of multiple regression analyses compare the influence of the three groups of individual difference variables. This is accomplished through a forced hierarchical procedure where those variables found significant in the prior analyses are entered one group at a time to predict the image variables: first, the demographic variables are entered under the assumption that they are stably and accurately measured individual characteristics; then, the interest data are added to determine if additional variance can be accounted for; and finally, the motive variables are forced into the equations last under the assumption that these variables are the least stable and reliable groups of measures.

Four tables summarize the multiple regression equations examining the role of individual differences in image formation. The first three report the results of offering only the demographic or the interest or the motive variables. To facilitate the flow of the chapter, these tables are briefly discussed in the following sections but placed in Appendix D (Tables 38 through 40). The fourth table appears in this chapter (Table 21) and tabulates the results of the first three sets of multiple regression equations; it summarizes the findings of a forced hierarchical procedure which demonstrates the prediction of the image variables using demographic, interest, <u>and</u> motive variables.

<u>2. Predicting image from demographic variables.</u> The results of the multiple regression analyses predicting image from demographics reveal low to moderate relationships (Table 38). They suggest that there are some

influences of demographic variables over the formation of urban park images.

In Forest Park, the Multiple R's for the image variables range from as low as .24 (6% of the variance) to .41 (17% of the variance) while no equations were formed in six out of the sixteen cases. For Elizabeth Park, the Multiple R for one variable was only .19 (4% of the variance) and for others was as high as .36 (13%) while no equations were formed in five cases. The low Multiple R's suggest that any interpretations be made cautiously as the results are significant, but not overwhelmingly so.

The descriptive image variable which was best predicted from the demographic variables in Forest Park was "familiarity." Persons living in the metropolitan area longer estimated greater familiarity with the park. Also quite high Multiple R's were found for "safety" and "pride." Males and persons without children found Forest Park to be safer, and those persons indicating greater pride in the park have higher incomes, fewer adults in the household, and live closer to the park.

In Elizabeth Park, the variance predicted by the demographic variables was not as high. Of the most successful equations, the number of items named in the "free recall" task was related to higher income and more years in residence. Also, interpretations about "safety" and "driving" were predicted; those persons living in their homes less time (younger persons in general) and living further from the park found it to be safer. More positive interpretations about driving in the park were held by those persons living further away from the park and those with fewer adults in the household.

Overall, the significant multiple regression equations which predict image from demographics do not account for large proportions of the variance of the image variables. In contrast, more significant relationships were revealed in the previous section where aspects of image were predicted quite well using other aspects of image. However, the significant correlations here do suggest some logical and informative relationships between demographic and image variables.

3. Predicting image from interest variables. Similar to the multiple regression analyses using demographic characteristics as predictor variables, the interest variables serve as only fair predictors of image, providing evidence of a moderate influence of activity interests over park image.

Where equations were formed, the Multiple R's for the most part are quite low (Table 39). In Forest Park, the range of the Multiple R's for the equations was from .22 (5% of the variance) to .39 (15%) and no equations were formed for eleven out of the sixteen image variables. The analyses were more successful in Elizabeth Park where Multiple R's range from .18 to .47 (from 3% to 22% of the variance) and equations were formed in nine out of sixteen cases.

Most successfully predicted in Forest Park was the interpretive-specific item about the "woods." The statement that "it would be easier to walk through the woods if there were more paths" was more readily agreed with by persons with lower interests in activities in general. There is no clear interpretation to this result.

In Elizabeth Park, interpretations about "driving" were linked to low interests in most recreational activities. Interests in "relaxation" and "nature observation" were significantly related to the interpretive variables "pride" and "naturalness," and the overall "evaluation" variable. This last finding indicates that persons with interests in relaxing or observing nature have different (more "positive") images of Elizabeth Park.

In sum, there is very little relation of activity interests to the image of Forest Park. Much greater prediction is found between activity interests and image in Elizabeth Park; in particular, interests in "relaxation" and "nature observation" are quite important there. Perhaps the smaller, less diverse environment of Elizabeth Park makes it easier to correlate specific interests with image. In other words, Elizabeth Park might more consistently satisfy persons with these particular interests. On the other hand, the larger and more diverse Forest Park accommodates a broader range of recreational interests resulting in fewer consistent interest-image relationships.

4. Predicting image from motive variables. The final set of stepwise multiple regression analyses predict image from recreational motives and again show low or insignificant results (Table 40). These analyses were even less successful in establishing the relationship of image to motives than the analyses for demographics and interests. In other words, very little influence of motives over image is evident.

In Forest Park, the Multiple R's ranged from .20 (4% of the variance) to .27 (7%) and no equations were formed in seven of sixteen cases. The situation was similar in Elizabeth Park where equations were formed in only four cases, and the Multiple R's ranged from .19 to .24 (from 3% to 6% of the variance).

As discussed at the outset of this chapter, to draw interpretations from minimally significant regression equations is dangerous. Therefore, the relationship between the motive variables and the measures of image cannot be consistently established. Some equations are formed, but the total amount of variance accounted for is minimal. At this point, the utility of these motive variables is questionable, but the utility of all the individual characteristics will be examined further in the next section where all three groups of data combined are used to predict image.

5. Predicting image from demographics, interests, and motives combined. The final set of analyses for this research objective examines how the combined groups of individual difference data predict image. The purpose is to determine whether the amount of variance accounted for in the previous three sets of analyses combines to account for even more total variance, or, if the original equations are actually predicting the same sources of variance so that the total variance accounted for is not increased. The results provide an overall estimation of the extent of the relationship between individual characteristics and urban park images.

To accomplish this test, a three-step forced hierarchical procedure was used: 1) to begin with, the demographic variables which entered in the previous equations are forced into the equation; 2) then, the interest variables which were proven significant are entered; 3) and finally, the significant motive variables are forced to enter. The order of entry was based on assumptions about the stability and reliability of the individual difference variables and the effectiveness of the variables in the earlier analyses. Under these considerations, the demographic variables were viewed as stable and reliable, interests as less stable, and measures of motives as least stable or reliable. The resulting three-step hierarchical procedure is designed to produce generalizable results which are as stable as possible across settings and over time.

The multiple regression equations combining all of the individual characteristics are summarized in Table 21. It is expected that the variance accounted for in any of these equations be as high as the variance accounted for by any of the prior runs. However, if the prior runs were predicting unique sources of variance, then the Multiple R's for the combined runs would be even higher.

Overall, higher and more respectable levels of prediction are achieved in these combined runs than were found in the individual analyses. In Forest Park, the Multiple R's range from .27 (7% of the variance) to .46 (22%), and in Elizabeth Park, they range from .20 to .54 (4% to 29% of the variance). For the most part these levels of prediction are quite significant, but not as high as the multiple regression equations predicting image from image (Tables 18 through 20).

The demographic variables are always offered first for these equations, and they consistently account for small but significant amounts of variance. Then, the interest variables enter and are able to account for additional variance which is an indication that there is predictable variance beyond what the demographic variables had predicted. Small amounts of additional variance are added on occasion by the motive

Table 21. Predicting Image Variables Using Demographic, Interest, and Motive Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Description	1 (.08)	Distance	Demographic	
	(.28)				
	Free Recall	1 (.05)	Avg. Interest	Interest	Multiple R not significant.
	(.27)	2 (.03)	Social Act.	Motive	
	Familiarity	1 (.17)	Years in Area	Demographic	17% of variance, using demos only.
	(.41)		Age	"	
	Evaluation	1 (.11)	# Children	Demographic	
	(.38)		Distance	"	
		2 (.04)	Physical Act.	Motive	
	Cleanliness	1 (.07)	Enjoy Nature	Motive	Multiple R not significant.
	(.27)		Physical Act.	"	
	Convenience	1 (.08)	Years in Home	Demographic	Multiple R not significant.
	(.28)		Age	"	
	Natural	No Variables Entered			
	Safety	1 (.16)	# Children	Demographic	16% of variance using demos only.
	(.40)		Sex	"	
	Driving	No Variables Entered			
	Pride	1 (.16)	Income	Demographic	16% of variance using demos only.
	(.40)		Distance	"	
			# Adults	"	
	Lake	1 (.06)	Age	Demographic	
	(.29)	2 (.02)	Escape	Motive	
	Woods	1 (.15)	Unorg. Sport	Interest	15% of variance using interests.
	(.39)		Non-Strenuous	"	
			Avg. Interest	"	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, and 3)motives.
**Multiple R significant at p<.05 unless otherwise noted.

Table 21. (continued) Predicting Image Variables Using Demographic, Interest, and Motive Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Roses	1 (.12)	Distance	Demographic	Most variance accounted for in FP, 22%.
	(.46)	2 (.08)	Non-Strenuous	Interest	
		3 (.02)	Social Act.	Motive	
	Picnic Area	No Variables Entered			
	Meadows	1 (.09)	Years in Home	Demographic	Note that motives add no variance.
	(.34)	2 (.02)	Unorg. Sport	Interest	
		3 (.00)	Escape	Motive	
	Roads	1 (.06)	Age	Demographic	
	(.34)	2 (.04)	Nature Obs.	Interest	
		3 (.02)	Enjoy Nature	Motive	
Elizabeth:	Description	1 (.05)	Income	Demographic	Only 5% of variance.
	(.23)				
	Free Recall	1 (.12)	Income	Demographic	
	(.36)		Years in Home	"	
	Familiarity	1 (.05)	Distance	Demographic	
	(.34)	2 (.04)	Nature Obs.	Interest	
		3 (.03)	Physical Act.	Motive	
	Evaluation	1 (.16)	Nature Obs.	Interest	16% of variance using interests, motives add no variance.
	(.40)		Unorg. Sport	"	
			Relaxation	"	
		2 (.00)	Enjoy Nature	Motive	
	Cleanliness	No Variables Entered			
	Convenience	1 (.10)	Distance	Demographic	
	(.34)	2 (.02)	Unorg. Sport	Interest	
	Natural	1 (.18)	Relaxation	Interest	18% of variance using interests, motives add no variance.
	(.42)		Unorg. Sport	"	
			Nature Obs.	"	
		2 (.00)	Physical Act.	Motive	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, and 3)motives.
**Multiple R significant at $p < .05$ unless otherwise noted.

Table 21. (continued) Predicting Image Variables Using Demographic, Interest, and Motive Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Safety	1 (.11)	Years in Home	Demographic	
	(.34)		Distance	"	
	Driving	1 (.13)	Distance	Demographic	Most variance accounted for in EP, 29%.
	(.54)		# Adults	"	
		2 (.16)	Unorg. Sport	Interest	
			Nature Obs.	"	
			Org. Sport	"	
			Avg. Interest	"	
	Pride	1 (.04)	Sex	Demographic	17% of variance, motives add only 1%.
	(.42)	2 (.12)	Nature Obs.	Interest	
			Relaxation	"	
		3 (.01)	Social Act.	Motive	
	Lake	No Variables Entered			
	Woods	No Variables Entered			
	Roses	1 (.09)	# Children	Demographic	
	(.37)		Years in Home	"	
		2 (.04)	Org. Sport	Interest	
	Picnic Area	1 (.05)	Years in Area	Demographic	
	(.31)	2 (.05)	Relaxation	Interest	
	Meadows	1 (.05)	Years in Area	Demographic	
	(.31)	2 (.05)	Relaxation	Interest	
	Roads	1 (.04)	Distance	Demographic	Multiple R not significant.
	(.20)				

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, and 3)motives.
**Multiple R significant at $p < .05$ unless otherwise noted.

variables, but often the variance which they might have added is already predicted by the other variables in the equation.

Descriptive image. Looking at the descriptive image variables first, it is clear that they are most related to demographic characteristics. Distance, years in the area, and age are most influential in Forest Park. Income, years in home, and distance dominate prediction for Elizabeth Park. Only small amounts of additional variance are accounted for by interest and motive variables after the demographic variables are entered.

The relationship between individual characteristics and descriptive image is consistent for the two parks. It appears that demographic characteristics help to influence the image that people hold of a park. It is also quite possible that the link between types of people and park use is a part of a three-way relationship between demographics, image, and use. Analyses for the final research objective explore this possibility.

Evaluative. An interesting difference between the parks is highlighted by the equations predicting evaluative image from individual differences. It is apparent that the evaluations of Elizabeth Park can be linked to an individual's interest in particular activities. This is clearly not the case in Forest Park. The more limited size and less diverse opportunities in Elizabeth Park can be cited as reasons for the stronger connection between specific interests and evaluative image.

For the evaluative variables, there is a lack of significant equations in Forest Park; only the general "evaluation" variable is predicted significantly by number of children and distance. Insignificant equations (significance levels greater than .05 but still less than .10) were formed out of motive variables for the "cleanliness" score and out of demographic variables for "convenience."

In Elizabeth Park, much better prediction of the evaluative image variables is afforded, however, not by the demographic variables. "Evaluation," "convenience" and "naturalness" were most closely related to activity interests. Though the demographics were offered first, only the relationship between "convenience" and distance to the park was documented. As for the motive variables, very little variance remained which they could predict.

<u>Interpretive-general.</u> Highly significant prediction of the interpretive-general image variables is evident in both parks. These equations point to some interesting image differences between the parks. In Forest Park, demographic characteristics are predictive of general interpretations of "safety," "pride," and "driving." And in Elizabeth Park it is interests which are more related to the interpretive-general variables.

In Forest Park, both "safety" and "pride" were predicted by various demographic variables. These equations suggest that a person's stage in life cycle influences interpretations about how safe the park is and whether or not one has pride in the park.

In Elizabeth Park, equations are formed for each of the interpretive-general variables with the demographic variables most prominent. However, interests in activities have additional influences in the prediction of "driving" and "pride." This finding is further evidence of the relationship between specific interests and the image of Elizabeth Park.

Interpretive-specific. High levels of prediction by individual difference characteristics are evidenced for many of the interpretive-specific variables. In Forest Park, significant equations are formed for all of the interpretive-specific variables using a mix of demographic, interest, and motive variables. In Elizabeth Park, two of the six items are significantly predicted with equations formed from demographic and interest variables.

The general utility of these findings for the interpretive-specific variables is still unclear since the items are specifically related to photos of features in the particular parks. However, these items may prove to be useful and informative for the park planners in the individual parks. The analyses in this and later sections do suggest what type of person values certain features in the park and how these opinions relate to use of the park.

6. Summary. The examination of the relationship of individual characteristics to image produces mixed results. Clearly, the demographic variables were most successful in predicting image, the activity interests were moderately successful, and the motive variables least so. However, the amount of variance predicted by any of the three groups of individual characteristics is smaller than the prediction of image variables using other image variables (presented in Tables 18 through 20).

When combining the individual characteristics, the overall prediction of image variables was more significant than the individual analyses. Still, a large amount of unique variance in the image variables remains to be accounted for. The indications are that image is only partially influenced by an individual's characteristics in the form of demographics, interests, or motives; and therefore, that the park image variables are measuring something more than characteristics of an individual. If this additional information is related to park use is the question examined in the final set of analyses.

D. Relationship of Image to Use

1. Overview. What is the role of image in people's decisions to use or not use urban parks? Do the image variables predict park use? How well do individual characteristics predict park use? And, does the prediction afforded by the image variables add to the understanding of park use, or is that prediction an artifact of the relationship of individual characteristics to park use?

The focus of these final questions is to understand urban park use by determining the relationship of individual characteristics and image to the measures of park use. It is expected that demographic characteristics, activity interests, and recreational motives will be directly related to the degree to which people use Forest Park and Elizabeth Park. It has been hypothesized that the image of these parks is also related to their use. A test of the utility of the measures of image is provided by a series of multiple regression analyses which examine how well these variables predict use and whether there is variance accounted for beyond that which is accounted for by the individual characteristics.

Measures of park use. Six estimates of park use are used in these multiple regression analyses. These variables were described earlier when differences in patterns of use between Forest and Elizabeth Park were tested for (Table 17). The respondents had estimated the number of days over the previous twelve months that they had participated in each of 36 activities. Four summed estimates were derived from these scores; these were measures of days spent in unorganized sports, relaxation, organized sports, and nature observation. Two measures which estimate total days of use of Forest and Elizabeth Park over the previous twelve months were used: first, a sum of the estimates for all of the 36 activities, "all days;" then, a single overall estimate by the respondent of days of use over the previous year, "park days."

Discussion in the earlier chapters mentioned the desirability of directly observing behaviors in the environment. However, the data collection procedure for this research was a face-to-face interview at one point in time, and therefore, the only measures of park use available for the analyses are self-reports. Although it is assumed that the respondents attempted to accurately represent their use of the parks in their answers, it is likely that their estimates contain errors. It is also quite likely that no predictable pattern of error exists, in that some respondents were more prone to exaggeration while others might have underestimated their use. The inevitable conclusion is that the measures of park use will contain indeterminable amounts of unpredictable or "error" variance.

These measures of use, the four activity groups and the two summed estimates, were used in the data analyses. In order to best facilitate the prediction of these variables, one simple transformation was accomplished -- the square root was taken for each use variable. This was done because it was hypothesized that a consistent source of error in judgment might have been in exaggerating larger numbers. For example, respondents would be less likely to overestimate park use if they spent three days there than if they had gone there ten times over the previous year. The same logic prevails for estimates of 20 days versus 50, or 100 versus 200 days. Using the square root of the use estimates reduces the larger values more than the smaller ones and thus the exaggeration is reduced. Preliminary analyses revealed that by taking the square root the use data were transformed from a curvilinear to a more linear form and thus better prediction for the linear multiple regression procedure is facilitated.

Regression equations predicting park use. There are three sets of multiple regression analyses which address this research objective. First, the aspects of image are offered in a stepwise manner to measure how much variance each aspect has in common with the park use variables (Tables 41 through 44 in Appendix D). In addition, a forced hierarchical procedure compares the effectiveness of the aspects of image by entering all the variables into one combined equation (Table 22).

The second set of analyses parallels the first only using the demographic, interest, and motive variables individually to predict use in a stepwise multiple regression procedure (Tables 45 through 47 in Appendix D). Also for these individual characteristics, a forced hierarchical procedure is run to compare the variance accounted for by all the variables in a combined run (Table 23).

The third set of multiple regression analyses consists of equations examining the maximum amount of park use predicted by all the individual difference variables and the image variables (Table 24). This final set of analyses is designed to test if the image variables account for unique variance beyond that which is predicted by the individual characteristics.

The procedures for these multiple regression analyses were guided by the same theoretical considerations used earlier. When using a forced hierarchical procedure, only variables which were found significant from prior stepwise analyses are entered. When combining image variables, the same order is maintained, forcing first the descriptive, then the evaluative, next the interpretive-general, and finally the interpretive-specific variables into the equation. The order of entry for the individual characteristics is maintained as demographics first, interests second, and motives last. And, when finally putting all the variables together, the individual characteristics are forced into the equations before the image variables. This final ordering is designed to give a stern test of how well image relates to park use beyond the influences of individual characteristics.

2. Predicting park use from image. Stepwise multiple regression procedures were used to form equations predicting park use from each aspect of image. These sets of analyses are described below and summarized in Appendix D (Tables 41 through 44). Following the review of how the individual aspects of image predict use, all the image variables are combined to predict park use using a forced hierarchical procedure, discussed and summarized below (Table 22).

Predicting use from descriptive image. In both parks, the multiple regression analyses were run predicting the six estimates of park use from the descriptive image variables -- "description," "free recall," and "familiarity." As was the case when these descriptive variables were used earlier, the "familiarity" variable was held out until last because, as a self-estimate, it is not actually a test of "knowledge."

The results of these analyses reveal that the measures of descriptive image are quite good as predictors of park use (Table 41). In Forest Park, Multiple R's ranged from .28 (8% of the variance) to .41 (17%) and equations were formed in all but one case ("nature observation"). In Elizabeth Park, Multiple R's ranged from .19 (only 4% of the variance) to .39 (15%) and equations were formed for all but one use variable ("organized sports"). The "description" variable accounted for large amounts of variance in many of the equations, and often, the "familiarity" variable was added with more variance accounted for. The added variance from "familiarity" was most evident in the overall estimates of park use -- "all days" and "park days." The "free recall" item was not useful in Forest Park, but of moderate utility in Elizabeth Park.

Preliminary interpretations can be made from these equations. Descriptive knowledge of either park is clearly related to the use of that park; in other words, the respondents with more knowledge of the parks used the parks more often. The fact that the overall estimates of use are highly related to the self-estimates of "familiarity" indicates that these may actually be estimates of park use rather than perceptions of "familiarity."

Predicting park use from evaluative image. Each estimate of park use was predicted from the evaluative variables using a stepwise procedure. The results are summarized in Table 42 of Appendix D. In Forest Park, no relationship between the evaluative variables and use was found as only one equation was formed. That equation, predicting "park days," accounted for only 3% ($p < .10$) of the variance using "evaluation." The situation in Elizabeth Park is the opposite; equations were formed for all but one of the use variables with Multiple R's ranging from .25 to .37 (from 6% to 14% of the variance).

The contrasting results from the two parks is intriguing. In Elizabeth Park, the general "evaluation" of the park is strongly related to its use, and "naturalness," "cleanliness" and "convenience" contribute to the prediction of some of the use variables. In Forest Park, no such relationships exist. One interpretation is that persons use Forest Park regardless of their evaluations of the park. It is the largest and most diverse urban park in the region and very well might be the only alternative. Elizabeth Park, on the other hand, can be avoided by potential users with negative images as they can seek out and find other locations for their outdoor recreation.

Predicting park use from interpretive-general image. Once more, each of the six use variables were predicted in multiple regression analyses offering the interpretive-general variables in a stepwise manner. The results of these analyses are the reverse of findings from the evaluative variables as here there is greater prediction of use in Forest Park than in Elizabeth Park (Table 43). In Forest Park, equations were formed in four of six cases with Multiple R's ranging from .18 (3% of the variance) to .35 (12%). In Elizabeth Park, only two equations were formed, both with Multiple R's of .28 (8% of the variance).

In Forest Park, "safety" and "pride" are the variables which contribute to the prediction of use, with minor assistance from "driving." In the two Elizabeth Park equations, "driving" and "pride" are used. These findings suggest that persons who use the parks more make interpretations about the parks that indicate a greater sense of pride in the parks, a higher perception of safety, and less interest in driving through the parks. The finding that evaluations are predictive of use in Elizabeth Park and interpretive-general variables are of use in Forest Park is revealing. It suggests that there is a difference between what the evaluative and the interpretive-general items are measuring. It also suggests evidence that the decisions to use the two parks could be based on different types of information.

Predicting park use from interpretive-specific image. The last stepwise multiple regression analyses predicting park use from image offers the interpretive-specific items. The results from these equations are mixed (see Table 44 in Appendix D). In Forest Park, five equations are formed with Multiple R's ranging from .19 to .45 (4% to 21% of the variance). In Elizabeth Park, only three equations resulted with Multiple R's from .20 to .24 (4% to 6%).

The interpretation of these results is not simple. In particular, the "woods" item is the main influence in the Forest Park equations. Apparently, increased park use is negatively related to the preference for more paths through the woods. There is a logic to this relationship since frequent users should be more satisfied with the current physical characteristics of the park than less frequent users. However, the utility of this finding and the small amounts of variance accounted for in the other equations suggest that interpretations be made cautiously.

Predicting park use from all image variables. The final analyses examining the relationship of image to use combine the information from the prior stepwise analyses. The variables which were entered in the stepwise procedure are now entered, one aspect at a time, in a forced hierarchical procedure. First, the descriptive variables which were useful in predicting use are forced to enter the equation (with the exception of "familiarity"). Then, the evaluative variables and the interpretive-general items follow in the equations. Next, the interpretive-specific variables are placed in the equation. And finally, "familiarity" is forced into the equation (if it was used in the earlier stepwise equations).

This order of entry was based on the same theoretical considerations used throughout these analyses: the descriptive image variables are viewed as measures of knowledge which are considered to be prerequisite to evaluations or interpretations; the interpretive-specific items are held out of the equations until the other variables have entered because of their park-specific orientation; and, "familiarity" is entered last since it is a self-estimate which could really be an estimate of use.

