To the Graduate Council:

I am submitting herewith a thesis written by Homer Ernest Weeks entitled "Perceptions of Downtown." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Planning.

Joseph Prochaska, Major Professor

We have read this thesis
and recommend its acceptance:

Thomas L. Bell

Pat L Fisher

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

PERCEPTIONS OF

DOWNTOWN

A Thesis

Presented for the

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Degree in Planning

The University of Tennessee, Knoxville

Homer Ernest Weeks

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ABSTRACT

This project examined perceptions of both planners and citizens related to Knoxville's central business district. The study used a variety of nonparametric statistics in combination with a "sketch map" format to conduct an inter-group comparison.

The primary finding was that information content seemed to be the crucial factor in explaining group differences and similarities. Direct relationships were tentatively explored and these observations are expanded in a separate publication, Towards A Livable Downtown (Weeks, 1982).

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CHAPTER I

PERCEIVING DOWNTOWN

INTRODUCTION

The study of environmental perceptions belongs to no one discipline. Researchers from backgrounds as diverse as artificial intelligence, architecture, geography, philosophy, psychology, and planning have studied people's perceptions of the environment. Each field brings to these efforts its own terminology and theory. The result is an impressive demonstration of the potential of interdisciplinary research. However, this is accompanied by confusion and endemic terminological problems.

The following definitions hold for the purposes of this research project. Any definition is somewhat arbitrary in the field of environmental perception and these are not exceptions. However, these definitions are based on those most commonly used in the literature and they are not specialized to any discipline.

Terms indicated by an asterisk (*) will be used only in the literature review section of the thesis. While they add to the background of the undertaking, they are not essential to the understanding of the research project. These terms are included only for the benefit of the reader who might be familiar with the several possible definitions of each currently in use.

DEFINITIONS

Cognitive mapping. A projective survey technique developed by the planner, Kevin Lynch, in which the respondent is given a blank piece of paper and asked to draw a map.

Indirect mapping. A similar technique to "cognitive mapping" except that the subject is given an actual map and asked to indicate the location of some area or feature.*

Mental maps. The organization of "images" a person has of a specific space.

Man/Environment System. A way of conceptualizing reality that consists of three elements: people (micro-environment), people's perception (meso-environment), and objective reality (macro-environment).

Environmental perception studies. A variety of research, the common theme of which is seeking an understanding of the micro- and macro-environments by the study of the meso-environment.

Information space. A concept developed by Peter Gould in Mental Maps and People in Information Space. This approach allows the treatment of people's knowledge of the "environment" at interval level.

Sketch maps. The raw data produced by a "cognitive mapping" survey.

Environmental elements. An aspect of the macro-environments which is shared by the meso-environment and recorded on a sketch map.

An "environmental element" might be a building which is standing or a building which is torn down but still remembered by the respondent. These elements are categorized as Nodes, Edges, Barriers, Landmarks, or Districts. Lynch's definitions are used to define these categories.

Shared images. Environmental elements which are shared by more than 60 percent of a given group.

Image. (a) The representation of an "environmental element" in a "mental map." This need not be a visual image. (b) The total impression of a place, thing, or person.

Perception. The conscious awareness of an environmental element that is indicated by recording that element on a sketch map. Implicit here is the assigning of some importance to that environmental element.

Environment. The total arena in which people exist.

Appleyard's templates. A series of ideal organization styles for analyzing sketch maps.

PURPOSE

The purpose of this study is to examine the differences and similarities between planners' perceptions and those of the untrained citizen user groups. This effort also seeks to tentatively explore the implications of these perceptions to planning.

Perceptions are a difficult problem for the planning profession. Although the cities and regions which are planned for have an objective measurable existence, there are people in this objective world who tend

to be somewhat less than objective. All of us perceive the environment and act on the basis of images which are complex and often emotional. "Every citizen," writes Lynch (1960), "has had a long association with some part of the city, and his image is soaked in memories" (p. 1). But the planner is a professional trained to deal with the complex objective urban form. This training is intended to influence the image the planner carries of the city. Appleyard (1976) provides a precise statement of this problem:

> The illusion that professionals are value free technicians has been somewhat dispelled in recent years, but the illusion of objective perception endures. Since the city can be mapped, measured, and physically changed, it appears to be an objective entitity, but the items of analysis and the media chosen to plan cities are subjectively selected. The paradox is that as planners grow more adept and sophisticated at conceptualizing the so-called 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. (p. 1)

Does training in planning change the way planners perceive and more importantly organize space? Are their views of an area, in this case a downtown, different from those of the people who use the area? And finally, what might those differences mean?

PROBLEM STATEMENT

The influence that perceptions have on behavior has received considerable attention in recent years. As the images are assigned more and more importance, the differences between the views held by citizens and those held by planners become even more crucial. The increasing role being discovered for perceptions is described by a

number of studies. Sommer (1978) describes one relevant experiment by the articulate Englishman, T. R. Lee:

> Terrace Lee was curious about why people patronized a shopping center in their own city when the shopping center of a nearby town was geographically closer. Examining the mental maps of the residents, he found that people consistently overestimated the distance to out of town facilities. (pp. 159-160)

While many people recognize that distance is as much a matter of perception as of miles, there is a tendency to discount such subjective material. "Geographer Yi-Fu Tuan regards imagery as luxury something akin to illustrations in a book or a slide in a lecture--desirable but not necessary" (Sommer, 1978:180).