The results from these multiple regression analyses, as summarized in Table 22, illustrate that image is strongly related to park use. In Forest Park, Multiple R's for the six estimates of use range from .29 (8% of the variance) to .58 (34%). In Elizabeth Park, Multiple R's ranged from .43 to .50 (or 19% to 25% of the variance) except for "organized sports" where no equation was formed. (The opportunities for

Table 22. Predicting Days of Use Using Descriptive, Evaluative, and Interpretive Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.54)	1 (.12)	Description	Descriptive	29% of variance accounted for.
		2 (.13)	Safety	Interp-Gen.	
			Driving	"	
		3 (.00)	Woods	Interp-Spec.	
		4 (.04)	Familiarity	Descriptive	
	Relaxation Days (.31)	1 (.03)	Description	Descriptive	
		2 (.03)	Woods	Interp-Spec.	
		3 (.04)	Familiarity	Descriptive	
	Organized Sport Days (.38)	1 (.10)	Description	Descriptive	
		2 (.05)	Lake	Interp-Spec.	
	Nature Observation (.29)	1 (.08)	Safety	Interp-Gen.	Only 8% of variance.
			Pride	"	
	All Days Combined (.49)	1 (.04)	Description	Descriptive	
		2 (.04)	Pride	Interp-Gen.	
		3 (.04)	Woods	Interp-Spec.	
		4 (.13)	Familiarity	Descriptive	
	Estimate of Park Days (.58)	1 (.05)	Description	Descriptive	34% of variance accounted for.
		2 (.03)	Evaluation	Evaluative	
		3 (.08)	Driving	Interp-Gen.	
			Pride	"	
		4 (.11)	Woods	Interp-Spec.	
		5 (.06)	Familiarity	Descriptive	

*Variables forced hierarchically (based on prior analyses): 1)descriptive (without familiarity), 2)evaluative, 3)interpretive-general, 4)interpretive-specific, and 5)familiarity.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 22. Predicting Days of Use
(continued) Using Descriptive, Evaluative, and Interpretive Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R2 △)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Unorganized Sport Days (.50)	1 (.05)	Description	Descriptive	25% of variance accounted for.
		2 (.07)	Natural	Evaluative	
		3 (.07)	Driving	Interp-Gen.	
		4 (.02)	Meadows	Interp-Spec.	
		5 (.05)	Familiarity	Descriptive	
	Relaxation Days (.43)	1 (.04)	Description	Descriptive	
		2 (.11)	Cleanliness	Evaluative	
			Evaluation	"	
		3 (.04)	Driving	Interp-Gen.	
			Pride	"	
	Organized Sport Days	No Variables Entered			No prediction of organized sports in EP.
	Nature Observation (.45)	1 (.04)	Free Recall	Descriptive	
		2 (.11)	Cleanliness	Evaluative	
			Evaluation	"	
		3 (.04)	Picnic Area	Interp-Spec.	
		4 (.02)	Familiarity	Descriptive	
	All Days Combined (.50)	1 (.05)	Free Recall	Descriptive	
		2 (.09)	Cleanliness	Evaluative	25% of variance accounted for.
			Evaluation	"	
		3 (.03)	Picnic Area	Interp-Spec.	
		4 (.08)	Familiarity	Descriptive	
	Estimate of Park Days (.43)	1 (.04)	Free Recall	Descriptive	
		2 (.07)	Natural	Evaluative	
			Convenience	"	
		3 (.07)	Familiarity	Descriptive	

*Variables forced hierarchically (based on prior analyses): 1)descriptive (without familiarity), 2)evaluative, 3)interpretive-general, 4)interpretive-specific, and 5)familiarity.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

participation in organized sports in Elizabeth Park are severely limited; thus, participation in these activities is less dependent on image and more influenced by the availability of facilities.)

These highly significant equations indicate that use of a park by an individual is very much related to a combination of that individual's descriptive, evaluative, and interpretive image. They provide the first substantiation of the hypothesized link between the image and use of urban parks. However, as has been discussed, this relationship could be a reflection of the relationship of individual characteristics to use. In other words, the types of persons who use the parks may hold similar images of the park; and, if this were the case, the image data would not be extremely useful in understanding park use. The remaining multiple regression analyses focus on finding whether the image has a unique influence on park use.

3. <u>Predicting park use from individual characteristics.</u> The relationship between a park's image and its use was established in the previous section. However, this relationship could be a reflection of the link between individual characteristics and use. For example, age may be correlated with both evaluative image and park use; therefore, the multiple regression analyses which predict use from "evaluation" may be a reflection of the relation of age to use. To examine these possibilities, multiple regression equations were formed to predict use from individual characteristics.

The format for these analyses predicting use from individual characteristics is identical to that used for the image variables. Stepwise multiple regression analyses produced equations which separately predict park use from demographic characteristics, activity interests, and recreational motives (see Tables 45 through 47 in Appendix D). Then a forced hierarchical procedure tests for the prediction of use from all the individual characteristics combined (Table 23).

Predicting use from demographic characteristics. Multiple regression analyses were run for both parks offering the demographic variables to predict the six measures of park use. The results reveal a moderate relationship between demographics and use (summarized in Table 45). In Forest Park, equations are formed in four of six cases with Multiple R's ranging from .20 (4% of the variance) to .44 (20%). In Elizabeth Park, there were also four equations with Multiple R's from .21 to .37 (4% to 13% of the variance). In Forest Park, sex and distance to the park were entered most often while number of children was the most influential variable in Elizabeth Park. Therefore, the strongest link between use and demographics is that men, persons living closer, and persons with more children use the parks more often.

The inconsistency of the equations formed by these analyses indicates that while demographic characteristics are related to use, the link is not strong. The results from the previous analyses demonstrate a stronger link between image variables and use. For the most part then, park use is not determined by these demographic characteristics.

Predicting use from activity interests. A much more consistent relationship between activity interests and park use is established in the next set of multiple regression analyses (summarized in Appendix D, Table 46). In Forest Park, equations are formed for all of the use variables except "park days" and the Multiple R's ranged from .26 (7% of the variance) to .40 (16%). In Elizabeth Park equations are formed for all the use variables with Multiple R's ranging from .33 to .43 (11% to 19% of the variance).

This pattern, greater interests predicts more use, is not unexpected, given that the measures of interest in activities are grouped in the same manner as the measures of park use. The result is, for example, that interests in "unorganized sports" predict the estimated number of days spent participating in unorganized sports. This pattern is consistent for each of the estimates of participation in activity groups with one exception -- days spent in relaxation activities in Elizabeth Park is predicted better by interests in "nature observation" than by the "relaxation" variable. The estimates of total days spent in the parks do not have the same advantage as the prediction of days spent in specific activity groups. In Forest Park, "park days" is not predicted, but "all days" is, using interests in "relaxation." In Elizabeth Park, "nature observation" significantly predicts both "all days" and "park days."

The link between greater activity interests and increased park use is established by these equations. Still, there are large amounts of variance in the use variables which are not accounted for. Even though interests in particular types of activities predict participation in those activities to some degree, there are apparently other factors which influence the decision to use the parks. Later analyses will test how much of an influence image has in this decision.

Predicting use from recreational motives. Moderate prediction of the use variables is afforded by the recreational motive variables

(Table 47). In Forest Park, equations were formed in five of six cases with Multiple R's ranging from .20 (4% of the variance) to .35 (12%). Equations are formed in all six cases in Elizabeth Park and Multiple R's range from .18 to .38 (3% to 14% of the variance). These levels of prediction are in general lower than the image or interest variable equations and comparable to the equations formed from the demographic variables. To "escape" and to "enjoy nature" and for "physical activity" appear to be motivations which are linked to the increased use of both parks.

These findings are informative; however, it remains to be seen whether the prediction offered by the motive variables adds to an understanding of park use, or rather, if this prediction duplicates the variance accounted for by the demographic and interest variables.

Predicting use from individual characteristics combined. A set of multiple regression analyses which hierarchically forces the variables from the previous stepwise analyses provides for a comparison of the variance accounted for by the demographics, interests, and motives. The order of entry established is identical to the ordering used before for the individual characteristics: the significant demographic variables are entered first, activity interests second, and motives last. The results of these analyses are summarized in Table 23.

It is apparent that there is a significant relationship between the days of use of the parks and individual characteristics. In Forest Park, Multiple R's range from .20 (4% of the variance) to .48 (23%), and in Elizabeth Park, from .38 to .55 (14% to 29%). Overall, the prediction of use in Elizabeth Park was more consistent than in Forest Park. This

Table 23. Predicting Days of Use
Using Individual Characteristics.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.48)	1 (.08)	Sex	Demographic	23% of variance accounted for.
			Age	"	
		2 (.07)	Avg. Interest	Interest	
			Unorg. Sport	"	
		3 (.08)	Physical Act.	Motive	
	Relaxation Days (.41)	1 (.04)	Distance	Demographic	
		2 (.11)	Avg. Interest	Interest	
			Relaxation	"	
		3 (.02)	Escape	Motive	
	Organized Sport Days (.48)	1 (.19)	Sex	Demographic	23% of variance accounted for, mostly using demographics.
			Income	"	
			Family Size	"	
		2 (.01)	Org. Sport	Interest	
		3 (.02)	Escape	Motive	
	Nature Observation (.41)	1 (.16)	Nature Obs.	Interest	
		2 (.00)	Escape	Motive	
	All Days Combined (.28)	1 (.07)	Relaxation	Interest	Multiple R not significant.
		2 (.01)	Enjoy Nature	Motive	
	Estimate of Park Days (.20)	1 (.04)	Distance	Demographic	Multiple R not significant.

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, and 3)motives.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 23. Predicting Days of Use
(continued) Using Individual Characteristics.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Unorganized Sport Days (.52)	1 (.09)	# Children	Demographic	27% of variance accounted for.
		2 (.12)	Unorg. Sport	Interest	
		3 (.06)	Escape	Motive	
			Physical Act.	"	
	Relaxation Days (.38)	1 (.13)	Nature Obs.	Interest	
		2 (.01)	Enjoy Nature	Motive	
	Organized Sport Days (.55)	1 (.13)	# Children	Demographic	29% of variance accounted for, using demographics and interests.
			Sex	"	
		2 (.13)	Org. Sport	Interest	
		3 (.03)	Avg. Motive	Motive	
	Nature Observation (.46)	1 (.19)	Nature Obs.	Interest	
		2 (.02)	Escape	Motive	
			Enjoy Nature	"	
	All Days Combined (.45)	1 (.04)	# Children	Demographic	
		2 (.15)	Nature Obs.	Interest	
		3 (.00)	Enjoy Nature	Motive	
	Estimate of Park Days (.49)	1 (.08)	# Children	Demographic	
			Years in Home	"	
		2 (.12)	Nature Obs.	Interest	
		3 (.04)	Physical Act.	Motive	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, and 3)motives.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

finding might be linked to the evidence of a stronger relationship between activity interests and the use of Elizabeth Park. Particular interests in "nature observation," "organized sports" and "unorganized sports" add to the prediction of the use of that park. In Forest Park, where a broad array of activity interests can be satisfied, use is less influenced by specific interests.

Summary. These tests of the relationship of individual characteristics to use of Forest Park and Elizabeth Park reveal that demographic characteristics and recreational motives are slightly related to use, and that activity interests are moderately related to use. When all three groups of individual characteristics are combined to predict use, more substantial amounts of variance are predicted. These results establish a strong link between individual differences and the use of urban parks. However, considerable variance remains to be accounted for in the use data (assuming there is more than error variance remaining). The final step in the data analyses tests for the ability of the image variables to predict this remaining variance.

4. Predicting park use from all variables. The final set of multiple regression analyses pulls together all the variables used in the previous analyses with the primary goal of understanding urban park use. This is accomplished through a forced hierarchical procedure which compares and combines the variance in park use which can be accounted for by individual characteristics and image. First, individual characteristics which are significantly related to the park use variables are entered into the equation using the same order as before -- demographic charac-

teristics, activity interests, and recreational motives. Then, the image variables which proved significant are entered to test how much additional park use variance is accounted for once the individual characteristics have been taken into consideration.

The equations predicting the six measures of park use for each park are summarized in Table 24. Extremely significant Multiple R's ranging from .49 (24% of the variance) to .64 (41%) are evidenced in the two parks. Although there appear to be large amounts of variance which remain to be accounted for, much of this is error variance resulting from the inaccuracies of measuring park use based on self-estimates. In addition, the distribution of days use for activity groups is truncated at 0; many persons in the sample participated in no activity days for each activity group. The truncated distribution also inhibits total prediction of variance in multiple regression analyses.

Still, the multiple regression equations are quite significant. Although it is difficult to grasp the full extent of the prediction of use, specific comparisons are possible. The amounts of variance predicted by individual characteristics compared with the variance predicted by image provides a test of the relative effectiveness of each type of variable. Each equation will be examined individually to facilitate discussion of these issues.

Unorganized sports. An equation is formed which quite significantly predicts use of Forest Park for unorganized sports (Multiple R of .64, 41% of the variance accounted for). Individual characteristics account for much of the variance: sex and age (8%), "average interest" and interest in "unorganized sports" (7%), and the motive for "physical

Table 24. Predicting Days of Use Using All Variables.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.64)	1 (.08)	Sex	Demographic	41% of variance accounted for, "image" adds 18%.
			Age	"	
		2 (.07)	Avg. Interest	Interest	
			Unorg. Sport	"	
		3 (.08)	Physical Act.	Motive	
		4 (.18)	Description	Image	
			Safety	"	
			Driving	"	
			Woods	"	
			Familiarity	"	
	Relaxation Days (.50)	1 (.04)	Distance	Demographic	25% of variance accounted for, "interests" contribute 11%, "image" adds 7%.
		2 (.11)	Avg. Interest	Interest	
			Relaxation	"	
		3 (.02)	Escape	Motive	
		4 (.07)	Description	Image	
			Woods	"	
			Familiarity	"	
	Organized Sport Days (.57)	1 (.19)	Sex	Demographic	33% of variance accounted for, demographics contribute 19%, "image" adds 10%.
			Income	"	
			Family Size	"	
		2 (.01)	Org. Sport	Interest	
		3 (.02)	Escape	Motive	
		4 (.10)	Description	Image	
			Lake	"	
	Nature Observation (.49)	1 (.16)	Nature Obs.	Interest	24% of variance accounted for, "nature obs." contributes 16%, "image" adds 7%.
		2 (.00)	Escape	Motive	
			Enjoy Nature	"	
		3 (.07)	Safety	Image	
			Pride	"	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, 3)motives, and 4)image.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 24. Predicting Days of Use
(continued) Using All Variables.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	All Days Combined (.54)	1 (.07)	Relaxation	Interest	30% of variance accounted for, "image" adds 22%.
		2 (.01)	Enjoy Nature	Motive	
		3 (.22)	Description	Image	
			Pride	"	
			Woods	"	
			Familiarity	"	
	Estimate of Park Days (.59)	1 (.04)	Distance	Demographic	35% of variance accounted for, "image" adds 31%.
		2 (.31)	Description	Image	
			Evaluation	"	
			Driving	"	
			Pride	"	
			Woods	"	
			Familiarity	"	
Elizabeth:	Unorganized Sport Days (.62)	1 (.09)	# Children	Demographic	38% of variance accounted for, "unorganized sport" contributes 12%, "image" adds 11%.
		2 (.12)	Unorg. Sport	Interest	
		3 (.06)	Escape	Motive	
			Physical Act.	"	
		4 (.11)	Description	Image	
			Natural	"	
			Driving	"	
			Meadows	"	
			Familiarity	"	
	Relaxation Days (.49)	1 (.13)	Nature Obs.	Interest	24% of variance accounted for, "nature observ." contributes 13%, "image" adds 10%.
		2 (.01)	Enjoy Nature	Motive	
		3 (.10)	Description	Image	
			Cleanliness	"	
			Evaluation	"	
			Driving	"	
			Pride	"	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, 3)motives, and 4)image.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 24. Predicting Days of Use
(continued) Using All Variables.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Organized Sport Days (.55)	1 (.13)	# Children	Demographic	29% of variance accounted for, no contribution from "image".
			Sex	"	
		2 (.13)	Org. Sport	Interest	
		3 (.03)	Avg. Motive	Motive	
	Nature Observation (.55)	1 (.19)	Nature Obs.	Interest	31% of variance accounted for, "nature observ." contributes 19%, "image" adds 10%.
		2 (.02)	Escape	Motive	
			Enjoy Nature	"	
		3 (.10)	Free Recall	Image	
			Cleanliness	"	
			Evaluation	"	
			Picnic Area	"	
			Familiarity	"	
	All Days Combined (.57)	1 (.04)	# Children	Demographic	33% of variance accounted for, "nature observ." contributes 15%, "image" adds 14%.
		2 (.15)	Nature Obs.	Interest	
		3 (.00)	Enjoy Nature	Motive	
		4 (.14)	Free Recall	Image	
			Cleanliness	"	
			Evaluation	"	
			Picnic Area	"	
			Familiarity	"	
	Estimate of Park Days (.55)	1 (.08)	# Children	Demographic	30% of variance accounted for, "nature observ." contributes 12%, "image" adds 6%.
			Years in Home	"	
		2 (.12)	Nature Obs.	Interest	
		3 (.04)	Physical Act.	Motive	
		4 (.06)	Free Recall	Image	
			Natural	"	
			Convenience	"	
			Familiarity	"	

*Variables forced hierarchically (based on prior analyses): 1)demographics, 2)interests, 3)motives, and 4)image.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

activity" (8%). Still, when the image variables are forced into the equation, a large amount of additional variance (18%) is accounted for.

A similar equation is formed for predicting participation in unorganized sports in Elizabeth Park (Multiple R equals .62, 38% of the variance). Once more individual characteristics are linked to park use: number of children (9%), interest in "unorganized sports" (12%) and motives for "escape" and "physical activity" (6%). When image variables are forced to enter, they too add a significant amount of variance (11%).

Although individual characteristics are significantly related to park use for unorganized sports, the image of Forest Park is also influential in the use of that park. The additional contribution of image in Elizabeth Park is smaller but still significant. Therefore, the relationship between image and use above and beyond individual characteristics is supported.

Relaxation days. Days of participation in relaxation activities in Forest Park is significantly predicted (Multiple R of .50, 25% of the variance). The contribution of individual characteristics is weighted towards "interests": distance (4%), "average interests" and "relaxation" (11%) and the motive to "escape" (2%). The image variables enter with a small amount of additional variance (7%).

The pattern of prediction for relaxation days in Elizabeth Park is similar, although a smaller proportion of variance is accounted for (Multiple R equals .49, 24% of the variance accounted for). Interests in "nature observation" enters first (13%) followed by the motive to "enjoy nature" (1%). Image variables pick up an additional 10% of the variance after these individual characteristics are entered into the equation.

The small influence of demographics and motives in the prediction of relaxation days indicates that a broad range of individuals participate in relaxation activities for a variety of motives. This fact leaves interests in specific "relaxation" activities as the best predictor of actual participation in these activities. Still, interests do not lead directly to use; image variables add significant amounts of predicted variance to the equations for days participating in relaxation.

Organized sports. Again in Forest Park, participation in organized sports is significantly predicted (.57 for the Multiple R, 33% of the variance). In this case, demographic characteristics are the most significant contributors to the equation (19%) with minimal added variance from other individual characteristics: interests in "organized sports" (1%), the motive to "escape" (2%). The image variables add to the prediction of participation in organized sports (10%) where interests and motives could not.

Comparable variance is predicted in Elizabeth Park (Multiple R equals .55, 29% of the variance), but there is no contribution from the image variables. All the predicted variance comes from individual characteristics: number of children and sex (13%), interests in "organized sports" (13%) and the score for "average motive" (3%).

The analyses for days spent in organized sports reveal a marked difference between the two parks. In Forest Park, the pattern established in the first two equations is repeated; the image variables add to the prediction established by the individual characteristics. However, in Elizabeth Park, demographics and interests predict participation in organized sports and none of the image variables contribute to the prediction. This difference can be understood given the more limited opportunities for participation in organized sports in Elizabeth Park; the park facilitates other activities to a much greater extent. So, regardless of an individual's image of Elizabeth Park, participation in organized sports is an unlikely occurrence. A large section of Forest Park, on the other hand, is oriented toward participation in organized sports.

Nature observation. The equation to predict participation in nature observation in Forest Park is also significant (Multiple R of .49, 24% of the variance accounted for). The only individual characteristic that contributes is interest in "nature observation" (16%) which accounts for the variance that motives to "escape" and "enjoy nature" would have added (they add 0%). Image variables enter with a small but significant increase (7%) in variance accounted for.

In Elizabeth Park, the pattern of the equation is quite similar (Multiple R of .55, 31% of the variance). Interests in "nature observation" dominates the variance accounted for (19%) with a small contribution from "escape" and "enjoy nature" (2%). The image variables add a moderate amount of variance (10%).

A strong link between interests in "nature observation" and participation in nature observation is established in both parks. This is an indication that persons seeking to participate in these activities do so in Forest Park and Elizabeth Park. However, the image of the parks does influence the ultimate decision of whether or not to use the parks for those activities.

Total use. Two variables are used to approximate total days of use: "all days," which is a sum of estimates of participation in 36 activities, and "park days," a single overall estimate made by the respondent. In Forest Park, the total estimates of park use are influenced by image. Small amounts of the variance predicted for "all days" (total Multiple R .54, 30% of the variance) are contributed by the individual characteristics: interests in "relaxation" (7%), and the motive to "enjoy nature" (1%). The only individual characteristic contributing to the prediction of "park days" (total Multiple R of .59, 35% of the variance) is distance to the park (4%). For both variables, image adds the majority of the variance for total park use: for "all days," image contributes an additional 22% of the variance; and for "park days" an additional 31%.

In Elizabeth Park, the pattern of prediction is similar for "all days" (.57 for the Multiple R, 33% of the variance) and "park days" (Multiple R of .55, 30% of the variance). A selection of individual characteristics predicts "all days:" number of children (4%), interests in "nature observation" (15%), and the motive to "enjoy nature" (actually adds 0%). The same is true for "park days:" number of children and years in home (8%), interests in "nature observation" (12%) and the motive for "physical activity" (4%). Image variables add a large amount of predicted variance to "all days" (14%), and a smaller, but still significant amount to "park days" (6%).

In sum, the total use of Forest Park is linked to the image of the park, while the individual characteristics of the respondents have minimal impact on the prediction of overall use. In Elizabeth Park, the image variables share in their contribution to the prediction of total use with interests in "nature observation" also linked to the overall use of the park, perhaps because these are the primary activities facilitated by the park. The limited but significant additions by image could be due to the variance grabbed first by this interest variable.

E. Summary

The final research objective is to explore the relationship of park image and individual characteristics to park use. This was accomplished by first examining how well image predicts use. A strong link between the respondents' images and use of Forest Park and Elizabeth Park was established. In the next step, another link was made to park use; the respondents' individual characteristics were found to be predictive of their use of the parks. Interests in specific activities served as the best predictors of park use. Finally, all the variables from the previous analyses were entered into an equation to predict the measures of park use. Within the limits of the multiple regression analytic framework, large amounts of the variance in the park use variables are predicted. Even when individual characteristics are allowed to enter and account for variance first, image variables, demonstrating their utility, still add variance.

The introductory analyses in the first results chapter and the multiple regression analyses in this chapter have covered a lot of ground. The discussion chapter begins with an attempt to tie these findings together into a more coherent picture describing what has been discovered about images of urban parks.

CHAPTER VI

DISCUSSION

Image, a much used term, is the focus of this dissertation. Broadly defined, it includes all the information about environments which are stored in a person's mind. The image contains more or less accurate perceptions of environments, opinions and judgments about places, comparisons between places, and quite often, inaccurate information about environments. As defined here, the image serves as a reference point for an individual's transactions with the environment. Perceiving an environment, making plans concerning that place, and acting in that environment all involve the individual's knowledge of this and related environments -- the image.

Two urban parks were used as "laboratories" for the study of image. A face-to-face interview was conducted in the homes of a random selection of people who use and live near Forest Park in Springfield, Massachusetts, or Elizabeth Park in Hartford, Connecticut. Several types of information were collected from these samples: their images of the park, interests in recreational activities, demographic characteristics, and patterns of use of outdoor recreational areas.

The data from the survey were analyzed to explore five research objectives concerning people's images of the two parks. The first section of this chapter summarizes the results from each of the five objectives. Next, the discussion turns to a more general focus about the usefulness of these findings in understanding urban parks. Then, the relevance of the findings to research on images in general is addressed. And finally, future directions evolving from this research are discussed.

A. Summary of Results

A review of the image literature and current problems in urban park planning and management led to the formation of the overall objective of this research:

> To adapt and expand upon available research methods in environmental knowing to assess environmental images of urban parks.

This broad objective was refined into a series of five more specific objectives, each of which was addressed in the data analyses. These objectives concern: 1) the nature of images of urban parks; 2) image differences between the two parks; 3) the relationship of the aspects of image; 4) the relationship of individual characteristics to park image; and 5) the relationship of image to the use of urban parks.

In exploring these research objectives, the complexity of the specific data analyses and the volume of tables may have, at times, obscured the reader's overview of the results in general. In addition, findings from one objective which were relevant to objectives were not tied together in the results chapters. Therefore, the goal of the first section of the discussion chapter is to integrate and summarize the results which bear on each of the five research objectives.

1. The nature of images of urban parks. What is the nature of the images of Forest Park and Elizabeth Park held by local residents? How accurate is their descriptive image? What are their overall evaluations

of the parks? Also, what interpretations do they make based on this information?

Forest Park. At 750 acres, Forest Park is the largest park in the Springfield, Massachusetts park system. Within the park's boundaries are diverse areas with distinguishable features and facilities for a range of activities. There are athletic areas of the park with fields for team sports, tennis courts, a swimming pool, a shuffleboard area, a skating rink, basketball courts, and facilities for lawn bowling. Other features of the park include a children's zoo, a playground, picnic areas, and a rose garden. Two-thirds of the park consists of more natural areas dominated by woods, lakes, and meadows.

Elizabeth Park. Elizabeth Park is only 120 acres, but is distinguished as the gem of the Hartford, Connecticut parks system. The park's rose garden has regional appeal. Adjacent to the roses are other gardens, a greenhouse, and a small lake. Athletic facilities are not as pervasive in Elizabeth Park, although there are tennis courts, baseball fields, and a lawn bowling area. Other features of the park include several open meadows, small but densely wooded areas, two playgrounds, and a lookout view of downtown Hartford.

Images. These physical descriptions are informative, yet the information is not complete. The survey conducted for this research has produced data on how these parks are perceived by local residents. To begin with, it is apparent that most of the respondents do not know all that there is to know about the descriptions of their parks. Four tasks designed to measure the descriptive knowledge about the parks reveal the respondents' incomplete and inaccurate perceptions. Many park users failed to name significant features of the parks, could not describe park rules, and were unable to identify or locate photographs of their parks.

Despite their lack of knowledge about the parks, the respondents had favorable impressions of them; average evaluations for both parks using adjective pairs were on the more positive side of valuable (vs. worthless), convenient (vs. inconvenient), like (vs. dislike), and accessible (vs. inaccessible). Still, there was evidence that some persons had more negative opinions because certain adjective pairs averaged closer to neutral (in other words, halfway between the adjectives). These pairs included safe (vs. dangerous), crowded (vs. uncrowded), and dirty (vs. clean). The variance in these responses also indicate that opinions do differ among the users of the parks.

The respondents also revealed a difference of opinion when making interpretations about their parks. Most found the parks to be easily accessible, but opinions about pride in the park, the maintenance of the roads, and the appearance of vandalism were mixed. Interpretations about specific features of the parks revealed consistent opinions about some features (for example, the rose gardens in Elizabeth Park, the lake in Forest Park), and a diversity of opinions relative to other features (for example, the closing of roads in both parks).

In sum, two attractive and diverse parks were examined. The responses of persons living near and using these parks reveal that there are inaccuracies in their perceptions of the parks. Their descriptive knowledge is incomplete and often wrong, and their opinions are quite diverse. There is no objective way to determine if an opinion is right or wrong, but the diversity of opinions suggests that different perceptions of the park have been developed and maintained by the respondents.

2. Differences in images between two urban parks. How do the images of Forest Park and Elizabeth Park differ? Do respondents from one area have a better descriptive knowledge of their park? Do the evaluations and interpretations about the two parks differ? If there are differences, how might they be explained?

Despite the different sizes of the two parks, there are many similarities in the descriptions of Forest Park and Elizabeth Park. Also common to both parks is the finding that the respondents' perceptions are incomplete and inaccurate. Beyond these overall similarities, there are a number of specific differences in the images of the two parks on measures of descriptive knowledge, evaluations, and interpretations.

Description. In terms of descriptive knowledge, it is apparent that the Forest Park respondents know their park better than the respondents from Elizabeth Park. Since the patterns of park use are not significantly different, and Forest Park is so much larger than Elizabeth Park, it would be expected that Forest Park is more difficult to know. Yet, the results from the tests of knowledge reveal that Elizabeth Park is not as well known.

The segmented layout of Elizabeth Park offers a possible explanation for this finding. The east end of the park is separated from the other areas by a major road and the west end is cut off from the other areas by a densely wooded section. What remains is the central portion of the park and prior analyses revealed that these areas (the rose garden and the lake) dominate the rankings of familiarity over the other areas. Therefore, it is likely that the isolated sections of Elizabeth Park are not well known and that the knowledge scores were lower because of test items from these areas. Most of the areas in Forest Park, on the other hand, are easily accessible. The familiarity rankings are spread evenly across all of these areas with the probable results that knowledge of the park is more evenly distributed across the entire park.

Evaluation and interpretation. Although the Elizabeth Park respondents know less about their park, they clearly have a more positive opinion of the park based on the evaluative and interpretative data. While both parks are valued highly on overall measures of evaluation (for example, like vs. dislike), Elizabeth Park is more preferred on this dimension. The parks are both viewed as convenient, but again, Elizabeth Park is perceived as such to a greater extent. And, there are mixed opinions about the parks' cleanliness, but Forest Park is perceived on the average as less clean than Elizabeth Park. Also, Elizabeth Park is viewed more favorably in terms of safety and pride in the parks.

Preliminary observations in the parks and discussions with park officials led to the prediction that there is a more positive image of Elizabeth Park when compared to Forest Park. However, the outward appearance of the parks does not suggest such an extreme difference. It is quite possible that the parks' histories have an effect on these perceptions. For example, Forest Park was once known for the drug transactions that took place in certain areas of the park. Although this problem is no longer prevalent, the perception of Forest Park as a "hang-out" for drug dealers lingers. In addition, Forest Park was once known for its zoo and rose gardens, two features which have deteriorated over the years. As a result, comparisons are often made to the history of the park which obscure the many positive features which still remain. More recently, deterioration similar to that recognized in Forest Park has become evident in Elizabeth Park. Perhaps the less positive aspects of Elizabeth Park are not perceived because they have only recently occurred and have evolved more gradually, or because they are not as prominent as the negative aspects in Forest Park (for example, the closing of the zoo).

Park diversity. A final park difference to be discussed is that recreational interests influence the image and patterns of use of Elizabeth Park while no such relationship is evident in Forest Park. The larger size and greater diversity of Forest Park can help explain this discrepancy. There are opportunities to participate in many different activities in the widely diverse areas throughout Forest Park. Interest in any one subset of activities is less likely to affect the image or the use of the park.

On the other hand, Elizabeth Park is smaller and less diverse. The park has a central section (rose garden and lake areas) which dominates the patterns of use. Persons interested in more passive recreation are more likely to use this area of the park and hold a certain type of image. Other persons with different interests are likely to hold different images and to exhibit different patterns of use. Therefore, the relationship of specific activity interests to the image and use of Elizabeth Park can be seen, in part, as a function of the park's smaller size and more limited range of activities.

However, diversity alone does not explain the full scope of differences between the two parks. From another perspective, Elizabeth Park suffers an "image problem" in that its potential users perceive it as a site for passive forms of recreation and they are not as aware of the opportunities for active recreation which are available in less familiar areas of the park. Forest Park also has an "image problem;" there, it is a negative image of the park as being dirty or unsafe or as being dominated by teenagers which keeps some persons from going to the park. This perspective is discussed further in a section on the "barriers to use" of urban parks.

Overall, using samples which are comparable in terms of individual characteristics and patterns of recreational use, it is apparent that people's images of Forest Park and Elizabeth Park are quite different. A better descriptive knowledge of Forest Park is balanced by a more negative view of its safety, convenience, and value. The history of Forest Park is viewed as an influence in these perceptions. In Elizabeth Park, interests in activities have a greater influence on image and use than in Forest Park. This difference is partially attributed to the limited size and range of activities available to the users of Elizabeth Park.

3. The relationship of the aspects of image. Are the three aspects of image defined in this dissertation -- descriptive, evaluative, and interpretive (general and specific) -- distinguishable from one another? In what ways are they related to each other? How well can each of the measures of image be predicted from the other image variables?

A broad definition of image was defended in the literature review of this dissertation. It was proposed that several aspects of image are evident and must be recognized as influential when studying the image. Many theories of environmental knowing support this broad approach and taxonomies of image are suggested in the literature.

The survey instrument was designed with three aspects of image in mind: descriptive information, the knowledge of places held by an individual; evaluative information, the value that is placed on the places by an individual; and interpretive information, an individual's plans and predictions based on the other components of image. Two formats for obtaining the latter aspect of image were developed: interpretive-general items were designed to obtain predictions about the parks as a whole; and interpretive-specific items measured opinions about particular features in the parks.

Within the constraints of the survey format, methods were developed to measure each of these aspects of image from more than one perspective. As a result, several tests of descriptive knowledge were used, evaluations were measured using two kinds of procedures, and as described above, two approaches were developed for obtaining interpretations. Still, it is possible that other methods could provide additional perspectives on each of the aspects of image. For example, how well the interpretive items produce a measure of an individual's plans and predictions is not totally clear. However, other ways of obtaining interpretations during an interview are not readily apparent.

Distinguishing aspects. The analyses which examined the relationship of the aspects of image reveal stronger links between some dimensions than between others. The descriptive image appears to be only weakly related to the other aspects of image. Evaluative and interpretive-general image are strongly related and difficult to distinguish. And, the interpretive-specific image is unique and only moderately related to the other dimensions of image.

The *a priori* differentiation of the aspects of image is defended by these results. However, the relationship among the aspects is more complex than originally suggested. In particular, it was not expected that the evaluative and interpretive-general measures would be so strongly linked. The evidence would suggest that these measures are most likely monitoring a single aspect of image. Perhaps when asking for general interpretations across the park as a whole, the respondents are relating their responses to their overall evaluation of the park. This notion is supported by the fact that the interpretive items about specific features are unrelated to the measures of evaluative or interpretive-general image. What remains are three aspects or dimensions to image: descriptive, general evaluative/interpretive, and interpretive-specific.

The descriptive aspect of image is not systematically related to evaluations or interpretations. For example, when examining park differences, it was found that the respondents from Forest Park knew their park better, but their higher score on the descriptive knowledge tests did not result in better evaluations or interpretations. The Elizabeth Park respondents showed less complete knowledge of that park, but more positive scores on the evaluative dimensions.

The evaluative and interpretive-general items are actually measures of a single dimension of image which monitors general attitudes and opinions of the park. The two types of items are basically indistinguishable with one exception -- the prediction of use is better facilitated by evaluations in Elizabeth Park and by general interpretations in Forest Park. This difference may be due to the more negative evaluations of Forest Park which are expressed by the users. These users are evaluating the park relative to its history, but are still using it despite these evaluations.

The specific interpretations about features of the parks stand as a unique dimension of image. Although the interpretive-general items were lost as a third aspect, these measures adequately stand as that third aspect to image. They facilitate the collection of information about how specific features of the parks are perceived and upon what these opinions are based. However, the specific nature of these measures limits their utility when attempting to make comparisons across the two parks or to generalize to other urban parks. This consideration led to the cautious use of this aspect of image in analyzing the results and reporting findings.

At the outset of this research, every effort was made to design methods which would measure as much of an individual's image as possible within the constraints of the survey format. Three aspects of image were defined and they served to guide the formation of the survey instrument. However, it is feasible that other "aspects" of image lie outside of those aspects defined in this dissertation. It is even more likely that within the scope of the three aspects defined here another researcher could make further distinctions resulting in four, five, or more aspects of image. Still, the utility of defining image in three parts has been demonstrated in this research, and other ways of dissecting image remain unspecified to date.

4. Relationship of individual characteristics to image. Are differences in park image related to differences in demographic characteristics, activity interests, or recreational motives? The influences of these individual characteristics on park image and patterns of use have been examined throughout the dissertation. The relationship of demographics, interests, and motives to the decision to engage in outdoor recreation and to the choice of settings is key to understanding the role of park images in outdoor recreation.

The two final research objectives monitor the role of individual differences while examining the importance of image. First, it is determined if the images of these urban parks are a reflection of the individual characteristics of the respondents. More simply stated, the question is whether positive images of the parks are held by persons of a particular demographic type, with interests in certain activities, with similar motives for participating in outdoor recreation, or some combination of these characteristics. Later, in the final objective, the influence of park image on patterns of use is examined relative to the influence of individual characteristics on use.

Information about individual characteristics is easily obtained compared to data on images. It is standard procedure to collect demographic characteristics on most surveys. And, in recreational surveys, it is also common to collect data on activity interests and/or recreational motives. If these types of information are strongly related to the data on image, then it would have been unnecessary to survey urban park images in such detail. However, the results indicate that urban park image is not solely a function of individual characteristics, as only a moderate relationship between image and individual characteristics is evident. These findings are informative, but they do not preclude the potential utility of image as a unique source of data about recreational choices.

Of the three types of measures of individual characteristics, the role of recreational motives in predicting park image proved to be the least effective. Perhaps the information contained in these variables is too general to be useful in predicting specific attitudes (or consequent behaviors). As further evidence of this suggestion, the measures of activity interests, which are more specific data, were better predictors of park image. Still, this relationship is not a strong one, and is much less evident in Forest Park. (The greater influence of interests on image and use in Elizabeth Park was discussed in the earlier section on park differences.) Similarly, moderate relationships between demographic characteristics and image were documented in the data analyses. Thus, knowing the respondent's sex, number of children, income, or distance from the park is informative about his/her knowledge, evaluations, and interpretations about the park.

A different approach to this objective would have provided interesting results. Rather than using individual characteristics as covariates, the information could have been used to place individuals in groups or "types." For example, young persons with high recreational interests may represent a type, or middle-aged persons with teenage children could form another type. This procedure might have revealed relationships which were not found in the present analyses. However, there are factors which made this approach implausible; these included the small sample sizes and the inability to create types on an a priori basis. Later research efforts, with larger samples, could benefit from this project by forming types based on these results.

Overall, when the influence of the three groups of individual characteristics are examined together, there is evidence of a moderate relationship between these factors and urban park image. The extent of this relationship, as measured by the variance accounted for, is not nearly substantial enough to suggest that image is merely a reflection of individual characteristics. Rather, the image appears to be a measure of something above and beyond demographics, interests, or motives.

5. Relationship of image to park use. What is the role of image in people's decisions to use or not use urban parks? Do the image variables predict park use and does the prediction afforded by the image variables add to the understanding of park use?

This final research objective is a key test of the utility of image research. These analyses examined the influence of urban park image on the patterns of use of that park. Each of the models upon which the image literature is based suggest that the image of an environment is related to the use of that place. This relationship was documented in urban parks where the link between park image and use was clearly established.

This objective was first approached by predicting park use from image variables alone. Measures of park use were obtained from the respondents' self-estimates of days participating in specific activities. These responses were transformed into estimates of days spent participating in the park for four types of activities and into two overall estimates of park use. The image variables predicted park use to a substantial degree despite the limitations of using self-reports as the method of data collection. Clearly, more knowledge about a park and more positive opinions are linked to the use of that park.

The influence of individual characteristics on park use was also examined. A link comparable to the relationship of image to use was established for these variables as well. In other words, demographic characteristics, activity interests, and recreational motives are also clearly related to the use of the parks. This relationship is consistently acknowledged in the recreational literature cited earlier.

Finally, both individual characteristics and image were used in analyses designed to predict urban park use. The previous analyses suggested that there is unique information in the image data which is unrelated to individual characteristics. These findings were confirmed as the prediction of use by individual characteristics was enhanced further by the addition of park image. The result was that urban park use was predicted to an even greater extent due to the contribution of park image.

At issue might be the assumption that park image is positively or negatively influencing park use. Since correlational statistics do not provide evidence of causality between the predictor and predicted variables, it is an open question whether image influences use or use influences image. As proposed earlier, it is more likely that image affects use which, in turn, affects image which, in turn, affects use, and so on.

Within this "give and take" between park image and use, it is possible to provide an argument against the dominant influence of park use over image. If park use were a primary determinant of image, it would be expected that individual characteristics be the main predictors of park use. Once demographic characteristics, interests, and motives have led to use, then an image of the park would be formed. However, it has been shown that individual characteristics only predict use to a moderate degree. There is a predictive gap in explaining park use which image appears to fill. More discussion on this issue follows in the section on image research.

The findings from the final research objective support the hypothesized decision-making model of urban park use. The analyses suggest that an individual with particular characteristics, interests, and motives related to recreation will consult his/her image of a recreational site before choosing to use that place. Further insights concerning the relationship of image and behavior are contained in later sections in a more general discussion of contributions to the image literature and of future research.

<u>6. Summary.</u> This review of the research objectives has served to summarize the findings from this research: the nature of images of urban parks were described; differences between the images of Forest Park and

Elizabeth Park discussed and analyzed; the dimensions or aspects of image distinguished; the relationship of individual characteristics and image examined; and, the influence of individual characteristics and park image on patterns of park use explored.

The remaining sections of the discussion chapter view these results from other perspectives. How the findings inform us about barriers to use of urban parks is examined first. Then, the contributions of this research to image research in general is discussed. Finally, future directions for research and applications are explored.

B. Barriers to the Use of Urban Parks

Urban parks have had an important but ever-changing role in the history of cities. Today, many urban parks are not utilized to their potential despite the increased need for recreational resources which are close to home. Why is it that urban parks are underused? A better understanding of the "barriers to use" of urban parks was identified earlier as a research priority in the recreational literature.

This research on the image of urban parks can contribute to the exploration of "barriers to use." This section highlights findings from the research which are relevant to this topic. This is accomplished in a discussion of recreational needs, physical barriers, and the image as barriers to use.

1. Recreational interests. It is clear from this research that persons living near Forest Park and Elizabeth Park express an interest in a wide range of outdoor activities for a variety of reasons. Their interests

include unorganized sports, organized sports, non-strenuous sports, nature observation, and simple relaxation. They participate in outdoor recreation for a variety of motives, such as for escape, to enjoy nature, for social activity, or for physical activity.

It is also clear from this research that these expressed needs for outdoor activities are often not satisfied by the major urban park in the vicinity. In some cases, this is understandable; for example, Elizabeth Park is designed with few facilities for organized sports (for example, baseball or football). However, no such explanation exists for most of the remaining analyses which demonstrate only a moderate relationship between needs for recreation and the use of local parks.

Some of the discrepancy between recreational needs and local park use might be explained by the use of other facilities within or outside of the city. Still, this factor cannot explain why people choose a park which is less convenient to their homes and perhaps even less appropriate for their needs, since both Forest Park and Elizabeth Park are within one mile of all the respondents and are among the most attractive and diverse parks in their cities.

Apparently there are one or more barriers which inhibit local urban park use despite the expressed needs for outdoor recreation. This research has documented the existence of these barriers to use. The discussion turns first to physical barriers to use, and then to image as a barrier to the use of Forest Park and Elizabeth Park.

2. Physical barriers. This dissertation has pointed to some aspects of the environment which may be barriers to the use of urban parks. The

most obvious barrier to use which would inhibit an individual from satisfying a recreational need in a park is if that park has no facilities to accommodate that particular need. This is the case for organized sports in Elizabeth Park where there are some ballfields but they are not well-maintained and several of them are on gently sloping meadows where playing some sports would be difficult. In addition, there are other areas in the Hartford parks system which are much more popular as facilities for organized sports. However, this is the only activity group which appears to be influenced by this type of barrier in either park. For most other purposes, facilities exist to accommodate a diversity of activities in Forest Park and Elizabeth Park.

The size of an urban park is another potential barrier to the use of that park. Forest Park's size is clearly influential in the park planners' abilities to accommodate a diversity of uses and a large number of users. The smaller size of Elizabeth Park is a limitation; there is enough space for many activities, but the more activities facilitated, the less space available for each. When it is stated that both parks have the potential to accommodate most urban recreational activities, it must also be remembered that the size of the parks limits how much activity space is available.

Another environmental barrier to use is the layout of the park. Not only can Elizabeth Park's size be an influence in the patterns of use of the park, but the park's layout appears to add even greater limitations to its use. More specifically, it was discussed earlier how one section of Elizabeth Park was cut off by a road and how the opposite end was isolated by dense woods. The layout of the park is such that users congregate around the lake and rose garden areas in the center of the park. The result is an even greater decrease in the "size" of Elizabeth Park in terms of actual patterns of use.

A recent change in Forest Park was the closing of roads which radically altered the vehicular circulation patterns. This change was not made in time for the current research project to measure its effects. However, this change in layout would presumably serve as a barrier to use similar to the influence of layout discovered in Elizabeth Park.

3. Image as a barrier to use. Image, the focus of this dissertation, can also be viewed as a barrier to the use of urban parks. The analyses of the park use data have demonstrated how the descriptive, evaluative, and interpretive dimensions of image help predict the use of Forest Park and Elizabeth Park. In other words, if individuals know about a park and its facilities and value the park, then they are more likely to use it. If, however, individuals do not have accurate knowledge about the park or do not value it, their images of the park are likely to serve as barriers to its use.

In more practical terms, the respondents' evaluative and interpretive images of Forest Park vary from somewhat positive to quite negative. Many persons reveal a dissatisfaction with the park because it is not safe, it is frequently vandalized, and it is dominated by teenagers. This negative image does not reflect many of the positive changes which have occurred in Forest Park over the last few years. If the respondents were more aware of the park's increased security and maintenance efforts, they would be more inclined to use it. However, it is the inaccurate images of Forest Park which stand as barriers to the use of the park for a substantial portion of the sample.

The respondents' use of Elizabeth Park is not as affected by their evaluations and interpretations because they are, on the average, much more positive about their park. However, this park has its own problem which serves as a barrier to use -- the perception of Elizabeth Park as a facility for passive recreation. The rose gardens and lake dominate the respondents' images of the park as a place for observing nature and relaxing. If other, more active areas of the park were accurately depicted and salient in the respondents' images, then an increased and more diverse pattern of use of Elizabeth Park would be evident.

These examples demonstrate how the image of an urban park can serve as a barrier to its use. When selecting an outdoor recreational environment, individuals must review their images of possible places where their recreational needs might be satisfied. If a park is evaluated negatively, for example, as unsafe, it might be eliminated from consideration. Or, if the park is perceived as lacking particular facilities, again, it may not be chosen. As a result, park images serve as barriers to use and thus contribute to the underuse of urban parks like Forest Park and Elizabeth Park.

4. Summary. This section has focused on how the research has contributed evidence on the barriers to use of urban parks. Recreational needs are identified as influential in the decision to use a park, but there appear to be barriers which inhibit the use of an urban park to fulfill these needs. The size, layout, and range of activities in a park are

cited as physical barriers to use. Another important influence in the decision to use an urban park is image; an incomplete or negative image of a park will serve as a barrier to its use.

C. Contributions to Image Research

The discussion now turns from the specific research settings to a more general perspective on images of environments. The literature review covered a broad range of research literature and issues in the name of "environmental knowing." How the dissertation research relates to this image research is the focus of this section. The three major sections from the literature review are used here to organize the discussion: theoretical issues, measurement issues, and topical issues.

1. Theoretical issues. A framework for understanding the process of environmental knowing was developed in the literature review. This theory suggests that an individual's knowledge of environments is constantly consulted during transactions with the environment. When formulating goals, perceiving environments, making plans, acting, and evaluating environments, the image serves as a reference for the individual. An illustration of this model is repeated in Figure 14:

the present environment: physical, social, cultural	⟷	the process of environmental knowing: goals, perceptions, plans, actions, evaluations	⟷	environmental knowledge: the image

Figure 14. An illustration of the relation of environment and the image.