Saarinen (1976) responds to this view:

> Planning may be considered the conscious organization of human activity to serve human needs. Better planning can be accomplished by better integration of separate components at each scale into a more coherent framework. To be effective planning must consider not only the physical environment, but the way people perceive and utilize each segment of the environment. (p. 7)

In this context even the incompleteness and inaccuracies which disturbed Tuan and prompted his remark that a lost person needs a "real map not an image" (Sommer, 1978:180) take on a definite significance. Lynch (1960) writes about one finding of his Boston survey:

> One of the most interesting districts is one that isn't there: the triangular region between the Back Bay and the South End. This was a blank area on the map for every person interviewed, even the one who was born and raised there. (p. 20)

Absence in itself can be an important element. However, these dead zones rarely show up in traditional methods of inquiry. But the traditional approaches themselves are not in question. T. R. Lee

makes this clear in an insightful comment on the newer focus and its relevance to the traditional methodologies:

> Whereas traditional analyses of city structure have been almost exclusively concerned with the description, measurement and classification of objective qualities, a newer approach has emerged over the past two decades which is not merely different but in direct contrast. It is subjective rather than objective. Its emphasis is on studying the world not as it is, but as it seems to be; not as a physical reality, but as a perceived experience; not as a thing, but as a "seeming."
>
> New methods are frequently proclaimed by their enthusiastic proponents as superior to the old ones, but such claims usually need to be qualified--new methods are often better only for certain purposes and this one is no exception. The subjective approach to the study of cities is not intended to supersede the objective; it is supplementary and may hopefully be ome complementary. It opens up new ways of conceptualizing urban phenomena and gives a more complete way of distilling out and expressing some of the complex social patterns that exist, but it leaves large areas of understanding to be accessed more effectively by other means. (Lee, 1976:159)

NEED FOR THIS STUDY

This study hopes to make contributions to four broad areas.

First, this study will contribute to the knowledge of the planning profession. While many studies have been undertaken by planners and other researchers on the values and views of both citizens and politicians, few include planners. Yet planners perform an important role in the decision process which helps shape our environment. An understanding of the perceptions held by planners should contribute to the understanding of the profession and its role in shaping the American city.

This study will also address the claim that planners either ignore or misunderstand the perceptions of the average citizen. From Jane Jacobs to Ronald Reagan, rhetoric has been advanced that planners

planners are somehow blind to the views of ordinary citizens. The perceptions of both planners and citizens are central to the questions being raised. This study will examine the differences between citizens' viewpoints and those of planners as they relate to one small geographic area. This study will also tentatively speculate on these implications.

Thirdly, this study hopes to contribute to the growing body of knowledge in the field of environmental perception. While this contribution is small in view of the material currently available, it is somewhat different than other studies. The closest similar study is that of Appleyard which is both set in a different culture and assumes a priori the perceptions of the planners. Few studies in the field combine the analytic techniques used here. The tendency instead is to examine the techniques either quantitatively or qualitatively and even then to use only one of the available approaches. This is an attempt to combine the techniques in a reinforcing manner.

Finally, this study hopes to contribute to the techniques used in the field by demonstrating an effective small sample technique with a low cost that examines the perceptions of citizens. The field of environmental perception has changed considerably through the influence of planners such as Lynch and Appleyard. However, few planners make use of their contributions. This is true even though the questions faced by citizen participation, urban design, and several forms of zoning are amenable to cognitive mapping.

METHODOLOGY

The basic methodology employed in this research was a survey of two independent samples. One group consisted of planners who had done work in downtown Knoxville, Tennessee. The second group was composed of citizens who use the downtown area. The small size of the first population mandated a survey of the entire population insofar as was possible rather than a sample. The second population was somewhat larger. A systematic sidewalk sample was taken from the citizen group and limited to twice the size of the planning group. In all, 124 people were included in the interview process.

Cognitive Mapping

The specific technique used was cognitive mapping. While the term "cognitive mapping" has been applied to a number of theoretical concepts and techniques, particularly by Downs and Stea, the term is considered here only in the conservative sense as a research instrument in which the respondent is asked to draw an element of the physical environment. The cognitive mapping approach was first used in 1913 by Trowbridge. However, very little research was done until 1960 when Kevin Lynch published The Image of the City. Another MIT planner, Donald Appleyard, polished Lynch's approach and added substantially to the analytical framework in his monumental 1969 study of Ciudad, Guyana, Planning a Pluralistic City. Over the 20 years since Lynch's publication, numerous researchers have used this technique or variations of it. However, the instrument used here is derived almost

entirely from Lynch and Appleyard. Only slight adaptations have been made to take into account the aims of this particular research and the small area involved.

Kevin Lynch's efforts were preceded by other investigations. However, The Image of the City is separated from the earlier research by an attention to methodology and field work. "The Image of the City by Kevin Lynch is probably the best known work in the field of environmental perception" (Saarinen, 1976:109). The work has even made its way into introductory psychology books alongside Freud and Skinner (Baron, Byrne, and Kantowitz, 1980:279-283). The prestige and influence of Lynch is dependent upon his theoretical framework and his development of the cognitive mapping technique.