Given its central role in guiding this research, the full model of environmental knowing cannot be proven nor disproven. However, some findings from the research, as discussed below, do reflect upon some features of the theoretical understanding of environmental knowing.

A broad definition of images is one such feature of the theory which can be examined. Many researchers limit their study of the image to tests of descriptive knowledge (for example, the use of sketch maps to measure image). Others were cited who take a much broader view of the image, including attitudes and opinions, in their models. The utility of each of the aspects of image in the data analyses stands to defend this broader definition of image. Without measures of evaluative and interpretive image, it would not have been possible to fully understand urban park images and predict patterns of use.

Using the results of this research, it is possible to distinguish different aspects of image: descriptive, the knowledge of places; evaluative or interpretive-general, overall attitudes about environments; and interpretive-specific, the opinions about specific features of those places. These dimensions of image measure different dimensions of a person's environmental knowledge as illustrated by the lack of correlation across the aspects. However, the data analyses did not result in conclusive evidence about the interrelationship of these aspects of image. It is logical that some descriptive knowledge of a place exists before evaluations take place. Beyond that, however, it cannot be concluded that evaluations influence interpretations or the reverse.

In sum, defining the image as a multi-dimensional and measurable entity is defended by this research. The utility of the image in understanding the human-environment transaction is demonstrated. A larger body of research will be necessary before these models of environmental knowing can be further substantiated, altered, or replaced.

2. Measurement issues. In the discussion of research methods in the literature review, relevant issues in the measurement of image were reviewed. As a result, potential problems which might have occurred in this research were successfully avoided. However, there are some measurement issues which linger as problems or which stand as contributions from this research.

The use of color photographs as simulations of the environment was a methodological decision which proved to be appropriate. Photos were used to test the respondents and to remind them about features in the parks. The benefit from this strategy was that respondents could be interviewed in their homes so that their images of the park environment were the primary sources of information guiding their responses.

A mix of visual and verbal measures was used in the survey instrument to insure that one or the other type of measure would not bias the results. The difficulties cited in research where only visual or verbal methods of measurement were used were avoided using this approach. The evidence from this research is that both verbal and non-verbal tasks were useful in ascertaining the respondents' images of the urban parks and both types of measures served to demonstrate the utility of image in predicting park use.

The statistical analyses in this research are subject to the problems and criticisms cited in the literature review. The unique structure of this data led to a more or less unique set of data analyses. Analyses were selected which could best interpret the data generated from this survey, although this selection eliminated some possible comparisons with other research where different analytic frameworks were used. For example, the adjustment of the photo identification scores on the basis of each individual's average score was a logical and effective statistical procedure. However, the use of this adjustment strategy may inhibit comparisons with other research efforts where more standard transformations were used.

A final measurement issue concerns the classification scheme for image research outlined in the first chapter. Previous research efforts were classified according to a number of dimensions: categories of analysis, procedures, amount of skill required, and response format. Each of these dimensions was considered during the development of the survey instrument, and where possible, the most appropriate method chosen. However, the nature of survey research placed a limitation on the category of analysis which could be used. A preference for methods which are "closest" to the environment was expressed in the literature review, but it was impossible, within the constraints of the survey format, to directly measure park use in the environment. As a result, the research was forced to rely on self-estimates of park use. These responses obviously contained error and created difficulties when attempting to predict park use. However, the respondents were required to provide multiple estimates of their use of the parks. The use of multiple measures is recommended as a data collection procedure which can help pinpoint more accurate self-reports of behavior.

3. Topical issues. Several topics in environmental knowing were reviewed in the first part of the dissertation: the formation of images, individual differences and image, environmental variables and image, the relationship of image to behavior, and the application of image research. Each of these topics concerns a line of research which is important to current thinking in environmental knowing. These areas were touched upon in the research for this dissertation, although some (for example, the relation of image to behavior) more than others (the formation of images).

The first topic, the formation of images, is only tangential to the current research. All the respondents were adults, so those issues which concern only children are certainly not pertinent. For adults, experience with environment was cited as a key to image formation. In this research, the individual characteristic variables, which represent measures of experience, were somewhat related to the images of the parks. However, the formation of images of urban parks may be more related to activity interests; apparently, interests in specific activities influence an individual's desire to learn about and hence use an urban park.

The discussion of individual differences covers three domains: differences in abilities to perform a task, group differences, and cultural differences. Problems with task performance, the first category, were minimized by the pre-test of all procedures and the use of multiple methods. Since the research dealt with a culturally homogeneous population, the last set of differences are not pertinent. As for group differences, some evidence from this research is relevant. It is clear that certain perceptions of the parks are linked to demographic characteristics or activity interests. For example, males and persons without children found Forest Park to be safer; in Elizabeth Park, the perception of safety is stronger among younger persons and persons living further from the park. More clearly illustrated is the link between activity interest groups and park image in Elizabeth Park where, for example, persons interested in more passive forms of recreation are more positive about the park. (It has already been documented how the limited facilities in that park affect the range of uses and users.) In sum, group characteristics can be linked to the image of an environment which, in turn, is related to the use of that environment.

The issues surrounding the comparison of environments and the elements within environments received extensive discussion in an earlier section. The images of Forest Park and Elizabeth Park are found to be different for a variety of reasons. In physical terms, it is the differences in size, layout, and physical diversity which most influence the contrasting findings between the parks. Non-physical aspects of these environments are influential as well; for example, the perceptions of the recent history of Forest Park appear to influence the present-day image of that park.

The question of the relationship of image and behavior was a key issue addressed by this dissertation. In the literature review this link was identified as central to most image theory and research; yet, it is rarely tested. In this research, the link between the image of an urban park and the decision to use that park was clearly established.

No attempt has been made to suggest that image causes behavior. Instead, the results and discussion highlight the potential influence of image over behavior. It is not possible to discriminate the causal agent in the image-behavior relationship. It is more likely that there is a transaction between the two: use builds upon image, which changes due to use, and so on. One could suggest that image is a product of use, meaning that use is the causal agent. Although this perspective has not been disproven, the theory, research, and results from this research go a long way toward justifying the relationship of image to use as transactional.

The final topical issue from the literature review is the application of image research. Many of the findings established in this research are useful to park planners, but the results and discussion chapters have not focused on the potential applications of this research. As this issue is one of the topics for discussion in the next section (on future directions), it will suffice here to restate the need for image research to be linked to the planning and design processes.

4. Summary. In this brief recapitulation of issues from the literature review, the contribution of this research effort to these issues has been identified. In some cases, only a small piece of information has been added to an already large body of research. In other areas, hopefully, a more substantial contribution has been made to the environmental knowing literature.

D. Future Directions

The final section of this dissertation points toward future directions suggested by this research effort. First, future research which would help clarify issues and avoid errors from the current research is discussed. Then, applications from this research to Forest Park and Elizabeth Park are addressed, as well as applications to urban parks in general.

1. Future research. Many ideas for further research have come out of the current research effort. Sometimes it was the discovery of errors in the procedures which led to ideas for conducting the research differently in the future. Or, results from the dissertation suggested follow-up research which might clarify or augment these findings. Some of the more important ideas for future research are outlined below. These plans are viewed in light of an on-going research project which is a direct follow-up to this project.

The follow-up study, "Changing Images of Urban Forests," is based on issues which developed out of the current research. The focus of the follow-up is to determine how the images of an urban park change over time and whether an informational brochure can effectively change the park's image. This brochure was created for the research project with the intent of providing an updated presentation of the urban park's features, facilities, and planned activities which might change the image or use of the park.

Forest Park is once more under study and Green Hill Park in Worcester, Massachusetts was added as the second park for the follow-up work. A larger sample of persons were contacted for telephone interviews at two times during the summer (June and August). Between the two interviews, one-half of the respondents were sent the brochure about their park. The second data collection attempted to measure changes in image or in patterns of park use which may have resulted from the brochure. Data analyses will attempt to identify changes which can be attributed to the brochure and those which are due to other factors (such as time of year).

In any research effort where quantitative methods are involved, the size of the sample is of primary importance. This research was viewed as exploratory, so a choice was made to gather in-depth information in face-to-face interviews using a relatively small number of respondents. The size of the sample limited the types of statistics which could be used. However, the in-depth data obtained were helpful in determining the utility of each measurement procedure. These cross-checks helped in making the choices necessary to eliminate certain items for the briefer instrument in the follow-up research. Therefore, the next project was able to use a shorter survey instrument and interview a larger sample.

Another problem with the research was the reliance on self-estimates of park use in the survey instrument. Since park use was the key variable to be predicted in the data analyses, a more accurate measure would have been more desirable. Without more precise measures of behavior it is difficult to know how accurately behaviors are being predicted, or in other terms, how much measurement error there is.

Solutions to the problems of measuring behavior are not simple. Not only is direct observation in an environment costly, but it is nearly impossible in some settings. If examining the decision to use an urban park, the sample cannot be selected by observing persons who are already there. Yet, if the sample is selected outside the park (as it was in this research), there is no possibility of monitoring the decision to go there. One solution would be to use a log where respondents make a record of their trips to outdoor areas over a specified period of time. There are, of course, problems with this form of self-report similar to those with the self-estimates of use.

The decision made for the current research and the follow-up project was to collect multiple self-report measures of use. In this manner, checks across these measures can help identify exaggerations or omissions. In this research, aggregate measures of park use were developed from 36 estimates of participation in specific activities in the parks. In the follow-up, use data are collected at two points in time. Using the latter procedure, change data can be calculated which allows for comparisons of a respondent's self-estimate relative to a prior estimate.

Another weakness in the research design is the failure to examine causality in the image-behavior relationship. The follow-up research is designed to shed some light on this question by collecting data at two points in time, and for some of the respondents, attempting to change the image of the parks between the two interviews. Of course, this is only one step toward addressing the issue of the relationship of image to behavior. Multiple data collection periods over an extended period of time using more accurate measures of park use would ultimately facilitate a more thorough examination of this issue.

Many other research projects can be designed to eliminate some of the gaps in this research. The follow-up study stands as one example of how to address some of these problems. From this discussion it is evident that using larger samples, taking measurements over time, and increasing the accuracy of the measures of behavior will enhance the researchers' abilities to address current issues in environmental knowing.

2. Applications. The popularity of environment and behavior as a field of study is due in part to the applied nature of the research. However, the development of research in the field has not always focused on this goal. Many environment and behavior researchers who were trained in traditional social science disciplines conduct more basic research and fail to return to the issue of research applications. There certainly is value to this sort of research for some, but it fails to provide value for designers and planners who look to environment and behavior research as a useful source of information.

The research for this dissertation has its roots in more traditional psychological research. However, at critical points in the design of the research, decisions were made which facilitate applications while hopefully not compromising the basic scientific rigor of the research. The potential application of findings from the dissertation is the focus of this last part of the discussion. These applications concern information relevant to Forest Park and Elizabeth Park specifically and more general issues which may have broader applications.

To begin with, there are a number of benefits from this research for the planners of Forest Park and Elizabeth Park. Separate reports were prepared for the parks departments in Springfield and Hartford. These provided specific information for planning and decision-making in each park. For example, the results reveal who are the users of the park in terms of the demographic characteristics of the sample population as well as their recreational interests. The park planners can compare these data with other information they have, determine whether the parks are serving the types of people they are designed to serve, and discover what people with what types of interests are not being served by the parks.

The discussion of barriers to the use of Forest and Elizabeth parks also has applications for park planners. The information on who uses or does not use the parks may already be documented, but the "whys" of use and lack of use are not known. There are both physical aspects of the park and image problems which were cited as barriers to use in the parks. Physical issues include some manipulable design features (for example, layout) and some fixed features (for example, size). It could be assumed that most of the image problems could be manipulated, toward the more positive whether or not toward the truth. However, it should be easier (and ethically desirable) to make images more up-to-date and accurate than to promote inaccurate images. The follow-up research is examining the use of an informational brochure to modify park images.

There are a range of actions which the planners of Forest Park and Elizabeth Park could take as a result of this research. Their decisions to allocate funds for maintenance and repair can result from consideration of which park features and activities are most important to the users. Planned renovations for the parks should consider the effects of layout and diversity of activities on park use. Also, an awareness of image as a barrier to park use should be used to the planner's advantage; attempts to update and enhance a potential user's image of an urban park could assist the planner's efforts to see that the park is used to its potential.

Whether these results are generalizable has not been proven. The suggestion is that these results may be applicable to other urban parks, but related studies in more parks are necessary to confirm this. It remains to be discovered if similar physical barriers or image problems inhibit the use of other parks. In the follow-up study, the choice of a new park for study (Green Hill Park) along with one of the previous parks (Forest Park) will provide additional insight into these issues.

The relevance of these findings to settings other than urban parks must also be explored. Questions which need to be examined include: Does image serve as a barrier to use of other environments similar to the findings from this setting? Can image also be viewed as an enhancer of use of environments? How can information about an image barrier be useful in eliminating a barrier? How do images of environments form and change? What is the effect of a change in image on user satisfaction with an environment?

3. Summary. This section on future directions completes the dissertation. A discussion of future research directions focused on a follow-up study which built upon the findings from this research. Then, the discussion turned to research applications, an appropriate point to end the presentation of any environment and behavior research effort.

BIBLIOGRAPHY

Andrews, H. F. Home range and urban knowledge of school-age children. Environment and Behavior, 1973, 5, 73-86.

Appleyard, D. Why buildings are known. Environment and Behavior, 1969, 1, 131-156.

Appleyard, D. Styles and methods of structuring a city. Environment and Behavior, 1970, 2, 100-117.

Appleyard, D. Planning a pluralist city: Conflicting realities in Ciudad Guayana. Cambridge, Mass.: MIT Press, 1976.

Appleyard, D. & Lintell, M. The environmental quality of city streets: the resident's viewpoint. Journal of the American Institute of Planners, 1972, 38, 84-101.

Appleyard, D., Lynch, K. & Myer, J. R. The view from the road. Cambridge, Mass.: MIT Press, 1964.

As, D. Observing environmental behavior: The behavior setting. In W. Michelson (ed.), Behavioral research methods in environmental design. Stroudsburg, Pa.: Dowden, Hutchinson, and Ross, 1975.

Arthur, L. M. & Boster, R. S. Measuring scenic beauty: A selected bibliography (General Technical Report RM-25). Fort Collins, Col.: Rocky Mountain Forest and Range Experiment Station, 1976.

Baird, J. C., Degerman, R., Paris, R. & Noma, E. Student planning of town configuration. Environment and Behavior, 1972, 4, 159-188.

Bangs, H. P., Jr. & Mahler, S. Users of local parks. Journal of American Institute of Planners, 1970, 36, 330-334.

Barker, R. G. Ecological psychology. Stanford, Calif.: Stanford University Press, 1968.

Bechtel, R. B. The semantic differential and other paper-and-pencil tests. In W. Michelson (ed.), Behavioral research methods in environmental design. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1975.

Bechtel, R. B. Human movement in architecture. In H. M. Proshansky, W. H. Ittelson & L. G. Rivlin (eds.), Environmental psychology: Man and his physical setting. N.Y.: Holt, Rinehart and Winston, Inc., 1970.

Beck, R. J., Cohen, S. B., Craik, K. H., Dwyer, M., McCleary, G. F., Jr. & Wapner, S. Studying environmental moves and relocations: A research note. Environment and Behavior, 1973, 5, 335-349.

Beck, R. J. & Wood, D. Cognitive transformation of information from urban geographic fields to mental maps. Environment and Behavior, 1976, 8, 199-238.

Bell, P. A., Fisher, J. D. & Loomis, R. J. Environmental psychology. Philadelphia: W. B. Saunders, Co., 1978.

Bengtsson, A. Environmental planning for children's play. N.Y.: Praeger, 1970.

Blaut, J. M., McCleary, G. F., Jr. & Blaut, A. S. Environmental mapping in young children. Environment and Behavior, 1970, 2, 335-349.

Boulding, K. E. The image. Ann Arbor: University of Michigan Press, 1956.

Calvin, J., Dearinger, J. & Curtin, M. An attempt at assessing preferences for natural landscapes. Environment and Behavior, 1972, 4, 447-470.

Carr, S. The city of the mind. In W. R. Ewald, Jr. (ed.) Environment for man: The next fifty years. Bloomington, Ind.: Indiana University Press, 1967.

Carr, S. & Schissler, D. The city as a trip: Perceptual selection and memory in the view from the road. Environment and Behavior, 1969, 1, 7-35.

Clawson, M. Land and water for recreation -- Opportunities, problems, and policies. Resources for the Future, Policy Background Series; Chicago: Rand McNally, 1963.

Cox, K. R. & Zannaras, G. Designative perceptions of macro-spaces: Concepts, a methodology, and applications. In R. M. Downs and D. Stea (eds.), Image and environment: Cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973.

Craik, K. H. The comprehension of the everyday physical environment. Journal of the American Institute of Planners, 1968, 34, 27-37.

Craik, K. H. Environmental psychology. Annual Review of Psychology, 1973, 24, 403-422.

Craik, K, H. Multiple scientific paradigms in environmental psychology. Review paper for symposium, Psychology and ecology. XXIst International Congress of Psychology, Paris, 1976.

Cranz, G. Changing roles of urban parks: From pleasure garden to open space. Landscape, 1978, 22, 9-18.

Daniel, T. C. & Boster, R. W. Measuring landscape aesthetics: The scenic beauty estimation method (USDA Forest Service Research Paper RM-61). Fort Collins, Col.: Rocky Mountain Forest and Range Experiment Station, 1976.

Daniel, T. C., Zube, E. H. & Driver, B. L. Assessing amenity resource values (USDA Forest Service General Technical Report RM-68). Fort Collins, Col.: Rocky Mountain Forest and Range Experiment Station, 1979.

DeJonge, D. Images of urban areas: Their structure and psychological foundations. Journal of the American Institute of Planners, 1962, 28, 266-276.

Devlin, A. S. The 'small town' cognitive map: Adjusting to a new environment. In G. T. Moore & R. G. Golledge (eds.) Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Donnelly, D., Goodey, B. & Menzies, M. Perception related survey for local authorities: A pilot study in Sunderland. Research memorandum No. 20, Centre for Urban and Regional Studies, University of Birmingham, 1973.

Downs, R. M. The cognitive structure of an urban shopping center. Environment and Behavior, 1970, 2, 13-39.

Downs, R. M. & Stea, D. (eds.), Image and environment: Cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973(a).

Downs, R. M. & Stea, D. Cognitive maps and spatial behavior: Process and products. In R. M. Downs & D. Stea (eds.), Image and Environment: Cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973(b).

Driver, B. L. & Brown, P. J. A social-psychological definition of recreation demand, with implications for recreation resource planning. In Assessing demand for outdoor recreation (Appendix A). Washington, D.C.: National Academy of Science, 1975.

Driver, B. L. & Knopf, R. C. Temporary escape: One product of sport fisheries management. Fisheries, 1976, 1, 21, 24-29.

Driver, B. L. & Knopf, R. C. Personality, outdoor recreation, and expected consequences. Environment and Behavior, 1977, 9, 169-193.

Elsner, G. H. & Smardon, R. C. (eds.) Proceedings of our national landscape: A conference on applied techniques for analysis and management of the visual resource. Berkeley, Ca.: Pacific Southwest Forest and Range Experiment Station (General Technical Report PSW-35), 1979.

Evans, G. W. Environmental cognition. Psychological Bulletin, 1980, 88, 259-287.

Evans, G. W., Marrero, D. G. & Butler, P. A. Environmental learning and cognitive mapping. Environment and behavior, in press.

Everett, J. & Cadwallader, M. The home area concept in urban analysis: The use of cognitive mapping and computer procedures as methodological tools. In W. J. Mitchell (ed.) Environmental design research and practice, Vol. 1. L.A.: School of Architecture and Urban Planning, University of California, 1972.

Firey, W. Sentiment and symbolism as ecological variables. American Sociological Review, 1945, 10, 140-148.

Francescato, D. & Mebane, W. How citizens view two great cities: Milan and Rome. In R. M. Downs & D. Stea (eds.), Image and environment: cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973.

Gold, S. M. Non-use of neighborhood parks. Journal of the American Institute of Planners, 1972, 38, 369-378.

Golledge, R. G. Methods and methodological issues in environmental cognition research. In G. T. Moore & R. G. Golledge (eds.), Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Golledge, R. G. and Zannaras, G. The perception of urban structure: an experimental approach. In J. Archea & C. Eastman (eds.), EDRA two: Proceedings of the second annual EDRA conference. Pittsburgh: Carnegie-Mellon University, 1971.

Golledge, R. G. Rivizzigno, V. L. & Spector, A. Learning about a city: analysis by multidimensional scaling. In R. G. Golledge & G. Rushton (eds.), Spatial choice and spatial behavior: Geographic essays on the analysis of preferences and perceptions. Columbus, Ohio: Ohio State University Press, 1976.

Goodey, B., Duffett, A. W., Gold, J. R. & Spencer, D. City-scene: An exploration into the image of central Birmingham as seen by area residents. Research Memorandum No. 10, Centre for Urban and Regional Studies, University of Birmingham, 1971.

Gratzer, M., Sutherland, J. & Throssell, R. Recreation in the Poconos: Images and perceptions. Syracuse, N.Y.: College of Environmental Science and Forestry, State University of New York, 1978.

Greenbie, B. B. Contrasting and consistent perceptions of neighborhood boundaries in a New England city. Man-Environment Systems, 1975, 5, 325-327.

Gulliver, F. P. Orientation of maps. Journal of Geography, 1908, 7, 55-58.

Hall, E. T. The silent language. Garden City, N.Y.: Doubleday, 1959.

Hall, E. T. The hidden dimension. Garden City, N.Y.: Doubleday, 1966.

Hammitt, W.E. Measuring familiarity for natural environments through visual images. In G. H. Elsner & R. C. Smardon (eds.), Proceedings of our national landscape: A conference on applied techniques for analysis and management of the visual resource (General Technical Report PSW-35). Berkeley, Ca.: Pacific Southwest Forest and Range Experiment Station, 1979.

Harrison, J. & Sarre, P. Personal construct theory in the measurement of environmental images: problems and methods. Environment and Behavior, 1971, 3, 351-374.

Hart, R. A. & Moore, G. T. The development of spatial cognition: a review. In R. M. Downs & D. Stea (eds.), Image and environment: cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973.

Hardwick, D. A., McIntyre, C. W. & Pick, H. L., Jr. The content and manipulation of cognitive maps in children and adults. Monographs of the Society for Research in Child Development, 1976, 41, No. 3.

Hayward, D. G. Psychological concepts of home among urban middle class families with young children. Unpublished Ph.D. dissertation, Department of Psychology, The City University of New York, 1977.

Hayward, D. G. & Wallis, A. Final report: Herald and Greeley Squares. New York: The City University of New York, 1973.

Hazen, N. L., Lockman, J. J. & Pick, H. L., Jr. The development of children's representations of large-scale environments. Child Development, 1978, 49, 623-636.

Heise, D. Some methodological issues in semantic differential research. Psychological Bulletin, 1969, 72, 406-422.

Hershberger, R. G. Predicting the meaning of architecture. In J. Lang, C. Burnette, W. Moleski & D. Vachon (eds.), Designing for human behavior. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1974.

Holahan, C. J. & Dobrowolny, M. B. Cognitive and behavioral correlates of the spatial environment: an interactional analysis. Environment and Behavior, 1978, 10, 317-333.

Horton, F. E. & Reynolds, D. R. Effects of urban spatial structure on individual behavior. Economic Geography, 1971, 47, 36-48.

Howard, R. B., Chase, S. D. & Rothman, M. An analysis of four measures of cognitive maps. In W. F. E. Preiser (ed.), Environmental design research, Vol. 1. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1973.

Hunt, J. D. Image as a factor in tourism development. Journal of Travel Research, 1975, 13, 1-7.

Ittelson, W. H. Environment perception and contemporary perceptual theory. In W. H. Ittelson (ed.), Environment and cognition. New York: Seminar Press, 1973.

Ittelson, W. H. Environmental perception and urban experience. Environment and Behavior, 1978, 10, 193-214.

Ittelson, W. H., Rivlin, L. G. & Proshansky, H. M. The use of behavioral maps in environmental psychology. In H. M. Proshansky, W. H. Ittelson & L. G. Rivlin (eds.), Environmental psychology: Man and his physical setting. New York: Holt, Rinehart, and Winston, Inc., 1970.