Lynch's projective technique quickly influenced other researcher efforts. Programs have been written in LISP, a high level modeling language, which attempts to examine how people draw cognitive maps. Extensive research has been devoted in England to determining people's concept of neighborhood. J. R. Gold and T. R. Lee have been extensively involved in developing theory and methodology to address the place and use of the perceptions Lynch's technique allows the researcher to study. Yet, this flood of material was unleashed by a relatively simple survey technique. Saarinen (1976) describes Lynch's cognitive mapping format which he refers to as the "draw-a-map" section of the technique:

> The great advantage of the draw-a-map portion of Lynch's technique is that it is essentially a projective test that allows for and demands a maximum of structuring by the subject. There are no clues given, as would be the case if the subjects were asked to outline areas on a prepared map. In such a case the individual's ignorance of connection would

> be overlooked because the map would already provide the structure. The use of a sheet of paper means that the only available source for the map production is the subjects' minds. They may not put on the map everything they know, but they cannot include anything they are not aware of. A major advantage of the method is that it can elicit responses that might be difficult to obtain by other means. . . . This is very important in attempting to assess experiences that people can rarely articulate. (p. 109)

This technique has to a certain extent been standardized by Whyte (1977) in her compilation of environmental perception tools and techniques, Guidelines for Field Studies in Environmental Perception. While the decision to use all or part of Lynch's total research methodology is dependent on the nature of the research involved and the resources to carry it out, Whyte isolates the cognitive mapping technique:

> In this method the respondent is asked to draw a map (on a blank piece of paper or area of ground) of an area, or a route. The area or route may be defined as a specific geographic location (e.g. Nairobi), as an area known to the respondent (e.g. his neighbourhood), an area in his past (e.g. his childhood environment), or a hypothetical area (e.g. his "Utopia").
>
> The unifying element is not the type of area that is drawn but the fact that the respondent himself translates his mental images into graphic, spatial terms.
>
> The respondent may be asked to describe what he has drawn and to annotate it. Depending on the research questions of the investigation, the map can be content analysed in terms of its structure, components, style, or what it includes or does not include. The analysis of the maps obtained from a sample of respondents can be converted back into a cartographical form to present a model of the collective image held by a group of people. Such group mental maps can then be compared with those of other groups. (p. 55)

Lynch suggests in the appendix to The Image of the City guidelines for further research efforts. Among these is a suggestion for an instrument to be used in mass research. The elements in his list have been applied to a number of research situations "in different parts of the world at different scales and with samples of varying

sizes." Often only one of the elements is used and the sample sizes have ranged from 1118 to 15 (Saarinen, 1976:112-113). If anything the process is more appropriate to a small group level. The elements listed by Lynch (1960) are the starting point for the instrument to be used in this survey. They are:

> A) Draw a quick sketch map of the area in question, showing the most interesting and important features, and giving the stranger the knowledge to move about without too much difficulty.
> B) Make a similar sketch of the route and events along one or two imaginary trips, trips chosen to explore the length and breadth of the area.
> C) Make a written list of the parts of the city felt to be most distinctive, the examiner explaining the meaning of parts and distinctive.
> D) Put down brief written answers to a few questions of the type: Where is _____ _____ located? (p. 155)

These suggestions and others made by Lynch were investigated by another MIT planner, Donald Appleyard. Planning a Pluralistic City, the massive work of analysis on Ciudad, Guyana, published in 1969 is second in the field of environmental perception only to Lynch's own work. Where Lynch developed a technique, Appleyard, who often collaborated with Lynch, developed the analysis.

The problem Appleyard attacked was administering a relatively large-scale survey (N=320) to a population of South American peasants. This was the first time many of the subjects had ever been asked to draw a map. As a result, many of the efforts undertaken by Appleyard would be inappropriate in a North American middle-class setting. However, important advances were made in analyzing the raw data and especially in understanding the organization of the respondents' maps. The study extended the flexibility of cognitive mapping. It also showed dramatically that the sketch maps could be treated

quantitatively and interpretation was not solely dependent on the good sense of the researcher.

DATA

The information used in this project came from three sources:

1. A literature review
2. A visual survey and numerous walks through downtown
3. The survey.

The first two sources provided background for the survey which constituted the major information source for this research. The literature review provided a general background of the field of environmental perception. The visual survey provided a framework for analyzing the sketch maps. It was used to develop a companion work, Towards a Livable Downtown, which addresses specific recommendations for Knoxville's central business district (CBD).

SCOPE AND LIMITATIONS

The scope of this study is limited to the comparison of planner's and citizen's perceptions and the implications of the differences and similarities. A number of related questions are beyond the scope of this inquiry. Two areas which are especially valid, but beyond the scope of this work, are: the values of planners, and the debates in theory and perception.

This study will not address the fitness of the values which might be discovered. The values held by professionals is an important area of inquiry within a profession. However, here it is sufficient

to note values which may be discovered and to chart out some of the possible implications.

Another area which is outside the scope of this investigation is the overall theory of space and perception. While it will be necessary to acknowledge the theoretical contributions, this work will not address the intriguing and complex questions that accompany those theories: Whether images exist in the mind? In what form do they exist? Can they be modeled? These are all crucial questions for fields as diverse as artificial intelligence and behavioral geography. For the purpose of this study the position of David Harvey (1975) will be adopted: "There are no philosophical answers to the philosophical questions that arise over the nature of space. The answers lie in human practice" (p. 13).

CHAPTER OUTLINES

Chapter II: Literature Review

The literature review constitutes an attempt to place cognitive mapping into its intellectual context. This is designed to assist the reader unfamiliar with the field of environmental perception. The survey will briefly examine the early research and theoretical heritage, the immediate predecessors of Kevin Lynch, and the relevant trends since Lynch's The Image of the City. As much of this material is complex and some controversial, the literature review will be limited to major research and trends.

Chapter III: Methodology

This chapter will set out the methodology used in this investigation. Research process, survey, and data analysis methodology will be included.

Chapter IV: Data Analysis

This chapter will identify the differences between planners' and citizens' perceptions.

Chapter V: Implications

This chapter will tentatively speculate on the implications of the results. Questions, such as "What do the differences and similarities between planners' and citizens' perceptions mean to the profession?" will be explored. Also, explanations for any observed differences will be tentatively developed.

CHAPTER II

LITERATURE REVIEW

INTRODUCTION

Purpose

The purpose of this literature review is to explore the available resources and research with a special emphasis on the material with utility to planners.

Constraints

There is an extremely large amount of research which is relevant to this research project. Goodey and Spencer found over two thousand sources in a 1973 project (Goodey, 1974). Goodey refers to this literature as a "bibliographic jungle" (Goodey, 1974:41). A large section of this material is in the form of draft papers with limited circulation, thesis and dissertation projects, and isolated case studies which have received little, if any, circulation. A complete and full coverage of the available material is too large a task to be undertaken without the benefits of staff, funding, and large amounts of time. Therefore, this review is confined to the most immediately relevant material to the research project being undertaken. The guidelines for relevancy come from Goodey. This review concentrates on 3 of the 13 areas outlined by Goodey. In addition, a fourth area, theory, is relevant and has primarily developed since Goodey's review.

The four areas of concentration are:

1. perception of the environment/the city
2. perception of the visual environment
3. perception of the environment/aesthetics of large architectural spaces
4. theory.

Within these four categories most of the attention will be given to the first two kinds of research. The whole will be collectively referred to as "environmental perception and mental imagery" research for the purposes of this review.

A great deal of material has been excluded from this review including some excellent work in geography. While this is unfortunate, most of this material is not immediately relevant to this research project. For example, cognitive distance and serial perception research is not readily applicable to a compact CBD. Studies which apply Multi-dimensional Scaling (MDS) or the (repertory grid) technique have little to do with the sketch map technique used in this research. This material was included in an initial literature survey and appears both in the bibliography and in occasional references in the text. This material appears to be amongst the most sophisticated and advanced in terms of analysis techniques.

While Goodey's outline was used to develop the categories for inclusion, the review is oriented toward the planners' concern and as such is unique. This emphasis introduces some definite differences in concentration which will be noticeable to the reader familiar with the field.

Organization

This literature review is divided into three sections:

1. Problems
2. Findings
3. Recent Trends.

These sections are somewhat independent of each other. However, they are not designed to be read separately. The material is complex and the last section depends heavily upon the first two to provide context and importance. The first section outlines some of the many problems associated with the field of environmental perception and mental imagery research. The second section covers the major conclusions which have been reached at this point in the research. The final section reviews four of the most recent trends in the literature.

PROBLEMS

The research on cognitive mapping, the technique used in this research, is a subset of the broader inquiries into environmental perception and mental imagery. To isolate the cognitive mapping research from its parent body is to truncate its impact and to severely distort its implications. The material on mental imagery and environmental perception is large. Moore (1979) notes over two hundred major studies in his widely cited 1979 review of the field. Saarinen and Sell (1980) produced a bibliography of over 234 writers and research efforts in geography alone during 1978-1979. The wingle most prominent consistency within the literature is the series of problems which characterize the field.

The problems associated with the available research should not be underestimated. During the 1970s, the newness of the direction and the research techniques were cited to account for the many problems (Ittleson, 1973; Saarinen, 1976). However, after 22 years of research it is apparent that some of these problems represent endemic and substantial difficulties. These problems fall into three major and interconnected categories:

1. Terminology
2. Theory
3. Application.

Terminology

The terminology found in the research is a cluttered olla podrida of borrowed words, pop usage, and oblique references. There is little coherency in terminology between researchers or even research efforts by the same researcher. There is a noticeable tendency to fall back on the original categories created by Lynch in The Image of the City; however, this is often used to explain an individual author's own perspective (Gold, 1980). This problem is illustrated by comments in the literature and from the terms themselves.

There is little pretense in the literature that the terminological issues are anywhere near resolution. Stea writes bluntly, "Even the name for the concept is unsatisfactory" (Downs & Stea, 1977: xiii). Sommer (1978) writes, "An accepted vocabulary of mental life would reduce confusion and make discussion of imagery easier" (p. 12). Prochansky, Ittleson, and Riulin (1970) provide a longer description of the problem:

> Various terms have been given to an individual's representation of specifically large-scale environments: "imaginary map" (Trowbridge, 1913), "field map" or "cognitive map" (Tolman, 1973; Blaut, McCleary, and Blaut, 1970; Stea and Downs, 1970), "mental map" (Hallowell, 1955), "schema" (von Senden, 1960; Lee, 1973), "topographical schema" (Piaget, Inhelder, and Szeminska, 1960), and "topographical representation" (Prochansky, 1972:31).

Simple everyday terms such as "image" require occasionally convoluted and extended definition. Sommer (1978) spends ten pages on the concept of image. Downs and Stea place the concept of image firmly in the neurological and psychological context. This effort requires two whole chapters. They add the comment, "It would be a pleasure to report . . . that there are a few common principles of organization and a few cognitive building blocks. At present such a report is not possible" (Downs & Stea, 1977:137).

The confusion created by terminological inconsistency is not fully illustrated by a few comments. However, the terms themselves show the problem graphically. The list of terms below was compiled from four writers:

cognitive mapping	environmental perception
mental map	environmental learning
place ballet	environmental mapping
text interpretation	mental image
boundaries	cognitive representation
edges	spatial cognition
nodes	form
landmark	visibility use
path	imageability
environmental knowing	distinctiveness

functional importance	cosmological schemata
life world	architectural symbols of transcendence
epoche'	human perceptual apparatus
phenomenological reduction	kinesthetic map
modeling	synesthesia
veridical perception	cross modality associations
whatness	imagery
whereness	negative afterimage
constructive manipulation of whatness and whereness	visual memory
whenness	visual perception
cognitive distance	mental rehearsal
location description	post visualization
state description	after image
process discretion	retentive visualizers
geographical macro-space	eidetic image
equivalence categories	inventive visualizers
topophilia	edetikers
segmentation	syntax
scale of human perception	hermeneutical knowledge

The above list shows a great diversity, and this diversity is a major cause of confusion. However, it is possible to trace the above terms back to their origins within a particular discipline. Many of the terms arise from classic design theory, such as "landmark." Others originate in psychology, such as "eidetic." The interdisciplinary genesis has contributed heavily to the terminological morass.