Ittelson, W. H., Proshansky, H. M., Rivlin, L. G. & Winkel, G. H. An introduction to environmental psychology. New York: Holt, Rinehart, and Winston, Inc., 1974.

Ittelson, W. H., Franck, K. A. & O'Hanlon, T. J. The nature of environmental experience. In S. Wapner, S. B. Cohen & B. Kaplan (eds.) Experiencing the environment. New York: Plenum Press, 1976.

Jacobs, P. The landscape image: Current approaches to the visual analysis of the landscape. Town Planning Review, 1975, 46, 127-150.

Jones, M. M. Urban path-choosing behavior: A study of environmental clues. In W. J. Mitchell (ed.), Environmental design: Research and practice, Vol. 1. Los Angeles: School of Architecture and Urban Planning, University of California, 1972.

Kaplan, B., Wapner, S. & Cohen, S. B. Exploratory applications of the organismic-developmental approach to transactions of men-in-environments. In S. Wapner, S. B. Cohen & B. Kaplan (eds.), Experiencing the environment. New York: Plenum Press, 1976.

Kaplan, R. Way-finding in the natural environment. In G. T. Moore & R. G. Golledge (eds.), Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Kaplan, R. Participation in environmental design: Some considerations and a case study. In S. Kaplan & R. Kaplan (eds.), Humanscape: Environments for people. North Scituate, Mass.: Duxbury Press, 1978.

Kaplan, S. Adaptation, structure, and knowledge. In G. T. Moore & R. G. Golledge (eds.), Environmental knowing. Stroudsberg, Pa: Dowden, Hutchinson, and Ross, 1976.

Kaplan, S. On knowing the environment. In S. Kaplan & R. Kaplan (eds.) Humanscape: Environments for people. North Scituate, Mass.: Duxbury Press, 1978.

Kaplan, S. & Kaplan, R. (eds.) Humanscape: Environments for people. North Scituate, Mass.: Duxbury Press, 1978.

Kates, R. W. Human perception of the environment. International Social Science Journal, 1970, 22, 648-660.

Kelly, G. A. A brief introduction to personal construct theory. In D. Bannister (ed.), Perspectives in personal construct theory. London: Academic Press, 1970.

King, L. J. & Golledge, R. G. Cities, space, and behavior: The elements of urban geography. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1978.

Knopf, R. C. Motivational determinants of recreation behavior. Master's Thesis, School of Natural Resources, The University of Michigan, 1972.

Knopf, R. C., Moeller, G. H., More, T. A., & Twight, B.W. Urban forest recreation: An analysis of research needs. Draft Working Document of The Recreation and Landscape Working Group, The Consortium for Environmental Studies, 1977.

Kozlowski, L. T. & Bryant, K. J. Sense of direction, spatial orientation, and cognitive maps. Journal of Experimental Psychology: Human Perception and Performance, 1976, 3, 590-598.

Ladd, F. C. Black youths view their environment: neighborhood maps. Environment and Behavior, 1970, 2, 74-99.

Lapage, W. F. & Cormier, P. L. Images of camping -- Barriers to participation? Journal of Travel Research, 1977, 15, 21-25.

Lee, S. A. Cognitive mapping research. In B. Honikman (ed.), Responding to social change, Sixth EDRA conference. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1975.

Lee, T. Urban neighborhood as a socio-spatial schema. In H. M. Proshansky, W. H. Ittelson & L. G. Rivlin (eds.), Environmental psychology: Man and his physical setting. New York: Holt, Rinehart, and Winston, Inc., 1970.

Lee, T. A theory of socio-spatial schemata. In S. Kaplan & R. Kaplan (eds.) Humanscape: Environments for people. North Scituate, Mass.: Duxbury Press, 1978.

Lowenthal, D. Research in environmental perception and behavior: Perspectives on current problems. Environment and Behavior, 1972, 4, 333-342.

Lowenthal, D. & Riel, M. Structures of environmental associations. New York: Publications in Environmental Perception No. 6. New York: American Geographical Society, 1972(a).

Lowenthal, D. & Riel, M. Milieu and observer differences in environmental associations. Publications in Environmental Perception No. 7. New York: American Geographical Society, 1972(b).

Lowenthal, D. & Riel, M. Environmental structures: Semantic and experiential components. Publications in Environmental Perception No. 8. New York: American Geographical Society, 1972(c).

Lynch, K. The image of the city. Cambridge: Mass.: MIT Press, 1960.

Lynch, K. Managing the sense of a region. Cambridge, Mass.: MIT Press, 1976.

Lynch, K. & Rivkin, M. A walk around the block. In H. M. Proshansky, W. H. Ittelson, & L. G. Rivlin (eds.), Environmental psychology: Man and his physical setting. New York: Holt, Rinehart and Winston, Inc., 1970.

Mandell, L. & Marans, R. W. Participation in outdoor recreation: A national perspective. Ann Arbor, Michigan: Institute for Social Research, University of Michigan, 1972.

Marans, R. W. Survey research. In W. Michelson (ed.), Behavioral research methods in environmental design. Stroudsburg, Pa.: Dowden, Hutchinson and Ross, 1975.

McKechnie, G. E. Manual for the leisure activities blank. Palo Alto, Ca.: Consulting Psychologists Press, 1975.

McKechnie, G. E. Simulation techniques in environmental psychology. In D. Stokols (ed.), Perspectives on environment and behavior: Theory, research, and applications. New York: Plenum Press, 1977.

Mercer, D. The role of perception in the recreation experience: A review and discussion. Journal of Leisure Research, 1971, 3, 161-176.

Michelson, W. Man and his urban environment: A sociological approach. Reading, Mass.: Addison-Wesley, 1970.

Milgram, S., Greenwald, J., Kessler, S., McKenna, W. & Waters, J. A psychological map of New York City. American Scientist, 1972, 60, 194-200.

Miller, G. A., Galanter, E. & Pribram, K. H. Plans and structure of behavior. New York: Holt, Rinehart, and Winston, Inc., 1960.

Miron, M. Universal semantic differential shell game. Journal of Personality and Social Psychology, 1972, 24, 314-320.

Moore, G. T. Developmental variations between and within individuals in the cognitive representation of large-scale spatial environments. Man-Environment Systems, 1975(a), 4, 55-57.

Moore, G. T. The development of environmental knowing: An overview of an interactional-constructivist theory and some data on within-individual developmental variations. In D. Canter & T. Lee (eds.), Psychology and the built environment. London: Architectural Press, 1975(b).

Moore, G. T. Spatial relations ability and developmental levels of urban cognitive mapping: A research note. Man-Environment Systems, 1976(a), 5, 247-248.

Moore, G. T. Theory and research on the development of environmental knowing. In G. T. Moore & R. G. Golledge (eds.), Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976(b).

Moore, G. T. Knowing about environmental knowing: The current state of theory and research on environmental cognition. Environment and Behavior, 1979, 11, 33-70.

Moore, G. T. & Golledge, R. G. (eds.), Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

National Park Service. National urban recreation study -- executive report. Washington, D.C.: United States Department of the Interior, 1978.

Orleans, P. Differential cognition of urban residents: Effects of social scale on mapping. In R. M. Downs & D. Stea (eds.), Image and environment: Cognitive mapping and spatial behavior. Chicago: Aldine Press, 1973.

Ostrander, E. R. The visual-semantic communication gap: A model and some implications for collaboration between architects and behavioral scientists. Man-Environment Systems, 1974, 4, 47-53.

Ostrander, E. R. Behavioral research for design application: On making the myth a reality. In B. Honikman (ed.), Responding to social change, EDRA 6. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Piaget, J. & Inhelder, B. The child's conception of space. New York: Humanities Press, 1956.

Piaget, J., Inhelder, B. & Szeminska, A. The child's conception of geometry. New York: Basic Books, 1960.

Pick, H. L., Jr. Mapping children...mapping space. Unpublished paper, presented at American Psychological Association Meeting, Honolulu, 1972.

Pocock, D. & Hudson, R. Images of the urban environment. New York: Columbia University Press, 1978.

Porteous, J. D. Environment and behavior: Planning and everyday urban life. Reading, Mass.: Addison-Wessley, 1977.

Rapoport, A. Human aspects of urban form. Elmsford, N.Y.: Pergamon Press, Inc., 1977.

Revelle, R. Outdoor Recreation in a hyper-productive society. Daedalus, 1967, 96, 1172-1191.

Rothwell, D. Cognitive mapping of the home environment. Unpublished Ph.D. Dissertation, Department of Geography, University of British Columbia, 1974.

Rothwell, D. Cognitive mapping of the home environment. In P. Suedfeld, J. A. Russell, L. M. Ward, F. Szigeti, & G. Davis (eds.), Book 2: Invited addresses, symposia, and workshops: The behavioral basis of design: proceedings of the 7th EDRA. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Saarinen, T. F. Environmental planning: Perception and behavior. Boston: Houghton Mifflin, 1976.

Seamon, D. Environmental imagery: An overview and tentative ordering. In W. J. Mitchell (ed.), Environmental design research and practice, Vol. 1. L.A.: School of Architecture and Urban Planning, University of California, 1972.

Shemyakin, F. N. Orientation in space. In B. G. Anan'yev (ed.), Psychological science in the USSR, Vol. 1. Washington, D.C.: Office of Technical Services.

Siegel, A. W. & White, S. H. The development of spatial representations of large-scale environments. In H. W. Reese (ed.), Advances in child development and behavior, Vol. 10. New York: Academic Press, 1975.

Silzer, V. J. Personal construct elicitation in space preference research. Department of Geography, York University Discussion Paper Series, No. 1, 1972.

Southworth, M. & Southworth, S. Environmental quality in cities and regions. Town Planning Review, 1973, 44, 231-253.

Spencer, D. An evaluation of cognitive mapping in neighborhood perception. Research Memorandum No. 23, Centre for Urban and Regional Studies, University of Birmingham, 1973.

Stea, D. Environmental perception and cognition: Toward a model for mental maps. In G. J. Coates & K. M. Moffett (eds.), Response to environment. Student Publications, School of Design, North Carolina State University, 1969.

Stea, D. Architecture in the head: cognitive mapping. In J. Lang, C. Burnette, W. Moleski & D. Vachon (eds.), Designing for human behavior. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1974.

Stea, D. & Downs, R. M. From the outside looking in at the inside looking out. Environment and Behavior, 1970, 2, 3-12.

Steinitz, C. Meaning and the congruence of urban form and activity. Journal of the American Institute of Planners, 1968, 4, 233-248.

Stokols, D. Environmental psychology. Annual Review of Psychology, 1978, 29, 253-296.

Strauss, A. L. Images of the American city. New York: Free Press, 1961.

Tolman, E. C. Cognitive maps in rats and men. Psychological Review, 1948, 55, 189-208.

Trowbridge, C. C. On fundamental methods of orientation and 'imaginary maps'. Science, 1913, 88, 888-896.

Tuan, Y. F. Topophilia. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1974.

Tuan, Y. F. Space and place: The perspective of experience. Minneapolis: University of Minnesota Press, 1977.

Tzamir, Y. The impact of spatial regularity and irregularity on cognitive mapping. Unpublished report, Technion-Israel Institute of Technology, Haifa, 1975.

Whyte, A. V. T. Guidelines for field studies in environmental perception. Paris: United Nations Educational, Scientific, and Cultural Organization, Programme on Man and the Biosphere, 1977.

Winkel, G. H., Malek, R. & Thiel, P. The role of personality differences in judgments of roadside quality. Environment and Behavior, 1969, 1, 199-224.

Winkel, G. H., Malek, R. & Thiel, P. Community response to the design features of roads: a technique for measurement. Highway Research Record, 1970, 305, 133-145.

Winkel, G. H. & Sasanoff, R. An approach to an objective analysis of behavior in architectural space. In H. M. Proshansky, W. H. Ittelson, & L. G. Rivlin (eds.), Environmental psychology: Man and his physical setting. New York: Holt, Rinehart and Winston, Inc., 1970.

Wright, J. K. Terrae incognitae: The place of imagination in geography. Annals of the Association of American Geographers, 1947, 37, 1-15.

Zannaras, G. The cognitive structures of urban areas. In W. F. E. Preiser (ed.), Environmental design research: Vol. 2, symposia and workshops; proceedings 4th EDRA. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1973(a).

Zannaras, G. An analysis of cognitive and objective characteristics of the city: Their influence on movements to the city center. Unpublished Ph.D. Dissertation, Department of Geography, The Ohio State University, Columbus, Ohio, 1973(b).

Zannaras, G. The relation between cognitive structure and urban form. In G. T. Moore & R. G. Golledge (eds.), Environmental knowing. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1976.

Zube, E. H. (ed.), Landscapes: Selected writings of J. B. Jackson. Amherst, Mass.: University of Massachusetts Press, 1970.

Zube, E. H., Brush, R. O. & Fabos, J. G. (eds.), Landscape assessment: Value, perceptions, and resources. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1975.

Zube, E. H., Pitt, D. G. & Anderson, T. W. Perception and prediction of scenic resource values of the Northwest. In E. H. Zube, R. O. Brush, and J. G Fabos (eds.), Landscape assessment: Value, perceptions, and resources. Stroudsberg, Pa.: Dowden, Hutchinson, and Ross, 1975.

Zube, E. H. & Zube, M. J. (eds.), Changing rural landscapes. Amherst, Mass.: University of Massachusetts Press, 1977.

APPENDIX A

PILOT STUDY FORMS

Five pilot studies were conducted prior to the preparation of the final interview forms. Each of these studies was described in the main body of the dissertation. Copies of the forms used for the pilot studies are contained in the following pages (pp. 267-277).

Urban Forests Pilot Interview #1

Date:__________ Day of Week:__________ Weather:____________________

Time:__________ Park:_________________ Interviewer:________________

Notes:

Hi, I'm with the University of Massachusetts and we're helping out with a study of urban parks for the U.S. Forest Service. Would you like one of our cards? Basically, we're interested in people's knowledge and use of __________ Park. Could you take a few minutes to answer a couple of questions? (It will only take about five minutes.....Yes, the Parks Department is aware of our study.....)

A. Incidents

1. Why did you come here today? (note activities)

2. Why else do you come to the park? (activities)

3. How many times have you come to the park in the last two months? __________

4a. Can you briefly describe three events which illustrate what you like about __________ Park--that is three good experiences which you have had in the park.

Once more, briefly describe three events which illustrate what you do not like about __________ Park--that is three bad experiences which you have had in the park.

4b. Please describe three of what we might call "assets" of ________ Park--that is three of its especially good features or qualities.

Now, please describe three problems with ________ Park in your view--that is three of its especially bad features or qualities.

B. Map

OK, now I have an outline map of ________ Park which I would like you to draw on. Would you take a couple of minutes to sketch as many areas, places, and features of the park which you are familiar with. Without taking too much time, try to include and label as many details as possible.

C. Demographics

1. OK, just a couple of final questions. Where do you live?
   (If necessary pursue: In what town? Close to what intersection?)

2. How long have you lived in this area?

3. Who did you come to the park with today, and, how old are they?
   (Record sex and relation to respondent. Use age category card to gain age approximations, if necessary.)

Urban Forests Pilot Interview #2

Date:__________ Day of Week:__________ Weather:__________________

Time:__________ Park:________________ Interviewer:_______________

Notes:

Hi, I'm with the University of Massachusetts and we're helping out with a study of urban parks for the U.S. Forest Service. Would you like one of our cards? Basically, we're interested in people's knowledge and use of __________Park. Could you take a few minutes to answer a couple of questions? (It will only take about five minutes.....Yes, the Parks Department is aware of our study.....)

A. Incidents

1. Why did you come here today? (note activities and reasons)

2. Why else do you come to the park? (activities or reasons)

3. How many times have you come to the park in the last two months?__________

B. Map

1. People often see parks as having different areas, and indeed, we have found this to be true for __________ Park. So, I have here a map which identifies the features that most people are familiar with, but we need to see how things are grouped together into areas. That is, we're interested in how many different areas there are in __________ Park. For example, here's a drawing of what someone did in another park, showing how they grouped things into areas. Now would you please make a drawing like this for __________Park, dividing the park into as many or as few areas as you think are appropriate.

(Area discussed in following questions:_______________________________)

2. Please describe what might be called the "assets" of this area of the park -- that is especially good features or qualities. Why? Can you think of any others?

3. Now, please describe the problems with this area of the park -- that is its especially bad features or qualities. Why? Can you think of any others?

4. OK, which of these areas are you most familiar with?

5. Which are you least familiar with?

C. Demographics

1. OK, just a couple of final questions. Where do you live? (If necessary pursue: In what town? Close to what intersection?)

2. How long have you lived in this area?

3. Who did you come to the park with today? (Record sex, approximate age, and group type, and relation to respondent)

Basically, we have two tasks for you to do. It will help us if you take care to answer them accurately.

6. Here is a list of recreation activities that can be done in urban parks and forests. (Hand person activity list) Please check the activities you are interested in and like to do.

_____attend outdoor concerts

_____baseball/softball

_____basketball

_____bicycling

_____bird watching

_____driving

_____exercising

_____fishing

_____football

_____walking

_____horseback riding

_____horseshoes

_____ice skating

_____jogging

_____kite flying

_____motorcycling

_____reading

_____shuffleboard

_____sunbathing

_____swimming

_____photography

_____tennis

_____volleyball

_____watching sports

_____picnicking

_____frisbee

_____lawn bowling

_____sitting

_____eating lunch

_____looking at flowers

_____observing wildlife

_____feeding wildlife

_____walking dog

_____other; please list

____

____

____

Now, circle the checkmarks by activities you could do in _______________ Park but prefer to do elsewhere. Please describe to me why you prefer to do the activities you circled someplace other than in the park.

Our final question.....

7. People use urban parks and forests for many reasons. On the other side of the activity sheet (indicate person should turn over) are listed some of the reasons given to us in the past. We would like to know how important these reasons are to you for visiting ____________ Park. Please indicate the importance of <u>each</u> reason by circling the appropriate number. (Explain the scale).

<u>Key</u>:

Not At all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1	2	3	4	5

					<u>Reason for visiting park</u>:
1	2	3	4	5	To be with friends.
1	2	3	4	5	Because my family enjoys it.
1	2	3	4	5	To observe the other people.
1	2	3	4	5	To be in a natural setting.
1	2	3	4	5	To be away from other people.
1	2	3	4	5	To look at wildlife.
1	2	3	4	5	For the exercise.
1	2	3	4	5	To relieve my boredom.
1	2	3	4	5	To get out of the house for awhile.
1	2	3	4	5	To relax.
1	2	3	4	5	Because of the open space here.
1	2	3	4	5	To enjoy the quietness.
1	2	3	4	5	To get away from my job for awhile.
1	2	3	4	5	To enjoy the scenery.
1	2	3	4	5	To get away from crowded situations for awhile.
1	2	3	4	5	Closest park to where I live.
1	2	3	4	5	Other; please list ________________

____

____

Urban Forests Pilot Interview #4

Date:________ Day of Week:________ Weather:______________

Time:________ Park:______________ Interviewer:__________

Notes (include location of interview and description of respondent):

Hi, I'm with the University of Massachusetts and we're helping out with a study of urban parks for the U.S. Forest Service. Here's one of our cards. Basically, we're interested in people's use of __________ Park. Could you take a few minutes to answer a couple of questions? (It will only take about ten minutes....Yes, the Parks Department is aware of our study....)

1. Why did you come here today? (note activities or reasons)

2. Why else do you come to the park? (activities or reasons)

3. How familiar are you with __________ Park on a scale of one to seven, one being extremely familiar and seven being not familiar at all?

   extremely familiar 1 2 3 4 5 6 7 not familiar at all

4. How many times have you come to the park in the last two months?__________

5. Now, I would like to show you a series of photographs from different areas of __________ Park. For example, here are some photos taken in this area (point to interview area on the map). Please look at the photos carefully and pick the <u>one</u> photo that <u>best</u> depicts the area. I need the <u>one</u> that <u>best</u> represents the entire area of __________ Park.

   Feel free to comment on your choice.

   That's good. Now for this area (point to area on the map) can you pick the <u>one</u> photo which <u>best</u> represents it? Again, feel free to comment on your choice.

   (continue for all areas in pilot....)

6. A final question. There are probably some photos that you would have chosen if you could have chosen more than one. Please go through the photographs one more time and pick <u>two</u> photos which are important in depicting __________ Park. That is, pick <u>two</u> photos that represent things that were missed in your first choices.

   Again, please comment on your choices.

Pilot Interview #4 - Code Sheet for Elizabeth Park

number the order of presentation of the areas
circle the photo chosen as most representative, record comments
box the photos chosen as important, record comments

_____ area #1: "east side"

1/E2: ballfields
2/E3: playarea
3/E6: ballfields
4/E1: ballfields
5/E5: ballfields
6/E7: lookout
7/E4: basketball

_____ area #2: "activities"

1/E16: meadow
2/E14: ballfield/lawn bowl
3/E9: ballfield/tennis
4/E8: tennis
5/E53: meadow
6/E15: ballfield/tennis
7/E10: lawn bowling
8/E32: full shot
9/E17: meadow/trees

_____ area #3a: "lake"

1/E49: woods
2/E36: lake/trees
3/E13: lake/refreshments
4/E54: bank with people
5/E52: lake/bridge
6/E34: path
7/E11: lake/refreshments

_____ area #3b: "lake"

1/E12: lake/bridge
2/E18: bank with people
3/E33: lake/refreshments
4/E35: lake/refreshments
5/E29: lake/bridge
6/E20: trees/lake
7/E21: trees
8/E58: path

_____ area #4: "rose garden"

1/E23: roses/greenhouse
2/E55: trees/roses
3/E25: meadow
4/E26: garden/roses
5/E22: roses
6/E24: trees/roses
7/E27: garden/house
8/E57: lake/roses
9/E28: meadow/roses

_____ area #5: "west end"

1/E42: meadow
2/E41: playground
3/E38: picnic
4/E48: parking area
5/E47: woods
6/E46: woods/tennis
7/E44: tennis
8/E43: meadow
9/E37: picnic

Pilot Interview #4 - Code Sheet for Forest Park

number the order of presentation of the areas
circle the photo chosen as most representative, record comments
box the photos chosen as important, record comments

_____ area #1: "southwest"

1/F7: waterfall
2/F1: ballfield
3/F3: stream
4/F4: lily ponds
5/F5: amphitheater
6/F6: small lake
7/F2: meadow
8/F10: skating lake

_____ area #2: "Barney hill"

1/F17: office
2/F21: monument
3/F22: playarea
4/F24: dirt road
5/F55: monument
6/F19: meadow
7/F23: picnic table

_____ area #3: "southeast"

1/F13: lake/cars
2/F52: lake/trees
3/F9: shore with bench
4/F8: lake/trees/ducks
5/F15: woods
6/F14: boathouse
7/F16: woods/lake

_____ area #4: "zoo to playground"

1/F29: rose garden
2/F27: playground
3/F30: lawn bowling
4/F28: rose garden
5/F31: woods
6/F32: kiddie zoo
7/F26: playground

_____ area #5: "athletics etc."

1/F43: picnic area
2/F44: arena
3/F42: basketball
4/F40: shuffleboard
5/F36: office/police
6/F46: fields/road
7/F38: zoo
8/F41: pool
9/F34: fields/stadium

_____ extra board: "placements"

1/F54: amphitheater
2/F39: shuffleboard
3/F57: playarea
4/F45: stadium
5/F20: monument
6/F47: pavillion

Urban Forests Pilot #5

Date:________ Day of Week:________ Weather:______________

Time:________ Park:______________ Interviewer:___________

Notes (include location of interview and description of respondent):

Hi, I'm with the University of Massachusetts and we're helping out with a study of urban parks for the U.S. Forest Service. Here's one of our cards. Basically, we're interested in people's use of _________ Park. Could you take a few minutes to answer a couple of questions? (It will only take about ten minutes....Yes, the Parks Department is aware of our study....)

1. Why did you come here today? (note activities and reasons)

2. Why else do you come to the park? (activities or reasons)

3. Now, I would like you to look at a series of photographs. They were taken in _________ Park and in other nearby parks. We would like you to tell us how certain you are that the photo is from _________ Park. Please use the following scale (very certain in/somewhat certain in/not sure/somewhat certain out/very certain out).

   You might find some of your decisions difficult to make, but try your best. This is really a test of what the parks are like, not a test of your skill.

4. Here is a small group of photographs, all of which were taken in _________ Park. We would like you to use this outline map of the park to indicate where you think the photo was taken. Try to make your best guess, unless you absolutely do not know.

5. We are using photographs to obtain your evaluations of _________ Park. First, we would like you to rate the entire park on a number of dimensions. Each dimension is based on two opposing adjectives.

   Now, each of these photos depicts an area of _________ Park. We would like you to rate each area on the same scales.

6. This last series of photographs are accompanied by statements. We would like you to indicate your agreement or disagreement with the statements in regards to the area depicted by the photo. (strongly agree/moderately agree/neutral/moderately disagree/strongly disagree)

adjective ratings....indicate 0 for entire park
1,2,3,4,5 for each area

SAMPLE....

hot	/ 1	/ 3	/ 4,5	/ 0	/	/ 2		cold
like	/	/	/	/	/	/		dislike
active	/	/	/	/	/	/		passive
safe	/	/	/	/	/	/		dangerous
quiet	/	/	/	/	/	/		noisy
boring	/	/	/	/	/	/		interesting
relaxed	/	/	/	/	/	/		tense

statements.....indicate agreement or disagreement with the statements by circling

1. The beauty of the lake area is marred by the poor quality of the water.

   strongly agree / moderately agree / neutral / moderately disagree / strongly disagree

2. It is not dangerous to walk through this wooded area.

   strongly agree / moderately agree / neutral / moderately disagree / strongly disagree

3. The city takes proper care of the rose gardens.

   strongly agree / moderately agree / netural / moderately disagree / strongly disagree

4. This meadow is pleasant for sitting in the sun undisturbed.

   strongly agree / moderately agree / neutral / moderately disagree / strongly disagree

5. There are problems finding open picnic tables.

   strongly agree / moderately agree / netural / moderately disagree / strongly disagree

6. Signs of vandalism are common in the park.

   strongly agree / moderately agree / neutral / moderately disagree / strongly disagree

APPENDIX B

TELEPHONE INTERVIEW FORMS

All potential respondents were contacted by telephone and administered an "initial telephone contact" form (pp. 279-281). If the respondent did not qualify as a "user" of the park, a "discontinue for non-user" form was administered over the telephone (pp. 282-286). The following sample forms are for Elizabeth Park.

INITIAL TELEPHONE CONTACT

May I speak to ______________________________, please.

Hi, I'm working for the University of Massachusetts. We're doing a study of outdoor recreation and leisure for the U.S. Forest Service. Did you get one of our postcards in the mail?

(IF YES, say "Good." and continue)
(IF NO, say "Oh, well, we mailed postcards to people who were randomly selected from street lists in your area -- we're only contacting 100 households in the Hartford-West Hartford area, so we're very interested in what you might have to say about outdoor recreation and leisure in your local area." Then continue.)

There are basically two parts to the interviews that we're doing. First, if you agree, I'd like to ask you a few brief questions on the phone now. These questions are about outdoor recreation and leisure. Then secondly, we'd like to set up a time when we could come to your house and talk to you for about a half-hour or 45 minutes. This is necessary because one part of our interview involves photographs of outdoor areas, and we need you to look at these in order to answer the questions.

So, will you be able to help us with this study?
(IF PAUSE, say "We are getting good cooperation from people, and since we're able to contact only a small number of households, it's important that we try to get an interview with each person that we call. How about it? Can we interview you?)
(IF NO, thank them anyway)
(IF YES, say "Good, we really appreciate it. Now I'll just ask you some short questions, and then we can set up an interview time."

So, the first question that we ask is: .

Name______________________________
Phone_____________________________
Address___________________________
____

Interviewer______________
Day_____________
Date_____________
Time_____________

INITIAL TELEPHONE CONTACT

Now, the first question that we ask is:

1. What parks can you name in your area? (only in your city of town) (Probe: "Any other ones that you can think of?")

2. OK, and in terms of your own activities, which of the following do you use most often for outdoor recreation and leisure? There are four choices:

"1. _____ your own yard?"

"2. _____ your own street-block?" (that is, the street and sidewalks and front yards and steps of your neighbors on your block)

"3. _____ one or more of the local parks that you mentioned?"

and "4. _____ recreation and leisure settings <u>outside</u> the city?"

"Which of these do you use most frequently for your leisure and recreation? (mark a 1 beside their choice)
And which of these would you say you use second-most frequently? (mark a 2)"

3. OK, now I'd like to ask you about your use of ______________________ (ONE OF THE 4 ABOVE CHOICES THEY MENTIONED, OTHER THAN LOCAL PARKS) How often do you use ________________ for what you would call leisure and recreation? (IF INDEFINITE, SAY "Well about how many times in the last 2 months, would you say?) ____________________

4. And what kinds of things do you do there?

5. And next, I'm going to pick one of the parks you mentioned: Elizabeth Park.

(IF THEY DIDN'T MENTION THIS PARK, SAY: And now, I'd like to ask you about a park -- are you familiar with Elizabeth Park?)

(IF YES) (IF NO, SAY: Well, that's a problem, because we're specifically interested in studying Elizabeth Park, and why people do and do not use it. So, if you don't know the park, most of my questions won't make much sense. But, thank you very much for your cooperation, and I'm sorry I can't ask you to help further.")

How many times in the last 2 months have you been to Elizabeth Park?

________ (IF NONE, ASK How many times have you been there in the last year? _____ IF LESS THAN 3 TIMES, go directly to "DISCONTINUE FOR NON-USE."

6. What kinds of things do you do there, when you go?
(Probe: Anything else?)

7. How long have you lived in your present residence? ____________ years

ARRANGING FOR THE INTERVIEW

Well, thank you. These are just the initial questions that we ask prior to setting up an interview. Now when would be the best time to come by -- during the day? in the evening? what would be convenient?

(IF THEY DON'T NAME A DEFINITE TIME, TELL THEM YOUR SCHEDULE:) (EXAMPLE:) Right now I'm setting up appointments for Tuesday of next week, or for that Wednesday afternoon. Would either of those be convenient?

INTERVIEW TIME ________________ DAY ______________ DATE ____________

Shall I call the day before to remind you? Thanks again.

Name of person discontinued:

____

(If you need to DISCONTINUE FOR NON-USE:)

5a. When was the last time that you went to Elizabeth Park?
("How many years ago?" ___________ years)

6. What kinds of things do you do there, when you go? (or "... when you did go there ?")

7. How long have you lived in your present residence? ___________ years

8. We'd also like to know how many adults there are in your household, including yourself: ________ (DO NOT INCLUDE BOARDERS)

How many children are there in your household? ________

And may we have the age and sex of each person, including yourself?

	Sex	Age		Sex	Age
Respondent	___	___	Child 1	___	___
Adult 2	___	___	Child 2	___	___
Adult 3	___	___	Child 3	___	___
Adult 4	___	___	Child 4	___	___

Well, thank you. Actually, I'm not supposed to set up home interviews with people who haven't been to Elizabeth Park at least 4 times in the last year. However, we do like to continue the interview over the phone for another couple of minutes. This is really one of the most important parts of our study -- finding out why people do and do not use a park in their neighborhood. (If person says " Elizabeth Park isn't in my neighborhood," check here ___ and continue anyway.)

(IF PERSON SAYS, "But I do use it, check here ___ and SAY: "Yes, I understand, and I'm going to ask you the important questions anyway, but we're required to interview people who have some current familiarity with the park. That's why we're asking for a minimum of four visits over the last year, and at least once during the last 2 months.)

Is this a convenient time to continue with this interview?
It usually takes about 5 minutes.
(IF NO, SAY "When would it be convenient for me to call you back?")

9. We've found that different people have different reasons for not using an urban park. What would you say prevents you from using the park more often? (LET RESPONDENT ANSWER, then code into categories) (IF THEY ASK "Do you mean Elizabeth Park?, say YES) (Probe: Anything else?)

(PARK-UNRELATED)

_____ not enough time ("no spare time", "I work", etc.)

_____ don't need to go there -- I use other places ("like what?" _______________)

_____ other: _______________

(PARK-RELATED)

_____ don't like the park

_____ nothing to do there that I like

_____ the park isn't safe

_____ other: _______________

10. (IF RESPONDENT DID NOT GIVE A PARK-RELATED REASON FOR NON-USE, ASK:) Is there anything specific about Elizabeth Park that prevents you from using it more often? (LET RESPONDENT ANSWER, then code in RANK ORDER.

(IF RESPONDENT DID GIVE A PARK-RELATED REASON FOR NON-USE, ASK:) Is there anything else specifically about Elizabeth Park that prevents you from using it more often? (LET RESPONDENT ANSWER, then RANK ORDER into categories as appropriate)

(Probe: Anything else?)

_____ no

A. _____ distance to park

B. _____ accessibility of park (roads are blocked off, etc.)

C. _____ specific facilities that are available there (e.g., tennis courts, pool, playground, etc.)

D. _____ the condition of the facilities (_______________)

E. _____ the type of people who are in the park (_______________)

F. _____ safety and security in the park

G. _____ the woods and the lake areas

H. _____ how many people there are in the park ___ too many ___ too few

I. _____ the overall condition of the park

J. _____ other: _______________

K. _____ other: _______________

12. Great! Now of all the things that are in Elizabeth Park, what would you say are its best features? -- What are the parts that you like the most? (CODE IN RANK ORDER AGAIN)
(PROBE: Any other good parts that are worth mentioning?)
(IF THEY STATE SOMETHING GENERAL, SUCH AS "the opportunity for the kids," NOTE THAT, and ASK WHICH SPECIFIC FEATURES THEY MEAN)

_____ ballfields
_____ basketball courts
_____ bridges
_____ gazebo
_____ greenhouses
_____ horticultural buildings and gardens
_____ lake
_____ lawn bowling("Bacchi")
_____ lookout
_____ meadow
_____ picnic tables
_____ playgrounds
_____ refreshment stand ("pond house")
_____ roads (___jogging) (___biking) (___driving)
_____ rose garden
_____ tennis courts
_____ woods
_____ other:_______________
_____ other:_______________

13. And again, of all the things that are in Elizabeth Park, what would you say are its worst features? -- what are the parts that you dislike? (CODE IN RANK ORDER AGAIN) (Probe: Any other bad parts that are worth mentioning?)
(IF THEY STATE SOMETHING GENERAL, SUCH AS "the litter," NOTE THAT, and ASK WHICH SPECIFIC FEATURES THAT APPLIES TO)

_____ ballfields
_____ basketball courts
_____ bridges
_____ gazebo
_____ greenhouses
_____ horticultural buildings and gardens
_____ lake
_____ lawn bowling ("Bacchi")
_____ lookout
_____ meadow
_____ picnic tables
_____ playgrounds
_____ refreshment stand ("pond house")
_____ roads (___jogging) (___biking) (___driving)
_____ rose garden
_____ tennis courts
_____ woods
_____ other: _______________
_____ other: _______________

11. And we're also interested in what people know about this park... Could you please name as many of the different places or facilities in Elizabeth Park as you can -- just mention whichever ones you can think of: (CODE IN RANK ORDER: 1 for the first one mentioned, 2 for the next one, and so)
(Probe: Anything else you can think of?)

_____ ballfields
_____ basketball courts
_____ bridges
_____ gazebo
_____ greenhouses
_____ horticultural buildings and gardens
_____ lake
_____ lawn bowling ("Bacchi")
_____ lookout
_____ meadow
_____ picnic tables
_____ playgrounds
_____ refreshment stand ("pond house")
_____ roads (___jogging)
(___biking)
(___driving)
_____ rose garden
_____ tennis courts
_____ woods
_____ other: _______________
_____ other: _______________

total number of items mentionned ________

14. And now, the final question concerns your opinions about Elizabeth Park, using some common words to describe it. I'm going to give you a pair of words -- for example; like and dislike -- and I want you to tell me which one best describes your opinion of Elizabeth Park. You may also say "no opinion" or "in between" if you don't want to choose one word or the other, OK? Let's try one:

like -- dislike

(Probe: Which of these two words best describes your feelings about Park?) (CIRCLE ONE OF THE WORDS; IF RESPONDENT SAYS "No opinion", CIRCLE THE DASH BETWEEN THE WORDS)

OK, good. Let's go on:

safe -- dangerous

noisy -- quiet

boring -- interesting

active -- passive

tense -- relaxed

convenient -- inconvenient

dirty -- clean

crowded -- uncrowded

not littered -- littered

unpleasant -- pleasant

valuable -- worthless

wooded -- not wooded

inaccessible -- accessible

artificial -- natural

OK, that's the last one. I want to thank you so much for your cooperation. You've really been a help to us.

INTERVIEWER COMMENTS:

APPENDIX C

HOME INTERVIEW FORMS

If the respondent qualified as a park "user" during the phone interview and he/she was willing to participate, a home interview appointment was scheduled. During the home interview, the complete instrument was administered (pp. 288-303). The respondent was also provided with a packet for use during the interview (pp. 304-312). The following sample forms are for Elizabeth Park.

Name ______________________

Phone ______________________

Address ______________________

____

Interviewer ______________________

Day ______________________

Date ________/________ 79

Time Began ______________________

Time Ended ______________________

INTERVIEW ON OUTDOOR RECREATION AND LEISURE

(AT THE DOOR:) Hi, I'm ______________________ with the University of Massachusetts, and I'm here to interview ______________________.

(WHEN SETTLED:) OK, this interview is part of a study by the University of Massachusetts on "Outdoor Recreation and Leisure" in Springfield and Hartford. Here's one of our identification cards. The project is being conducted for one branch of the U.S. Forest Service, called the Consortium on Environmental Forestry Studies. We expect this interview to take about a half-hour to 45 minutes. But first, I'd like you to look over this consent form, which asks if you're willing to be interviewed. If you are willing, please sign it at the bottom where it says "respondent." (THANK YOU.)

Now this may seem like a long interview as we're going through it, but as far as we know, it's one of the few attempts to study outdoor recreation and leisure in <u>urban</u> areas. With this many questions, some of them may seem the same to you, but we've tried hard to keep that problem to a minimum. Shall we begin?

1. First, we'd like to know how many adults there are in your household, including yourself: ____________ (DO NOT INCLUDE BOARDERS).

   Next, how many children are there in the household?______

2. And may we have the age and sex of each person, including yourself? (DON'T FORCE EXACT AGES IF THEY DON'T WANT TO GIVE THEM -- MAKE A GUESS, AND CIRCLE ANY AGE FOR WHICH YOU'VE MADE A GUESS)

	Sex	Age		Sex	Age
Respondent	____	____	Child 1	____	____
Adult 2	____	____	Child 2	____	____
Adult 3	____	____	Child 3	____	____
Adult 4	____	____	Child 4	____	____

   OK, so that's a total of _____ people living here? Do all these people live here year-round? (IF NO, PUT AN "X" BESIDE ANYONE WHO DOESN'T LIVE THERE YEAR-ROUND)

3. How many years have you lived in this residence? ____________years.

4. And how many years have you lived in this metropolitan area?_____years.

5. What is your occupation?____
   (CHECK IF DONE: _____at home, or ______ away from home)

6. And approximately how many hours a week do you work at this job, on the average? __________________

7. Now we'd like to have a rough idea of the total annual income for your household -- that is, all the working members in your house. On the second page of your packet is a list of income categories ... and I'd just like the <u>letter</u> that corresponds to the total annual income for you <u>and</u> any other wage earners in the household -- just the letter. (IF THEY DON'T WANT TO ANSWER, TELL THEM THEY DON'T HAVE TO, AND GO ON)

A. $0 - 4,999
B. $5000 - 9,999
C. $10,000 - 14,999
D. $15,000 - 19,999
E. $20,000 - 24,999
F. $25,000 - 29,999
G. $30,000 - 39,999
H. $40,000 - 49,999
I. $50,000 - or more

8. On the next page of your packet is a list of recreation and leisure activities. I'd like you to look at each one on the list, and tell us how interested you are in that activity. Then assign it a number from 1 to 5, using the scale at the top of the page. That is, 1 represents 'not at all interested' and 5 represents 'extremely interested,' OK? Write one number on each blank line, corresponding to each activity. (IF RESPONDENT DOESN'T WANT TO WRITE IN THE ANSWERS, S/HE MAY TELL YOU THE NUMBER FOR EACH ACTIVITY, AND YOU WRITE IT IN. IF THEY WRITE IN ANSWERS, CHECK IT FOR LEGIBILITY LATER)

(IF PAUSE, SAY: "So, for example, how interested are you in the first activity -- attending outdoor concerts? Mark a 1 if you're not at all interested, a 5 if you are extremely interested, and a 2, 3, or 4 if you're somewhere in between. OK?)

(SAY THIS:) You should make your judgments based on your own interests in recreation and leisure activities, not those of your family or friends. (BRIEFLY RECORD ANY COMMENTS NEXT TO ACTIVITIES IF APPROPRIATE)

Scale:

not at all interested	slightly interested	moderately interested	very interested	extremely interested
1	2	3	4	5

_____ attend outdoor concerts
_____ baseball/softball
_____ basketball
_____ bicycling
_____ bird watching
_____ driving for pleasure
_____ eating in a park on lunch hour
_____ exercising
_____ fishing
_____ football
_____ frisbee
_____ gardening
_____ horseback riding
_____ horseshoes
_____ ice skating
_____ jogging
_____ kite flying
_____ lawn bowling
_____ looking at flowers
_____ motorcycling
_____ photography
_____ picnicking
_____ playing at playground
_____ reading (outdoors)
_____ roller skating
_____ shuffleboard
_____ sitting
_____ sledding
_____ watching sports
_____ sunbathing
_____ swimming
_____ tennis
_____ volleyball
_____ walking
_____ walking dog
_____ feeding wildlife (ducks, squirrels)
_____ observing wildlife
_____ going to a zoo
_____ other: _______________
_____ other: _______________
_____ other: _______________

9. Next, we have compiled a list of reasons why people participate in outdoor recreation and leisure. If you will turn to the next page of your packet, you'll find these reasons listed there. Again, we'd like you to make a judgment about each reason, and to indicate that judgment by assigning a number to each reason. We will use a similar 5-point scale for this question: from not at all important to extremely important.

(IF THEY DON'T GET IT YET, CONTINUE WITH THE EXPLANATION:) So, for example, the first reason for participating in outdoor recreation is listed as "To be with friends." How important is that as a reason for you? If it's not at all important, circle the number 1; if it's extremely important, circle the number 5; and if it's in between, circle a 2, 3, or 4. OK?

Scale:

not at all important	slightly important	moderately important	very important	extremely important
1	2	3	4	5

					Reason for participating in outdoor recreation:	Comments:
1	2	3	4	5	To be with friends.	
1	2	3	4	5	Because my family enjoys it.	
1	2	3	4	5	To observe other people.	
1	2	3	4	5	To be in a natural setting.	
1	2	3	4	5	To be away from other people.	
1	2	3	4	5	To look at wildlife.	
1	2	3	4	5	For the exercise.	
1	2	3	4	5	To relieve boredom.	
1	2	3	4	5	To get out of the house for awhile.	
1	2	3	4	5	To relax.	
1	2	3	4	5	Because of the open space.	
1	2	3	4	5	To enjoy the quietness.	
1	2	3	4	5	To get away from my job for awhile.	
1	2	3	4	5	To enjoy scenery.	
1	2	3	4	5	To get away from crowded situations for awhile.	
1	2	3	4	5	Other: ____________________	
1	2	3	4	5	Other: ____________________	
1	2	3	4	5	Other: ____________________	

Now, I'd like to ask you some questions about one of the parks in your area, Elizabeth Park.

10. On a scale of 1 to 5, how familiar are you with Elizabeth Park? -- a 1 represents not at all familiar, and a 5 represents extremely familiar. (SEE PACKET; CIRCLE THE NUMBER THAT THEY SAY)

    not at all familiar 1 2 3 4 5 extremely familiar

11. How far would you estimate that you live from Elizabeth Park? (ANY UNITS:) ____________________

    How long does it take to walk to the park? ____________mins.

    How long does it take to drive to the park? ____________mins.

    Now, we'd like to get your opinion about several popular statements about Elizabeth Park. For example, the first statement is:

(12.) In the evenings, it is safe to walk in Elizabeth Park.

    If you turn to the next page, you will see the "agree-disagree" scale that we're using for these statements. So, what would you say about this statement? -- strongly agree? agree? disagree? strongly disagree? or no opinion?

    Key:

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

12. _____ In the evenings, it is safe to walk in Elizabeth Park.
13. _____ A large proportion of the users of the park are older people.
14. _____ The city sponsors interesting activities in ElizabethPark.
15. _____ I find Elizabeth Park to be easily accessible.
16. _____ Elizabeth Park is used by a large number of teenagers.
17. _____ I like to drive through the park, even if I don't stop there.
18. _____ Signs of vandalism are common in Elizabeth Park.
19. _____ Elizabeth Park is safe in the daytime.
20. _____ I take pride in showing Elizabeth Park to out-of-town visitors.
21. _____ There is very little litter in Elizabeth Park.
22. _____ The roads in the park are not adequately maintained.
23. _____ I enjoy driving to Elizabeth Park, stopping the car, and just sitting.

24. Next, we're very interested in how much people know about Elizabeth Park. Could you please name as many of the different places or facilities in Elizabeth Park as you can -- just mention whichever ones you can think of: (CODE IN RANK ORDER: 1 for the first one mentioned, 2 for the next one, and so)
(Probe: Anything else you can think of?)

_____ ballfields
_____ basketball courts
_____ bridges
_____ gazebo
_____ greenhouses
_____ horticultural buildings and gardens
_____ lake
_____ lawn bowling ("Bacchi")
_____ lookout
_____ meadow
_____ picnic tables
_____ playgrounds
_____ refreshment stand ("pond house")
_____ roads (___jogging) (___biking) (___driving)
_____ rose garden
_____ tennis courts
_____ woods
_____ other: _______________
_____ other: _______________

(TOTAL NUMBER OF THINGS MENTIONNED: _______________)

OK, that's fine. Now to continue with some other questions about your knowledge of the park, I'd like to ask:

25. Do you know, are there hours when it is illegal to enter the park? (IF YES:) What are they? ________________
    ____yes(& correct) ____yes(incorrect) ____no ____don't know

26. Are people permitted to drink alcoholic beverages in the park?
    ____yes ____no ____don't know

27. Is there any system for reserving and using the picnic tables? (IF SO: What is it?) Do you think there should be a system?____
    ____yes(& correct) ____yes(incorrect) ____no ____don't know

28. Are people permitted to light fires in the park?
    ____yes, fire pits only ____yes,anywhere ____no ____don't know

29. Is there any system for reserving and using the tennis courts? (IF SO: What is it?) Do you think there should be a system?____
    ____yes(& correct) ____yes(incorrect) ____no ____don't know

30. Are there activities in the park for which there is a fee? (IF SO: What are they? ________________)
    ____yes(& correct) ____yes(incorrect) ____no ____don't know

    Should people be charge to enter the park, or perhaps for various activities in the park? ____yes ____no ____ don't know

31. OK, now I'd like to ask you about your opinions of Elizabeth Park and then we'll move on to looking at some photographs.

For these next questions I'd like you to think of ElizabethPark as a whole -- that is, the entire park -- and rate it using some common pairs of words. If you turn to the next page in your booklet, you'll see these pairs of words. For example, the first one is "like -- dislike." Could you please place an "X" or a check mark somewhere between these words, to show which word best expresses your opinion of Elizabeth Park? If you really like Elizabeth Park, then you would mark the blank nearest the word "like"; if you very much dislike the park, then mark the blank nearest the word "dislike." If you have no opinion, mark the blank space in the middle. OK? Go ahead.

Example:

hot ___: _X_: ___: ___: ___cold

like ___: ___: ___: ___: ___dislike
safe ___: ___: ___: ___: ___dangerous
noisy ___: ___: ___: ___: ___quiet
boring ___: ___: ___: ___: ___interesting
active ___: ___: ___: ___: ___passive
tense ___: ___: ___: ___: ___relaxed
convenient ___: ___: ___: ___: ___inconvenient
dirty ___: ___: ___: ___: ___clean
crowded ___: ___: ___: ___: ___uncrowded
not littered ___: ___: ___: ___: ___littered
unpleasant ___: ___: ___: ___: ___pleasant
valuable ___: ___: ___: ___: ___worthless
wooded ___: ___: ___: ___: ___not wooded
inaccessible ___: ___: ___: ___: ___accessible
artificial ___: ___: ___: ___: ___natural

Now, I'd like you to look at some photographs of outdoor areas.