Variations in usage and meaning create another form of terminological problem. To the extent that common terms are used with different shades of meaning, this is not a major problem. However, some writers create their own terminology. Alexander, for example, operates almost entirely within his own reference system. A few terms from A Pattern Language provide a sharp contrast with the terms listed above: child caves, intimacy gradient, zen view, beer hall, necklace of community projects, and cascade of roofs (Alexander et al., 1977).

The great range and variance in the words used to describe and explain what is essentially the same phenomena create two negative effects: a "translation" problem for a person entering the field, and severely constrained dialogue between researchers in different disciplines.

The first problem is especially crucial to the planner. A planner is unlikely to turn to the works in environmental perception for intellectual stimulation. Rather, he is more likely to face a particular problem which needs a solution. However, to understand what sort of solution is being proposed by the literature, he needs a fair background in psychology and architectural theory. A good grounding in philosophy is essential beyond the most elementary level. A working knowledge of, or at least conversational familiarity with, the current debates in geography is of great assistance. Finally, it might be helpful to know basic systems theory and cybernetics. At least one article is written almost entirely in symbolic logic. These demands raise very real questions as to whether anyone in the field has the needed training to interpret all or even most of the material.

According to Gold and Buttimer, it is not at all surprising that a planner would turn away in disgust (Gold, 1980; Buttimer & Seamon, 1979).

A second terminological problem is more severe than the first. While the disadvantages caused to a new researcher can be overcome or at least significantly reduced by a review of the major disciplines involved, significant barriers have developed to interdisciplinary exchange. The most widely cited strength of the environmental perception and mental image research is its interdisciplinary nature (Lynch, 1976; Sommer, 1977; Appleyard, 1982, 1976; Moore, 1979; Saarinen, 1976). However, most debate is intradisciplinary. For example, geography has produced a long series of lively exchanges, particularly in Progress in Human Geography. Cognitive psychology has an ongoing and crucial debate between Kossalyn and Pylyshyn in Cognitive Science. With the notable exception of the early issues of Environment and Behavior, there is a paucity of debate found between the disciplines.

Even information flow appears to be poor. Ley (1981), one of the more careful researchers, claims that Lynch's The Image of the City created great debate in the 1950s, quite an accomplishment for a book first published in 1960. This is a recognized problem. Saarinen and Sell devote one section of their 1980 review to the integration of disciplines and efforts to increase the quality of the information exchange. Whether these efforts will renew the interdisciplinary exchange remains to be seen. However, some doubt is raised by the fact that the Saarinen and Sell review listed 15 articles and books--

all of which are from geography. Perhaps their effort would have been more aptly referred to as the impact of other disciplines on geography.

Interdisciplinary exchange is rare. Advances and speculations from one discipline go unnoticed or ignored by other disciplines. Delong (1972) comments, "Discipline boundaries have badly fragmented the effectiveness of the overall effort" (p. 22). Whyte (1977), who produced the first compilation of the variety of techniques and the only major comparison of methods, includes the following passage in her preface: "Throughout this work I have grown increasingly aware of the isolation between different disciplinary approaches from one another in their testing techniques and concepts" (p. i). Since the mid 1970s debate has focused within the disciplines involved. The material researched is compatible and the results startlingly reinforcing, but written reports no longer appear to be in the same language.

Theory

A second major problem in the field of environmental perception and mental imagery relates to theory. This area has two distinct subsections:

1. a lack of a unifying theory
2. a mixed approach to theory by theorists.

The first problem is closely connected to the terminology problem. However, it goes somewhat beyond mere semantic differences and difficulties in communication. The second problem is the most crucial to the field as a whole in terms of its long-term development. It is, on

the other hand, less crucial than any other problem to more immediate questions, such as application or individual research projects.

The lack of unifying theory. The lack of unifying theory is closely linked to the terminological confusion discussed above. There is a great diversity of perspective and interpretation under a variety of analytical and theoretical frameworks.

Much of the difficulty that any theory encounters in the field of environmental perception and mental imagery is the existence of the frameworks inherent in the parent disciplines. The terminology discussed above comes from a variety of disciplines and each discipline brings its own theoretical framework. In addition at least half a dozen theoretical frameworks have been advanced from within the field (Moore, 1979). Moore summarizes that perhaps what is most striking about the theoretical work is its recent genesis. "Little coherent organization has yet appeared and only recently have explanatory theories been advanced" (Moore, 1979:62). This is a promising long-term improvement. The short-term impact is not promising. In the absence of a unifying theory, individual research projects have limited compatibility even if a "translation" is possible. Anne Buttimer will continue to interpret her findings in terms of "lifeworlds," while Gould talks of "information space," and Alexander of "beer halls." This goes beyond a mere terminological difference and into the arena that Moore terms "interpretations (which are) somewhat problemistic" [sic] (Moore, 1979:62).

Approaches. A second closely allied problem revolves around the widely divergent approaches to theory development. There have been a number of theories advanced. Moore (1979) counts seven. Rose's and Burnett's writings could be added to this list to bring the total to at least nine. In addition to the better developed theories, there are an inestimable number of researchers who operate under less explicit theoretical approaches. Most of the theory encountered during the course of this review depended heavily upon either psychology or philosophy for the basic background. The case of the philosophical theorist provides a graphic example of these divergent approaches.