32. The first group includes some photos which were taken in Elizabeth Park, and some which were taken in other parks. I'd like you to look at each one and tell me how certain you are that the photo is from Elizabeth Park, using this scale (SEE PACKET) which ranges from "certain that it's in" to "certain that it's out."

You might find some of your decisions difficult to make, but try your best. This is really a test of what the parks are like, not a test of your skill! Circle one number for each photo. (DO NOT GIVE FEEDBACK DURING THESE QUESTIONS)

Photo number	Rating: Very Certain it's in 1	Somewhat Certain it's in 2	Not Sure 3	Somewhat Certain it's out 4	Very Certain it's out 5
1.	1	2	3	4	5
2.	1	2	3	4	5
3.	1	2	3	4	5
4.	1	2	3	4	5
5.	1	2	3	4	5
6.	1	2	3	4	5
7.	1	2	3	4	5
8.	1	2	3	4	5
9.	1	2	3	4	5
10.	1	2	3	4	5
11.	1	2	3	4	5
12.	1	2	3	4	5
13.	1	2	3	4	5
14.	1	2	3	4	5
15.	1	2	3	4	5
16.	1	2	3	4	5
17.	1	2	3	4	5
18.	1	2	3	4	5

(IF NECESSARY AND APPROPRIATE, YOU MAY TELL THE RESPONDENT SOMETHING SUCH AS: "Good, you did pretty well on that. About two-thirds of the photos were taken in Elizabeth Park.")

33. Next, here is a small group of photos, all of which were taken in Elizabeth Park. We would like you to use this outline map of the park and indicate where you think the photo was taken. Try to make your best guess, placing a dot at the point where you think it was taken. Then put the number of the photo beside the dot. If you absolutely don't know, place the number of the photo in the box outside the park boundary.

    Photo numbers: 20 -26

34. Now in the next group of photographs, we want to find out which areas of the park you like the best. I'll show you each photo and explain its location on the map (DO NOT USE THE SAME MAP AS PREVIOUS QUESTION; USE "MAP OF AREAS" -- areas shown in colored pencil). Then, after I've shown you all the areas, tell me which one you like the best, which one second-best, and so on. OK? Now here's the first photograph -- it's a picture of the east end of the park, which is represented here (point) on the map.
    (EXPLAIN EACH OF 5 AREAS, THEN:)
    Now, of these areas, which one do you like the best?
    Why?

    Which area do you like second-best?

	Areas	Order of Preference	Familiarity
a.	east end	________	______
b.	activities	________	______
c.	lake	________	______
d.	rose garden	________	______
e.	west end	________	______

Now, let't go back over the areas, and rank them on how familiar you are with each one. Which one are you most familiar with? And which one is second-most familiar to you?

(RECORD RANKS IN RIGHT-HAND COLUMN; GET ALL 5 AREAS RANKED)

And now, this is the last set of photographs. Many of these will be similar to the areas that we just talked about, but this time the photos will illustrate some common statements which people have told us about the different areas in Elizabeth Park. I'd like you to tell me whether you agree, disagree, strongly agree, strongly disagree, or have no opinion about this statement, OK?

Here's the first photo, and the statement that goes with it is: (THEY SHOULD BE RATING THE PARK, NOT THE PHOTO)

Key:

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

	(Photo number)	Rating	
35.	(30)	______	The lake is quite an attractive feature of the park.
and a second statement about this photo is:		______	The beauty of the lake is marred by the poor quality of the water.
36.	(31)	______	It would be easier to walk through the woods if there were more paths.
and a second statement is:		______	It is not dangerous to walk through the wooded areas.
37.	(32)	______	The rose gardens are beautiful.
		______	The city needs to pay more attention to the care of the rose gardens.
38.	(33)	______	The picnic area is often too noisy.
		______	There are problems in finding a picnic table to use.
39.	(34)	______	The meadows are nice places to sit in the sun.
		______	It is difficult to relax in the meadow undisturbed.
40.	(35)	______	Some of the roads in the park should be closed to traffic.
41.	(36)	______	Already too many roads in the park are closed off.
42.	(37)	______	The zoo is kept in decent repair.
		______	If the zoo is not better maintained, it should be closed.

Now, that completes the two biggest sections of the interview. The third and last section is a series of questions about your use of outdoor areas for recreation and leisure.

43. First, I'd like to ask you about "your own yard" -- approximately how many days during the last 12 months did you use "your own yard" for purposes of recreation and leisure?
(Probe: Just take a stab at a number.)
(There are 365 days in the year, 52 weekends.)
(REPEAT QUESTION WITH OTHER ITEMS)

		number of days
	a. your own yard	______
	b. your own street-block	______
	c. one or more city parks	______
	d. Elizabeth Park specifically	______
	e. recreation and leisure settings outside the city	______
(ASK:)	f. any other?____________	______
	(outdoor settings ...they may mention a specific thing like a second home or campsite)	

44. And of the time that you spent in Elizabeth Park during the last 12 months, which of these activities did you do? (HAND OVER LIST OF ACTIVITIES TO RESPONDENT)

We'd like you to write in the number of days, approximately, that you did any of these activities in Elizabeth Park during the last 12 months.
(NO NEED TO MARK ZEROS)

_____ attend outdoor concerts
_____ baseball/softball
_____ basketball
_____ bicycling
_____ bird watching
_____ driving for pleasure
_____ eating in a park on lunch hour
_____ exercising
_____ fishing
_____ football
_____ frisbee
_____ gardening
_____ horseback riding
_____ horseshoes
_____ ice skating
_____ jogging
_____ kite flying
_____ lawn bowling
_____ looking at flowers
_____ motorcycling
_____ photography
_____ picnicking
_____ playing at playground
_____ reading (outdoors)
_____ roller skating
_____ shuffleboard
_____ sitting
_____ sledding
_____ watching sports
_____ sunbathing
_____ swimming
_____ tennis
_____ volleyball
_____ walking
_____ walking dog
_____ feeding wildlife (ducks, squirrels)
_____ observing wildlife
_____ going to a zoo
_____ other: ____________________
_____ other: ____________________
_____ other: ____________________

45. We're especially interested in why people do and do not go to Elizabeth Park. And from our preliminary interviews, we've compiled a list of factors which seem to be important in people's decisions to use this park.

(ASK RESPONDENT TO TURN TO NEXT PAGE IN PACKET)

Please read over this list, and tell me which reason is most important to you in deciding that you will go to Elizabeth Park. (MARK A "1" FOR FIRST CHOICE)

And which reason is second-most important? (MARK A "2")

What other factors are important in deciding that you will go to Elizabeth Park? (PUT A CHECK MARK BESIDE ANY OTHER ANSWERS)

(RANK ORDER BY NUMBER AS THEY GIVE ANSWERS)

A. _____ distance to park

B. _____ accessibility of park

C. _____ specific features that are available there (e.g., tennis courts, pool, playground, etc.) (Which ones? ______________________________)

D. _____ the condition of the facilities (________________________)

E. _____ the type of people who are in the park (____)

F. _____ safety and security in the park

G. _____ the woods and the lake areas

H. _____ how many people there are in the park _____too many _____too few

I. _____ the overall condition of the park

J. _____ other: ________________________________

K. _____ other: ________________________________

46. Now, using this same list, tell me which factor is most impor- to you in deciding that you will not or do not go to Elizabeth Park? (RANK ORDER BY NUMBER AS THEY GIVE ANSWERS)

And which of these is second-most important? (MARK A "2")

What other factors are important to you in deciding that you will not or do not go to Elizabeth Park? (INDICATE OTHER CHOICES WITH CHECK MARKS)

A. _____ distance to park

B. _____ accessibility of park

C. _____ specific features that are available there e.g., tennis courts, pool, playground, etc.) (Which ones? ______________________________)

D. _____ the condition of the facilities (____________________)

E. _____ the type of people who are in the park (____)

F. _____ safety and security in the park

G. _____ the woods and the lake areas

H. _____ how many people there are in the park ___too many ___too few

I. _____ the overall condition of the park

J. _____ other: ____)

K. _____ other: ____)

Now there are three final questions:

47. On a typical visit to Elizabeth Park, how long do you stay?
____________hours

48. What changes in Elizabeth Park would make you want to go there more than you do now?
(Probe: Are there any changes that would make you want to use the park more?)

49. If it became harder to maintain Elizabeth Park, what one or two features of the park should be kept over other features, in your opinion?

OK, That's it. I know this has been a long interview, but the detailed information that we're collecting will be very useful to the U.S. Forest Service in understanding recreation and leisure in urban areas. We will also be sharing this information with the Parks Departments in Springfield and Hartford, where we're conducting this study. The full report will probably be pretty technical, but we also expect to prepare a general summary of our findings. Would you like us to send you a copy of that when it's finished?
____________(IF YES, SAY: It will probably be finished in December.)

Thanks again for your time and cooperation.
You've been a great help.

INTERVIEWER COMMENTS:

VOLUNTARY CONSENT FORM

Research project on Outdoor Recreation and Leisure

conducted by

The Environmental Institute
University of Massachusetts
Amherst, MA 01003
413/545-0648

DESCRIPTION OF THE PROJECT: The purpose of this project is to study public attitudes about outdoor recreation and leisure in urban areas. Interviews are being conducted in people's homes by a team of trained interviewers. The answers that you give to the interview questions will be treated confidentially and anonymously. This is an independent study, not connected with the Department of Parks and Recreation in Springfield or Hartford.

CONSENT: I understand the above description of the project, and I agree to participate in this study. I understand that I may refuse to answer any question, and I am free to withdraw my consent at any time, without prejudice.

SIGNED, ______________________________ (respondent) ____________ (date)

Name ______________________________

Address ______________________________

City ______________________________

Thank you for your cooperation.
If you have any questions or comments about this study you may contact:

D. Geoffrey Hayward, Ph.D., Project Director
at the above address, or at 413/545-0648
(see the identification card given to you
by the interviewer)

TOTAL YEARLY INCOME

FOR YOUR HOUSEHOLD

Just give us the letter that corresponds to the correct category.

A. \$ 0 - 4,999.

B. \$ 5,000 - 9,999.

C. \$10,000 - 14,999.

D. \$15,000 - 19,999.

E. \$20,000 - 24,999.

F. \$25,000 - 29,999.

G. \$30,000 - 39,999.

H. \$40,000 - 49,000.

I. \$50,000 - or more

Outdoor recreation and leisure interests

Below is a list of recreation activities. Please indicate your interest in these activities by writing a number (from 1-5) in the blank space beside each one.

Key:

Not At All Interested	Slightly Interested	Moderately Interested	Very Interested	Extremely Interested
1	2	3	4	5

_____ attend outdoor concerts

_____ baseball/softball

_____ basketball

_____ bicycling

_____ bird watching

_____ driving for pleasure

_____ eating in a park on lunch hour

_____ exercising

_____ fishing

_____ football

_____ frisbee

_____ gardening

_____ horseback riding

_____ horseshoes

_____ ice skating

_____ jogging

_____ kite flying

_____ lawn bowling

_____ looking at flowers

_____ motorcycling

_____ photography

_____ picnicking

_____ playing at a playground

_____ reading (outdoors)

_____ roller skating

_____ shuffleboard

_____ sitting

_____ sledding

_____ watching sports

_____ sunbathing

_____ swimming

_____ tennis

_____ volleyball

_____ walking

_____ walking dog

_____ feeding wildlife (ducks, squirrels)

_____ observing wildlife

_____ going to a zoo

_____ other: ____________________

_____ other: ____________________

_____ other: ____________________

Reasons for outdoor recreation and leisure

Listed below are some of the reasons why people participate in outdoor recreation and leisure. Please indicate the importance of each reason by circling the appropriate number.

Key:				
Not At All Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1	2	3	4	5

					Reason for participating in outdoor recreation:
1	2	3	4	5	To be with friends
1	2	3	4	5	Because my family enjoys it.
1	2	3	4	5	To observe other people.
1	2	3	4	5	To be in a natural setting.
1	2	3	4	5	To be away from other people.
1	2	3	4	5	To look at wildlife.
1	2	3	4	5	For the exercise.
1	2	3	4	5	To relieve my boredom.
1	2	3	4	5	To get out of the house for awhile.
1	2	3	4	5	To relax.
1	2	3	4	5	Because of the open space.
1	2	3	4	5	To enjoy the quietness
1	2	3	4	5	To get away from my job for a while.
1	2	3	4	5	To enjoy scenery.
1	2	3	4	5	To get away from crowded situations for awhile.
1	2	3	4	5	Other: __________
1	2	3	4	5	Other: __________

Key:

Not at all Familiar	Slightly Familiar	Moderately Familiar	Very Familiar	Extremely Familiar
1	2	3	4	5

Key:

"Strongly Agree"	"Agree"	"Neutral"	"Disagree"	"Strongly Disagree"

Please think of Elizabeth Park as a whole -- the entire park -- and rate it using these pairs of words.

Example:

hot ________ : ___X___ : ________ : ________ : ________ cold

Very Somewhat Neutral Somewhat Very

like ________ : ________ : ________ : ________ : ________ dislike

safe ________ : ________ : ________ : ________ : ________ dangerous

noisy ________ : ________ : ________ : ________ : ________ quiet

boring ________ : ________ : ________ : ________ : ________ interesting

active ________ : ________ : ________ : ________ : ________ passive

tense ________ : ________ : ________ : ________ : ________ relaxed

convenient ________ : ________ : ________ : ________ : ________ inconvenient

dirty ________ : ________ : ________ : ________ : ________ clean

crowded ________ : ________ : ________ : ________ : ________ uncrowded

not littered ________ : ________ : ________ : ________ : ________ littered

unpleasant ________ : ________ : ________ : ________ : ________ pleasant

valuable ________ : ________ : ________ : ________ : ________ worthless

wooded ________ : ________ : ________ : ________ : ________ not wooded

inaccessible ________ : ________ : ________ : ________ : ________ accessible

artificial ________ : ________ : ________ : ________ : ________ natural

Key:

Very Certain it's in	Somewhat Certain it's in	Not Sure	Somewhat Certain it's out	Very Certain it's out
1	2	3	4	5

Key:

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

YOUR USE OF ELIZABETH PARK:

Please write in the number of days that you participated in each of these activities in Elizabeth Park during the past 12 months.

number of days:		number of days:	
_____	attend outdoor concerts	_____	photography
_____	baseball/softball	_____	picnicking
_____	basketball	_____	playing at playground
_____	bicycling	_____	reading (outdoors)
_____	bird watching	_____	roller skating
_____	driving for pleasure	_____	shuffleboard
_____	eating in a park on lunch hour	_____	sitting
_____	exercising	_____	sledding
_____	fishing	_____	watching sports
_____	football	_____	sunbathing
_____	frisbee	_____	swimming
_____	gardening	_____	tennis
_____	horseback riding	_____	volleyball
_____	horseshoes	_____	walking
_____	ice skating	_____	walking dog
_____	jogging	_____	feeding wildlife (duck, squirrels)
_____	kite flying	_____	observing wildlife
_____	lawn bowling	_____	going to a zoo
_____	looking at flowers	_____	other: ____________
_____	motorcycling	_____	other: ____________
		_____	other: ____________

Please read over this list. Then, tell us which reason is most important to you when you decide that you <u>will</u> go to Elizabeth Park?

A. distance to park

B. accessibility of park

C. specific features that are available there (e.g., tennis courts, pool, playground, etc.)

D. the condition of the facilities

E. the type of people who are in the park

F. safety and security in the park

G. the woods and the lake areas

H. how many people there are in the park

I. the overall condition of the park

J. other: ______________________________

K. other: ______________________________

Using this same list, which of these factors is most important to you in deciding that you <u>will</u> <u>not</u> or <u>do</u> <u>not</u> go to Elizabeth Park?

APPENDIX D

ADDITIONAL DATA TABLES

Data tables which were not essential to the body of the dissertation, but which are informative, are included in the following pages: first, frequency tables for individual "knowledge" items (pp. 314-319); then, correlation matrices for the image and use variables (pp. 320-327); and finally, additional multiple regression analyses which supplement those presented in the results (pp. 328-340).

Table 25. Free Recall of Park Features.
Forest Park

Feature of the Park	Percent of Respondents	Feature of the Park	Percent of Respondents
Ballfields	78.9%	Polar Bear	24.2%
Zoo	74.7	Barney Hill	22.1
Duck Pond	67.4	Horseback	22.1
Tennis Courts	65.3	Monument	16.8
Swimming Pool	62.1	Police Station	14.7
Porter Lake	60.0	Basketball	13.7
Cyr Arena	56.8	Pavillion	12.6
Rose Garden	55.8	Roads	12.6
Picnic Tables	51.6	Train Ride	9.5
Kiddie Zoo	50.5	Winter Sports	9.5
Playgrounds	45.3	Kennedy Flame	9.5
Shuffleboard	40.0	Monkey House	8.4
Amphitheatre	37.9	Skate House	8.4
Lily Ponds	34.7	Stadium	6.3
Bird House	31.6	Woods	6.3
Greenhouse	29.5	Park Offices	4.2
Lawn Bowling	27.4	Waterfalls	4.2
Barney Estate	26.3	Dinosaur Tracks	3.2
Refreshments	25.3	Camp Seco	3.2
Trails-Woods	25.3		

Table 26. Free Recall of Park Features.
Elizabeth Park

Feature of the Park	Percent of Respondents	Feature of the Park	Percent of Respondents
Rose Gardens	97.1%	Winter Sports	27.9%
Tennis Courts	86.1	Roads	26.9
Lake	70.4	Meadow	21.9
Refreshments	61.5	Concerts	20.9
Playgrounds	54.7	Bridges	16.9
Ballfields	49.5	Basketball	16.0
Lawn Bowling	44.7	Woods	13.0
Greenhouse	42.8	Gazebo	9.0
Horticulture	42.7	Lookout	8.0
Picnic Tables	41.7	Paths	7.0

Table 27. Knowledge Questions.
Forest Park

Question	Correct Answer	Partially Correct[1]	Incorrect	Didn't Know
Are there hours when it is illegal to enter the park? (yes, closes at 9:30)	17.9%	74.7%	1.1%	6.3%
Are people permitted to drink alcoholic beverages in the park? (no)	98.9%	0.0%	0.0%	1.1%
Is there any system for reserving and using the picnic tables? (yes, half-days on weekends)	27.4%	13.7%	27.4%	31.6%
Are people permitted to light fires in the park? (yes, in fire pits only)	76.8%	5.3%	4.2%	13.7%
Is there any system for reserving and using the tennis courts? (yes, need stickers, one hour)	40.0%	23.2%	2.1%	34.7%
Are there activities in the park for which there is a fee? (yes, several)	61.7%	9.6%	12.8%	16.0%

[1]Half-credit was given in cases where the respondents knew the correct answer but not the correct details.

Table 28. Knowledge Questions.
Elizabeth Park

Question	Correct Answer	Partially Correct[1]	Incorrect	Didn't Know
Are there hours when it is illegal to enter the park? (yes, closes at 9:30)	7.9%	34.7%	22.8%	34.7%
Are people permitted to drink alcoholic beverages in the park? (no)	64.4%	0.0%	10.9%	23.8%
Is there any system for reserving and using the picnic tables? (yes, call park office)	3.0%	9.9%	47.5%	39.6%
Are people permitted to light fires in the park? (no)	22.8%	0.0%	57.4%	19.8%
Is there any system for reserving and using the tennis courts? (yes, call park office)	9.9%	25.7%	43.6%	20.8%
Are there activities in the park for which there is a fee? (no)	63.4%	17.8%	1.0%	17.8%

[1]Half-credit was given in cases where the respondents knew the correct answer but not the correct details.

Table 29. Photo Location Task
Forest Park

	Correct Placement	Correct "Area"[1]	Totally Incorrect	Didn't Know
Pavillion at Sumner Ave.	67.4%	26.3%	5.3%	1.1%
Kiddieland Zoo	64.2%	15.8%	16.8%	3.2%
Bird Cages of Zoo Area	57.9%	25.3%	12.6%	4.2%
Barney Monument/Crypt	52.6%	26.3%	11.6%	9.5%
Barney Pond/Stone House	42.1%	18.9%	33.7%	5.3%
Ballfield at I-91 Ramp	35.5%	25.8%[2]	19.4%	19.4%
Gardens by Greenhouse	34.7%	30.5%	24.2%	10.5%
Average:	50.6%	24.1%	17.7%	7.6%

[1] One-half credit given to respondent if photo placed within the correct "area" of the park although not in the precise location.

[2] Often (20.4% of the cases), the photo of the ballfield was mistaken for a different ballfield and placed in that location. Therefore, one-half credit was given for this response which is categorized as in correct "area".

Table 30. Photo Location Task
Elizabeth Park

	Correct Placement	Correct "Area"[1]	Totally Incorrect	Didn't Know
Gazebo in Rose Garden	68.8%	19.8%	10.4%	1.0%
East Tennis Courts	52.1%	15.7%[2]	22.9%	9.4%
Refreshment Building	43.8%	41.7%	7.3%	7.3%
Playground	28.4%	24.2%	26.3%	21.1%
Knox House	26.0%	30.2%	14.6%	29.2%
East Athletic Field	18.8%	31.3%[2]	30.2%	19.8%
East Play Area	15.8%	9.5%	12.6%	62.1%
Average:	36.2%	24.6%	17.8%	21.4%

[1] One-half credit given to respondent if photo placed within the correct "area" of the park although not in the precise location.

[2] Often, the photo of the east tennis courts was mistaken for the west tennis courts (6.3%) and the east athletic field mistaken for another athletic field (16.7%). In both of these cases, one-half credit was given for these responses which were categorized as in correct "area".

Table 31. Correlations of Descriptive Image Variables[1]. Forest and Elizabeth Parks[2]

FOREST PARK / ELIZABETH PARK	familiarity	minutes to walk	minutes to drive	features named	knowledge score	park photo	non-park photo	location score
familiarity[3]		-.26	-.20		.27	.42		.26
minutes to walk	-.25		.42	-.18				-.31
minutes to drive	-.23	.56						-.19
features named	.27	-.23	-.22					.29
knowledge score						.35	.28	.20
park photo score	.29						.20	.36
non-park score				.18				.25
location score	.42	-.35	-.38	.47			.22	

1 Only those correlations significant at $p < .05$ reported.

2 Upper right-hand portion of table for Forest Park correlations.
Lower left-hand portion of table for Elizabeth Park correlations.

3 Spearman rank-order correlation calculated for this variable.

Table 32. Correlations Between Adjective Pairs[1]. Forest and Elizabeth Parks[2]

ELIZABETH PARK \ FOREST PARK	like-dislike	safe-dangerous	noisy-quiet	boring-interesting	active-passive	tense-relaxed	convenient-inconvene	dirty-clean	crowded-uncrowded	not littered-littered	unpleasant-pleasant	valuable-worthless	wooded-not wood.	inaccessible-access.	artificial-natural
like-dislike		.28		-.52	.27	-.36	.31	-.29		.17	-.60	.51		-.23	-.26
safe-dangerous	.19					-.34	.26	-.36		.25	-.36	.18			
noisy-quiet					.26	.17			.19						
boring-interesting	-.33	-.22				.41					.64	-.36	-.25	.35	.23
active-passive	.22			-.35		.17			.18		-.21	.23			
tense-relaxed	-.39	-.37	.23	.60	-.28			.27			.56	-.18		.24	
convenient-inconvenient	.38							-.25		.18	-.31	.30		-.41	-.17
dirty-clean	-.24	-.39	.24	.32	-.22	.43			.26	-.58	.41	-.26			.27
crowded-uncrowded			.22					.21					-.24		
not-littered-littered	.24	.26	-.25	-.28		-.27		-.60			-.32				
unpleasant-pleasant	-.39	-.26	.18	.48	-.36	.55		.59		-.42		-.40		.23	.27
valuable-worthless	.45	.18	-.17	-.28	.22	-.23	.24	-.25	-.17		-.27		.36	-.23	-.18
wooded-not wooded											-.21				.25
inaccessible-accessible			.18			.18	-.42				.26	-.18			
artificial-natural	-.25		.27	.34	-.32	.46		.28			.50	-.19	.21	.19	

[1]Only those correlations significant at $p < .05$ reported.