Philosophy as a discipline has a well developed vocabulary. However, this is a highly specialized vocabulary which depends heavily on its context for interpretation. Beyond the use of a few descriptive terms it is common practice in philosophical writing to refer to a specific movement, or often a specific writer, in reference to a term. Thus, one finds "Sarte's ontological argument," "Hegel's phenomenology," "Descarte's transcendental argument," "Plato's ideals." The reference is to very specific books and even passages. Without the specific connection, terms such as ontological, phenomenology, transcendental, and ideals refer to a heritage of different and even contradictory interpretations. The Dictionary of Philosophy provides a relevant example. It provides 9 separate definitions along with reference to 13 movements for the terms empiricism (Runes, 1979). A subcategory of empiricism, radical empiricism, is treated separately with three definitions and reference to four authors. Thus a reference to empiricism could well mean one of 29 different things.

The theorists in environmental perception and mental imagery provide a mixed approach to this situation. Few sources which dealt with theory bothered to include citations of sources in their bibliographies. This is an important consideration because of divergent translations and editions. M. T. Bowen (1979) notes:

> "(A translation) was repeated by several writers who apparently relied on secondary accounts or inadequate nineteenth century translations: the important discussion of the empirical method . . . was first translated into English in 1975. . . ." (p. 212)

up to a decade after the writers he mentions.

Other theorists provide considerable explanation and background. Rose includes excellent footnotes on Wittgenstein's theories and even individual logical moves (Buttimer & Seamon, 1979). Chapman (1977) provides clear examples with reference to the work of Shannon in information theory. Pat Burnett includes relevant passages and references to the complex work of Gilbert Ryle from philosophy of mind (Golledge & Rushton, 1976). However, these are exceptional and somewhat isolated works.

More often a theorist will adopt an almost "preachy" style evoking broad reaches of philosophical endeavor. Healy (1981) claims, "More recently positivism has come under such a sustained attack that opposition to it has become orthodoxy. . ." (p. vii). Bowen at times strikes a similar pose.

> . . . critics are now having a field day in exposing the inadequacies of the positivist model, and indeed almost every aspect of the prescribed method can be shown to be open to question. (M. T. Bowen, 1979:211)

While both writers have a point and both Rose and Burnett would probably agree that there are some problems with the positivist model,

there are still considerably more positivist articles published and research undertaken in geography, the tradition to which both Bowen and Healy belong, than in other disciplines. At best such comments are premature. At worst they are uncalled for polemic.

A second equally problematic approach is adopted by Marchand. Here the philosophy is used to advance a particular cause which appears to be Marxist.

> A characteristic of North American social sciences, which is most surprising for a Continental European, is an extreme disdain for philosophy, and particularly for modern philosophy. In most book stores, fundamental texts are few, usually shelved away under the title 'Philosophy, Religion and Occultism': Hegel and Sartre are mixed with Gurdieff, St. John of the Cross, and Black Magic in a strange, but non-dialectical, mixture of opposites. Geographers using philosophers always stop at Kant, who, characteristically, represents the Enlightenment at his peak. The cataclysm of Hegel's work, closing an era and building the foundations of all modern thought (e.g., Marx, Freud, Nietzsche) is not even discussed but conveniently ignored. Everything which has been important, controversial or pregnant with endless moral, social and political transformations for the past 150 years constitutes an enormous blind spot. Some particularly adventuresome social scientists may skirt it and use the work of a few people at its margins--Russell, Wittgenstein, Heidegger, Jung, Fromm--but they keep avoiding the centre of the maelstrom. (Marchand, 1979:237-238)

Whatever the specific value of Marchand's passage may be, it is a shock to read that "Hegel is the father of all modern thought" (p. 238). The contention that Bertrand Russell, Ludwig Wittgenstein, Martin Heidegger, Carl Jung and Eric Fromm are at the margins of philosophical and ethical thought is patently absurd. Finally the contention that geography always stops at Kant suggests that Marchand has read little geography. M. T. Bowen (1979), for example, maintains that Modern Geography starts with a series of lectures given by Kant. There is some difference even in the occasionally obtuse and convoluted

terminology accompanying philosophy between the terms "stopped" and "started."

A third problematic approach to the business of theory development is bluntly stated by Gould:

> This essay expresses opinion. It could hardly express anything else, since it is not an exercise in logic, using specified rules to reason out from stated conditions the consequences contained in them. My aim is to capture your assent, even though it is only partially given. Without such aim there is no point in writing, and, equally, no point in reading. If you disagree with my opinions, I hope you will tell me. I may revise some or all of them, and look again at a number of questions which are far from resolved. In the scholastic fashion, I shall marshall references to support my opinions, but these will be only more opinions, frequently those of authority figures in my current intellectual pantheon. A few of these seem to be permanent residents, others are new arrivals, and some may shortly disappear. But be skeptical of all of them: opinions supporting opinions should not be taken too seriously. (Gould, 1979:121)

There is some value in making such a statement in the preface of an article. However, the general practice inherent in such a relaxed approach is not one which lends itself to theory development.