[2]Upper right-hand portion of table for Forest Park correlations.
Lower left-hand portion of table for Elizabeth Park correlations.

Table 33. Correlations Between Interpretive-General Statements[1]. Forest and Elizabeth Parks[2]

FOREST PARK / ELIZABETH PARK	Int12	Int13	Int14	Int15	Int16	Int17	Int18	Int19	Int20	Int21	Int22	Int23
Int12: In the evenings, it is safe to walk in the park.			.27				-.43	.49		.35		
Int13: A large proportion of the users of the park are older people.			.24	.21				.37	.26			
Int14: The city sponsors interesting activities in the park.				.21			-.19	.30	.38	.20		
Int15: I find the park to be easily accessible.									.21			
Int16: The park is used by a large number of teenagers.		-.19					.30					.19
Int17: I like to drive through the park, even if I don't stop.					.24			.20		.19		.40
Int18: Signs of vandalism are common in the park.	-.37	.19						-.39		-.46	.25	
Int19: The park is safe in the daytime.	.41			.17			-.24		.25	.20	-.27	
Int20: I take pride in showing the park to out-of-town visitors.				.37		.32	-.19			.17		
Int21: There is very little litter in the park.						.26	-.38		.34			
Int22: The roads in the park are not adequately maintained.					-.20				-.17			
Int23: I enjoy driving to the park, stopping the car, and sitting.			.18			.43			.18			

[1]Only those correlations significant at $p < .05$ reported.

[2]Upper right-hand portion of table for Forest Park correlations.
Lower left-hand portion of table for Elizabeth Park correlations.

Table 34. Correlations Between Interpretive-Specific Statements[1]. Forest and Elizabeth Parks[2]

ELIZABETH PARK \ FOREST PARK	Int35	Int36	Int37	Int38	Int39	Int40	Int41
Int35: The lake is quite an attractive feature of the park.		-.18		.22			
Int36: It would be easier to walk through the woods if there were more paths.							
Int37: The rose gardens are beautiful.	.37			-.29			
Int38: The picnic area is often too noisy.							
Int39: The meadows are nice places to sit in the sun.	.25	-.18	.19			.17	
Int40: Some of the roads in the park should be closed to traffic.				.23			
Int41: The zoo is kept in decent repair.[3]	NA	NA	NA	NA	NA	NA	

[1] Only those correlations significant at $p < .05$ reported.

[2] Upper right-hand portion of table for Forest Park correlations. Lower left-hand portion of table for Elizabeth Park correlations.

[3] Zoo item not applicable (NA) to Elizabeth Park.

Table 35. Correlations Between Interpretive-General and Interpretive-Specific Statements[1]. Forest Park

	Int35: Lake is attractive feature.	Int36: Easier to walk thru woods.	Int37: Rose gardens beautiful.	Int38: Picnic area noisy.	Int39: Meadows nice for sitting.	Int40: Close off roads to traffic.	Int41: Zoo in decent repair.
Int12: In the evenings, it is safe to walk in the park.						-.23	
Int13: A large proportion of the users of the park are older people.					.19		-.22
Int14: The city sponsors interesting activities in the park.		-.32					.20
Int15: I find the park to be easily accessible.							
Int16: The park is used by large number of teenagers.							
Int17: I like to drive through the park, even if I don't stop.							
Int18: Signs of vandalism are common in the park.			-.20	.23			
Int19: The park is safe in the daytime.		-.19			.23		
Int20: I take pride in showing the park to out-of-town visitors.		-.19					.22
Int21: There is very little litter in the park.					-.19		.32
Int22: The roads in the park are not adequately maintained.							
Int23: I enjoy driving to the park, stopping the car, and sitting.							

[1]Only those correlations significant at $p < .05$ reported.

Table 35. Correlations Between Interpretive-General and Interpretive Specific Statements[1].
(continued) Elizabeth Park

	Int35: Lake is attractive feature.	Int36: Easier to walk thru woods.	Int37: Rose gardens beautiful.	Int38: Picnic area noisy.	Int39: Meadows nice for sitting.	Int40: Close off roads to traffic.
Int12: In the evenings, it is safe to walk in the park.						
Int13: A large proportion of the users of the park are older people.						
Int14: The city sponsors interesting activities in the park.	.22					
Int15: I find the park to be easily accessible.					.17	
Int16: The park is used by a large number of teenagers.						-.28
Int17: I like to drive through the park, even if I don't stop.	.31		.20			-.18
Int18: Signs of vandalism are common in the park.	-.33				-.30	
Int19: The park is safe in the daytime.	.26					
Int20: I take pride in showing the park to out-of-town visitors.	.36		.31		.23	
Int21: There is very little litter in the park.	.42		.31		.28	
Int22: The roads in the park are not adequately maintained.	.17					
Int23: I enjoy driving to the park, stoping the car, and sitting.	.23	.29	.22			

[1]Only those correlations significant at $p < .05$ reported.

Table 36. Correlations of Reduced Image Variables[1]. Forest and Elizabeth Parks[2]

ELIZABETH PARK \ FOREST PARK	Description	Free Recall	Familiarity	Evaluation	Cleanliness	Convenience	Naturalness	Safety	Driving	Pride	Lake	Woods	Roses	Picnic Area	Meadows	Roads
DESCRIPTIVE:																
Description		.29	.44									.22				
Free Recall	.36		.17				.22			.17						
Familiarity	.37	.29		.18								.22				
EVALUATIVE:																
Evaluation		-.26	-.20		.36	.37	.33	.20	.25	.60		-.21				
Cleanliness				.50		.17		.54	.39	.27		-.17				
Convenience	-.23	-.22	-.23	.26				.27		.53			-.21			
Naturalness				.33	.21									-.19		
INTERPRETIVE-GENERAL:																
Safety				.39	.67				.19	.33		-.19				-.23
Driving	.17			.25	.25											
Pride				.41	.25		.27	.24	.29			-.30				
INTERPRETIVE-SPECIFIC:																
Lake				.46	.44			.40	.36	.28		-.18		.22		
Woods																
Roses			.20	.31	.22				.24	.20	.37					
Picnic Area				-.20												
Meadows					.19			.26		.19	.25	-.18	.19			.17
Roads					-.18				-.24					.23		

[1]Only those correlations significant at $p < .05$ reported.

[2]Upper right-hand portion of table for Forest Park correlations. Lower left-hand portion of table for Elizabeth Park correlations.

Table 37. Correlations of Use Variables[1]. Forest and Elizabeth Parks[2]

FOREST PARK / ELIZABETH PARK	Unorganized Sports	Relaxation	Organized Sports	Nature Observation	"All Days"	"Park Days"
Days Spent in Unorganized Sports		.36	.18	NS[4]	.54	.47
Days Spent in Relaxation	.26		.34	.55	.83	.52
Days Spent in Organized Sports	.28	.21		.19	.43	.27
Days Spent in Nature Observation	.29	.73	.27		.66	.31
Estimate of "All Days"[3]	.57	.79	.36	.85		.74
Estimate of "Park Days"[3]	.59	.52	.30	.57	.82	

[1]Use variables are estimates of number of days spent in the parks over the last twelve months. All use variables are transformed by taking the square root of estimated days.

[2]Upper right-hand portion of table for Forest Park correlations. Lower left-hand portion of table for Elizabeth Park correlations.

[3]"All Days" is the sum of days estimated for a list of 36 activities. "Park Days" is also an estimate of overall use, but based on a single estimate by the respondent.

[4]All correlations significant at $p < .05$ except where noted as NS, "not significant".

Table 38. Predicting Image Variables Using Demographic Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Description	1 (.08)	Distance	Demographic	
	(.28)				
	Free Recall	No Variables Entered			
	Familiarity	1 (.06)	Years in Area	Demographic	Most variance in FP, 17%.
	(.41)	2 (.11)	Age	"	
	Evaluation	1 (.06)	# Children	Demographic	Not evident in EP.
	(.33)	2 (.05)	Distance	"	
	Cleanliness	No Variables Entered			
	Convenience	1 (.04)	Years in Home	Demographic	
	(.28)	2 (.04)	Age	"	
	Natural	No Variables Entered			
	Safety	1 (.11)	# Children	Demographic	16% of variance.
	(.40)	2 (.05)	Sex	"	
	Driving	No Variables Entered			
	Pride	1 (.04)	Income	Demographic	16% of variance.
	(.40)	2 (.07)	# Adults	"	
		3 (.04)	Distance	"	
	Lake	1 (.06)	Age	Demographic	Not evident in EP.
	(.25)				
	Woods	No Variables Entered.			
	Roses	1 (.12)	Distance	Demographic	
	(.35)				
	Picnic Area	No Variables Entered			
	Meadows	1 (.09)	Years in Home	Demographic	
	(.30)				
	Roads	1 (.06)	Age	Demographic	
	(.24)				

*All variables offered simultaneously.
Minimum "F to enter" set at 3.0
**Multiple R significant at $p < .05$ unless otherwise noted.

Table 38. Predicting Image Variables (continued) Using Demographic Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Description	1 (.05)	Income	Demographic	Only 5% of variance.
	(.23)				
	Free Recall	1 (.06)	Income	Demographic	Not evident in FP. 12% here.
	(.36)	2 (.06)	Years in Home	"	
	Familiarity	1 (.05)	Distance	Demographic	Multiple R not significant.
	(.22)				
	Evaluation	No Variables Entered			
	Cleanliness	No Variables Entered			
	Convenience	1 (.10)	Distance	Demographic	
	(.31)				
	Natural	No Variables Entered			
	Safety	1 (.07)	Years in Home	Demographic	11% of variance.
	(.34)	2 (.04)	Distance	"	
	Driving	1 (.09)	Distance	Demographic	Not evident in FP. 13% here.
	(.36)	2 (.04)	# Adults	"	
	Pride	1 (.04)	Sex	Demographic	Multiple R not significant.
	(.19)				
	Lake	No Variables Entered			
	Woods	No Variables Entered			
	Roses	1 (.05)	# Children	Demographic	
	(.29)	2 (.04)	Years in Home	"	
	Picnic Area	1 (.10)	# Children	Demographic	
	(.31)				
	Meadows	1 (.05)	Years in Area	Demographic	
	(.22)				
	Roads	1 (.04)	Distance	Demographic	Multiple R not significant.
	(.20)				

*All variables offered simultaneously.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.

Table 39. Predicting Image Variables Using Activity Interest Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Description	No Variables Entered			
	Free Recall (.22)	1 (.05)	Avg. Interest	Interest	Not evident in EP. Only 5% here.
	Familiarity	No Variables Entered			
	Evaluation	No Variables Entered			
	Cleanliness	No Variables Entered			
	Convenience	No Variables Entered			
	Natural	No Variables Entered			
	Safety	No Variables Entered			
	Driving	No Variables Entered			
	Pride	No Variables Entered			
	Lake	No Variables Entered			
	Woods (.39)	1 (.05)	Unorg. Sport	Interest	Not evident in EP. 15% is most in FP.
		2 (.05)	Avg. Interest	"	
		3 (.05)	Non-Strenuous	"	
	Roses (.25)	1 (.06)	Non-Strenuous	Interest	
	Picnic Area	No Variables Entered			
	Meadows (.26)	1 (.07)	Unorg. Sport	Interest	
	Roads (.22)	1 (.05)	Nature Obs.	Interest	Not evident in EP. Only 5% here.

*All variables offered simultaneously; average interest held for last. Minimum "F to enter" set at 3.0

**Multiple R significant at $p < .05$ unless otherwise noted.

Table 39. Predicting Image Variables
(continued) Using Activity Interest Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Description	No Variables Entered			
	Free Recall	No Variables Entered			
	Familiarity (.18)	1 (.03)	Nature Obs.	Interest	Multiple R not significant.
	Evaluation (.40)	1 (.09)	Nature Obs.	Interest	Not evident in FP. 16% here.
		2 (.03)	Unorg. Sport	"	
		3 (.04)	Relaxation	"	
	Cleanliness	No Variables Entered			
	Convenience (.22)	1 (.05)	Org. Sport	Interest	Not evident in FP.
	Natural (.42)	1 (.10)	Relaxation	Interest	Not evident in FP. 18% here.
		2 (.05)	Org. Sport	"	
		3 (.03)	Nature Obs.		
	Safety	No Variables Entered			
	Driving (.47)	1 (.07)	Org. Sport	Interest	Not evident in FP. 22% is most in EP.
		2 (.04)	Nature Obs.	"	
		3 (.04)	Unorg. Sport	"	
		4 (.07)	Avg. Interest	"	
	Pride (.39)	1 (.13)	Relaxation	Interest	Not evident in FP. 16% here.
		2 (.03)	Nature Obs.	"	
	Lake	No Variables Entered			
	Woods	No Variables Entered			
	Roses (.18)	1 (.03)	Org. Sport	Interest	Multiple R not significant.
	Picnic Area (.21)	1 (.05)	Nature Obs.	Interest	Not evident in FP.
	Meadows (.25)	1 (.06)	Relaxation	Interest	
	Roads	No Variables Entered			

*All variables offered simultaneously; average interest held for last.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.

Table 40. Predicting Image Variables Using Recreation Motive Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Description	No Variables Entered			
	Free Recall (.22)	1 (.05)	Social Act.	Motive	Not evident in EP. Only 5% here.
	Familiarity	No Variables Entered			
	Evaluation (.22)	1 (.05)	Physical Act.	Motive	Only 5% of variance.
	Cleanliness (.27)	1 (.03) 2 (.04)	Enjoy Nature Physical Act.	Motive	Not evident in EP.
	Convenience	No Variables Entered			
	Natural	No Variables Entered			
	Safety	No Variables Entered			
	Driving	No Variables Entered			
	Pride	No Variables Entered			
	Lake (.25)	1 (.06)	Escape	Motive	Not evident in EP.
	Woods	No Variables Entered			
	Roses (.20)	1 (.04)	[illegible] Act.	Motive	Multiple R not significant.
	Picnic Area	No [illegible]			
	Meadows (.20)	[illegible]	[illegible]	Motive	Multiple R not significant.
	Roads (.27)	[illegible]	[illegible]	Motive	Not evident in EP.

*All variables offered simultan[illegible] r last.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$

Table 40. Predicting Image Variables
(continued) Using Recreation Motive Variables.

Park	Image Variable (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Elizabeth:	Description	No Variables Entered			
	Free Recall	No Variables Entered			
	Familiarity (.24)	1 (.06)	Physical Act.	Motive	Not evident in FP.
	Evaluation (.23)	1 (.05)	Enjoy Nature	Motive	Only 5% of variance.
	Cleanliness	No Variables Entered			
	Convenience	No Variables Entered			
	Natural (.19)	1 (.03)	Physical Act.	Motive	Multiple R not significant.
	Safety	No Variables Entered			
	Driving	No Variables Entered			
	Pride (.23)	1 (.05)	Social Act.	Motive	Not evident in FP. Only 5% here.
	Lake	No Variables Entered			
	Woods	No Variables Entered			
	Roses	No Variables Entered			
	Picnic Area	No Variables Entered			
	Meadows	No Variables Entered			
	Roads	No Variables Entered			

*All variables offered simultaneously; average motive held for last.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.

Table 41. Predicting Days of Use Using Descriptive Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.41)	1 (.12)	Description	Descriptive	17% of variance accounted for.
		2 (.04)	Familiarity	"	
	Relaxation Days (.28)	1 (.03)	Description	Descriptive	
		2 (.05)	Familiarity	"	
	Organized Sport Days (.31)	1 (.10)	Description	Descriptive	Not evident in EP.
	Nature Observation	No Variables Entered			
	All Days Combined (.41)	1 (.04)	Description	Descriptive	17% of variance accounted for.
		2 (.13)	Familiarity	"	
	Estimate of Park Days (.36)	1 (.05)	Description	Descriptive	
		2 (.07)	Familiarity	"	
Elizabeth:	Unorganized Sport Days (.34)	1 (.05)	Description	Descriptive	
		2 (.07)	Familiarity	"	
	Relaxation Days (.19)	1 (.04)	Description	Descriptive	Multiple R not significant.
	Organized Sport Days	No Variables Entered			
	Nature Observation (.26)	1 (.04)	Free Recall	Descriptive	Not evident in FP.
		2 (.03)	Familiarity	"	
	All Days Combined (.39)	1 (.05)	Free Recall	Descriptive	15% of variance accounted for.
		2 (.10)	Familiarity	"	
	Estimate of Park Days (.38)	1 (.04)	Free Recall	Descriptive	14% of variance accounted for.
		2 (.10)	Familiarity	"	

*Variables offered in a hierarchical manner: 1)description <u>and</u> free recall, 2)familiarity.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 42. Predicting Days of Use Using Evaluative Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days	No Variables Entered			Virtually no relationship between the evaluative image variables and park use in Forest Park.
	Relaxation Days	No Variables Entered			
	Organized Sport Days	No Variables Entered			
	Nature Observation	No Variables Entered			
	All Days Combined	No Variables Entered			
	Estimate of Park Days (.18)	1 (.03)	Evaluation	Evaluative	Multiple R not significant.
Elizabeth:	Unorganized Sport Days (.25)	1 (.06)	Natural	Evaluative	
	Relaxation Days (.34)	1 (.06) 2 (.06)	Evaluation Cleanliness	Evaluative "	12% of variance accounted for.
	Organized Sport Days	No Variables Entered			
	Nature Observation (.37)	1 (.08) 2 (.06)	Evaluation Cleanliness	Evaluative "	14% of variance accounted for.
	All Days Combined (.36)	1 (.09) 2 (.04)	Evaluation Cleanliness	Evaluative "	13% of variance accounted for.
	Estimate of Park Days (.29)	1 (.06) 2 (.03)	Natural Convenience	Evaluative "	

*Variables offered simultaneously.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 43. Predicting Days of Use
Using Interpretive-General Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* ($R^2 \Delta$)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.35)	1 (.06) 2 (.06)	Safety Driving	Interp-Gen. Interp-Gen.	12% of variance accounted for.
	Relaxation Days	No Variables Entered			
	Organized Sport Days	No Variables Entered			
	Nature Observation (.29)	1 (.04) 2 (.04)	Safety Pride	Interp-Gen. "	
	All Days Combined (.18)	1 (.03)	Pride	Interp-Gen.	Multiple R not significant.
	Estimate of Park Days (.32)	1 (.05) 2 (.05)	Pride Driving	Interp-Gen. "	
Elizabeth:	Unorganized Sport Days (.28)	1 (.08)	Driving	Interp-Gen.	
	Relaxation Days (.28)	1 (.05) 2 (.03)	Pride Driving	Interp-Gen. Interp-Gen.	
	Organized Sport Days	No Variables Entered			Very little relationship evident between interpretive-general image and park use in Elizabeth Park.
	Nature Observation	No Variables Entered			
	All Days Combined	No Variables Entered			
	Estimate of Park Days	No Variables Entered			

*Variables offered simultaneously.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 44. Predicting Days of Use
Using Interpretive-Specific Image.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.22)	1 (.05)	Woods	Interp-Spec.	
	Relaxation Days (.20)	1 (.04)	Woods	Interp-Spec.	Multiple R not significant.
	Organized Sport Days (.19)	1 (.04)	Lake	Interp-Spec.	Multiple R not significant.
	Nature Observation	No Variables Entered			
	All Days Combined (.28)	1 (.08)	Woods	Interp-Spec.	
	Estimate of Park Days (.45)	1 (.21)	Woods	Interp-Spec.	21% of variance, based on "woods" item.
Elizabeth:	Unorganized Sport Days (.20)	1 (.04)	Meadows	Interp-Spec.	Only 4% of variance.
	Relaxation Days	No Variables Entered			
	Organized Sport Days	No Variables Entered			
	Nature Observation (.24)	1 (.06)	Picnic Area	Interp-Spec.	
	All Days Combined (.21)	1 (.04)	Picnic Area	Interp-Spec.	Only 4% of variance.
	Estimate of Park Days	No Variables Entered			

*Variables offered simultaneously.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 45. Predicting Days of Use Using Demographic Variables.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.28)	1 (.04)	Sex	Demographic	
		2 (.04)	Age	"	
	Relaxation Days (.21)	1 (.04)	Distance	Demographic	Multiple R not significant.
	Organized Sport Days (.44)	1 (.08)	Sex	Demographic	20% of the variance accounted for.
		2 (.04)	Family Size	"	
		3 (.08)	Income	"	
	Nature Observation	No Variables Entered			
	All Days Combined	No Variables Entered			
	Estimate of Park Days (.20)	1 (.04)	Distance	Demographic	Multiple R not significant.
Elizabeth:	Unorganized Sport Days (.30)	1 (.09)	# Children	Demographic	
	Relaxation Days	No Variables Entered			
	Organized Sport Days (.37)	1 (.09)	# Children	Demographic	13% of the variance accounted for.
		2 (.04)	Sex	"	
	Nature Observation	No Variables Entered			
	All Days Combined (.21)	1 (.04)	# Children	Demographic	Only 4% of variance.
	Estimate of Park Days (.29)	1 (.05)	# Children	Demographic	
		2 (.03)	Years in Home	"	

*Variables offered simultaneously.
Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 46. Predicting Days of Use
Using Activity Interests.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.34)	1 (.08)	Unorg. Sport	Interest	
		2 (.03)	Avg. Interest	"	
	Relaxation Days (.34)	1 (.08)	Relaxation	Interest	
		2 (.03)	Avg. Interest	"	
	Organized Sport Days (.26)	1 (.07)	Org. Sport	Interest	
	Nature Observation (.40)	1 (.16)	Nature Obs.	Interest	16% of variance accounted for.
	All Days Combined (.27)	1 (.07)	Relaxation	Interest	Relaxation best predictor of overall use.
	Estimate of Park Days	No Variables Entered			
Elizabeth:	Unorganized Sport Days (.42)	1 (.18)	Unorg. Sport	Interest	18% of variance accounted for.
	Relaxation Days (.36)	1 (.13)	Nature Obs.	Interest	Relaxation would enter at .07.
	Organized Sport Days (.38)	1 (.14)	Org. Sport	Interest	
	Nature Observation (.43)	1 (.19)	Nature Obs.	Interest	
	All Days Combined (.39)	1 (.15)	Nature Obs.	Interest	Nature Observation best predictor of overall use.
	Estimate of Park Days (.33)	1 (.11)	Nature Obs.	Interest	

*Variables offered simultaneously; average interest held for last. Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.

Table 47. Predicting Days of Use Using Motive Variables.

Park	Use Variable*** (Mult. R)**	Order of Entry* (R^2 Δ)	Predictor(s) Entered*	Type of Predictor	Comments
Forest:	Unorganized Sport Days (.35)	1 (.12)	Physical Act.	Motive	12% of variance accounted for.
	Relaxation Days (.20)	1 (.04)	Escape	Motive	Multiple R not significant.
	Organized Sport Days (.21)	1 (.04)	Escape	Motive	Only 4% of variance.
	Nature Observation (.34)	1 (.04) 2 (.07)	Enjoy Nature Physical Act.	Motive "	
	All Days Combined (.22)	1 (.05)	Enjoy Nature	Motive	Enjoy Nature best predictor of overall use.
	Estimate of Park Days	No Variables Entered			
Elizabeth:	Unorganized Sport Days (.38)	1 (.09) 2 (.05)	Physical Act. Escape	Motive "	14% of variance accounted for.
	Relaxation Days (.31)	1 (.10)	Enjoy Nature	Motive	
	Organized Sport Days (.18)	1 (.03)	Avg. Motive	Motive	Multiple R not significant.
	Nature Observation (.32)	1 (.07) 2 (.04)	Enjoy Nature Escape	Motive "	
	All Days Combined (.28)	1 (.08)	Enjoy Nature	Motive	Enjoy Nature best predictor of overall use.
	Estimate of Park Days (.28)	1 (.08)	Physical Act.	Motive	Physical Activity also predictor of overall use.

*Variables offered simultaneously; average motive held for last. Minimum "F to enter" set at 3.0.
**Multiple R significant at $p < .05$ unless otherwise noted.
***Variables have been transformed by taking the square root.