The total effect of these approaches is to complicate the theory development process. While some authors spend large amounts of time to document their thoughts, others dilute the effort with a variety of highly speculative and less precisely researched approaches. It is in recognition of this problem that Burnett refers to the operant assumptions as "a crude and unspecified philosophy of mind" (Burnett, 1976: 24). Gold (1976) summarizes the problem as it relates to the discipline of geography which has produced much of the relevant theory:

> Within the discipline there exists unease at the cavalier way that geographical researchers have, on occasions, "dipped" into the well of social science ideas; borrowing those that superficially appear to be relevant with but scant regard to their background. For instance, one does not have to look far

> in urban geographical literature to find studies employing Gestalt-learning, and personality theories and a plethora of other psychological ideas. There is of course nothing unusual or wrong in this, for geography has always been a discipline that followed rather than led, with its major stimuli coming from without. When ideas are used properly, with a due respect for their background and derivation, the results can be a stimulating merging of different research traditions. Here there is no problem. The objections relate to the other situation, where ideas are dredged up, tossed into geographical inquiries, misused, and then allowed to disappear again. The results of this strategy are unlikely to be of great utility. It does not assist research on neighborhoods, it does little to advance real understanding, and contributes to the regrettable fragmentation that has taken place in the urban behavioral research. In short, it reflects little credit on anyone. (pp. 12-13)

There are conventions in theory development just as there are in research methods. The fact that these are so continually ignored suggests that a solution is unlikely in the near future.

Application

Application is a specialized problem within the field. Although there is no longer any real debate over the validity of a number of analysis and research techniques and approaches, there has been little application in the urban area (Whyte, 1977; Moore, 1979; Downs & Stea, 1977; Saarinen, 1976). However, professionals operate under different conditions and constraints than their academic counterparts. It is not enough for the professional to know a process is operational and the underlying logic is valid. Instead a general criteria suggested by Stea is of more importance: "To be useful a cognitive map must predict something. It is not enough to have a network of images" (Lang et al, 1974:166). In some special situations the professional may have use for the collection of images. However, the predictive abilities or information which can then be used to guide and correct situations is

usually of more importance than a collection of individual case studies. Such applications have not been forthcoming and constitute a major gap in the field.

The paucity of application is a common and pervasive litany in the literature. Jarvis (1980) remains optimistic but adds, "Such connections (to application) do not seem to have been taken up in the mainstream of Design" (p. 62). Jenson (1974), writing from the design perspective, is considerably less optimistic: ". . . this analytical tool has so far not apparently led to any useful synthesis or methodology for creative planning" (p. 155). He then concludes that the approach has "failed to produce a workable design code or acceptable principles or criteria" (p. 163). Gold (1980) feels the issue is of such importance that it appears on the opening page of his survey: "It is not satisfactory to lecture the planner on his responsibility to adopt Geographical concepts and techniques when the material being produced contains few usable recommendations" (p. 1).

Three problems can be isolated which hinder application:

1. lack of theory
2. cost effectiveness
3. lack of proven criteria.

The lack of theory which was discussed above has a special impact for the professional beyond that of adding confusion to the field. Cost effectiveness is always an immediate concern for planners, although a research technique which is not cost effective can generate proven criteria which then are easily applied. However, criteria development is a recent innovation in the field.

Lack of Theory and Application

The lack of theory not only creates the various confusions noted above, it also creates problems at the very basic level of data coding and interpretation. The relatively simple question "What does this mean" can quickly become convoluted. Appleyard (1976) illustrates this point,

> . . . it may be too easy for those who process the interviews to interpret the results in-house and impose their preferred interpretations on the evidence. This may have happened with the interviews reported here. (p. 290)

The possibility seems likely in view of the kind of concerns expressed to Appleyard from the professionals. "There was concern among the urban designers that the interview should not ask for attitudes toward future alternatives, because 'they might not understand them'" (Appleyard, 1976:289). Ordinarily a comprehensive theory would provide a basis for the kind of information that could be extracted from a sketch map. In its absence this has been done on an ad hoc basis.

Explicit procedures can serve as a stopgap on the in-house interpretation. This is the strategy used by Appleyard and Saarinen (Appleyard, 1976; Saarinen, 1976). However, there is no standardization evident between these efforts. While validity and even replicability are not really in question as long as reasonable procedures are maintained, the utility for the planner is seriously undermined. The procedures used for particular studies remain unpublished. Appleyard (1982) reports that his guidelines have long since been thrown out. The individual researcher is left to develop a unique set of guidelines, a process which serves only to further compound the problem.

Cost

The second problem associated with application is cost. There are no suggestions in the literature that the sketch map procedure is inexpensive. Instead, both the few major applications and the comments in the literature indicate that direct application is of limited and constrained utility because of cost factors.

Only four applications are in any sense useful and readily available to planners. The studies that are available are Lynch's Los Angeles Study (Lynch, 1976; Gould and White, 1974); Goodey's Birmingham Central Business District and associated studies (Goodey, 1974); Appleyard's Guyana Study (Appleyard, 1976); and a variety of work on transportation impacts done by Appleyard and various co-authors (Appleyard & Lintell, 1972; Appleyard, Gerson, & Lintell, 1981).

The first three are not useful under the suggestion advanced by Stea. However, they do demonstrate the special utility contained in having a collection of images. These three works managed to elicit insightful and clear images of the popular city and the approach has utility prior to a major redesign of a CBD or as a means of evaluation. However, Appleyard and Goodey make clear there is a major cost and time factor involved in coding the data. Of the four studies Goodey's and Appleyard's provide some examples for planners.

Goodey's efforts were a series of three imagery studies conducted through newspapers. Response was low; 87 out of 180,000 responded to an initial round of one study (Goodey, 1974:99). Goodey makes clear that the time involved was extensive and contrary to Gould and Whyte's claim that "interpretation of this map as a major planning tool is

misplaced and does not reflect the aims of this project" (p. 79). Instead, much of the intent was to examine the problems encountered in working with the media in a research project. These proved considerable. Also, a postal strike in one of the three experiments further complicated the responses.

While not cost effective, the approach taken by Goodey might be effective in another setting. Many of the problems involved changes in the format dictated by the local press which could be ameliorated by an individual familiar with newspaper layout. No attempt was made by the researchers to control exactly what the respondent was presented with. Thus, in one survey the reader is confronted with a blank in the map on the newspaper page which looks adequate for a response but is far too small for any meaningful detail. In the sixth paragraph of the second accompanying article the reader is asked not to fill in the blank, but to sketch a map on a separate sheet of paper. Goodey at one point remarks dryly about the press/researcher process: "not precisely my own words" (p. 101). He adds comments on the response rate: "As a total for three projects we are talking of a response of less than three hundred, which is scarcely something which should be subjected to cost-benefit analysis" (p. 100); and in data coding: "Although the three projects yielded less than three hundred replies, the analysis of even this amount of material forced a furious pace and safeguards lowered in the process" (p. 101).

The newspaper format was clearly experimental. Certainly it was not in any sense cost effective as far as the three studies Goodey ran were concerned. However, in the absence of any follow-up studies with

greater researcher control and similar inquiries into the American setting with its different media-readership tradition, the possibility for application in a productive setting is an open question. However, here again the data coding and analysis is likely to be equally a problem. Finally, Goodey had the availability of several researchers and analyzed primarily landmarks and paths, the easiest information to extract.

Appleyard's usage of the sketch map procedure throughout the series of street and traffic studies is, like Goodey's, on a less than scientific basis. In Livable Streets the emphasis is upon developing criteria for application in other locations. The primary reliance is upon secondary sources of information and the sketch maps are used to supplement these large-scale information sources. Here the maps are used to provide a picture of the human element. This is a qualitative, small sample application.

Appleyard's sample was stratified in terms of major variables, such as traffic volumes, income, and neighborhood stability. The respondents were asked about a very limited area and the data were coded by individual structures noted. Since only one block was examined in each category, there was a considerable savings in time and money at all stages. The initial study consisted of 36 interviews but was in keeping with the results from a 400+ large sample study, which speaks well for Appleyard's approach. Despite careful attention to quantification and interactive interpretation between the verbal and sketch map interviews, the primary use of the sketch map procedure was

as a series of secondary graphic displays and illustration of individual cases.

While it is of limited application in scope, it does provide an example of how a planner might proceed at a local level on a very specific issue. However, Appleyard's final report, Livable Streets, is very recent, and important questions may be raised in the future concerning the effort. In the few months since its publication commentary and criticism have not been forthcoming.

There is little direction within the literature for a planner who wishes to solve a particular local problem. The demands for time and personnel are apparently high for most possible implementations. Goodey's approach is possibly a cost effective one under certain conditions. However, its applications are limited. Appleyard's latest effort shows how the technique can be used to elicit qualitative supporting evidence. The qualitative approach is definitely a valid and worthwhile technique. However, more methodological approaches seem to have a limited utility. The available application suggests that they are most likely to be useful at a small scale, small sample level. There seems to be little if any marginal gain in larger samples in terms of cost and there are at this time no computer-assisted techniques which could ease data coding, which is clearly the major stumbling block. Comments throughout the literature emphasize the problem of cost. Appleyard (1976), who has conducted what is regarded by almost every reviewer as the most thorough research project, writes, "However, to interview large numbers of people is expensive. Field surveys and the collection of secondary data may be

more economical" (p. 290). Lynch is very pessimistic about the problem. In Managing the Sense of a Region he goes so far as to propose a process where information is gathered on an ad hoc basis and filtered into the planning process by advocates (Lynch, 1976:62-64). In the newest works by both authors there is a turning away from agency research and toward criteria development which has been a successful planning solution to cost problems in other issues such as environmental concerns. This approach suggests that there is some consensus amongst the planning professionals most familiar with the field that the techniques and approaches involved in environmental perception and mental imagery research are of very limited use in the field except in special situations and as a qualitative tool. Appleyard and Lintell (1972) conclude an early article with, "It is a pilot study . . . and does not pretend to be statistically significant" (p. 84).

Criteria

The failure to find direct applications to planning practice for research techniques is not a problem confined to the field of environmental perception and mental imagery. There are a number of other cases. Performance standards developed out of academic research and applied in a broad variety of different situations are a well known example. Various ratio techniques within economic analysis are used in place of carefully tailored local analysis. Within transportation numerous variations on the gravity model are used to allocate and update origin destination data in the absence of highly detailed and expensive local studies. The material on impact assessment abounds

with criteria developed out of more detailed case studies which can then be applied to local problems with considerable savings in time and money. However, tested criteria are not yet available to implement environmental perception analysis.

This is a problem which is present today but is likely to recede in importance. Both Lynch and Appleyard have very recent publications which attempt to fill the gap of criteria availability. Lynch provides city scale criteria in A Theory of Good City Form. This is a 1980 publication which was not readily available until spring 1981. Appleyard's Livable Streets is a 1981 publication. These works are discussed in more detail below. Both are too new to have been subjected to any major analysis or test. Until some consensus is reached, the problem related to criteria will persist.

Both Lynch and Appleyard previously have published works suggesting a variety of criteria which have received some commentary but have failed to produce application readily. In each of these cases there are special problems which are not present in the current proposed criteria. Lynch outlined a detailed structure for implementation at the regional scale. Here the work had a decided advocacy angle involved in the process. Further, the regional scale, while valid and important, represents an even larger cost factor because of the large scale involved. This, in addition to the advocacy position, apparently limited application and testing. At least no test cases were found in the literature. Appleyard's efforts in Guyana represent a problem in that the criteria he developed on imageability were based on the views from a culture decidedly different from that found in the

American city. While some testing of these criteria are recorded by Moore, a translation into the North American framework had to be accomplished prior to application, which increased the time lag. Here, too, there is a strong advocate position taken by Appleyard which may have contributed to a hesitancy to apply the findings in a traditional agency setting.

The problem of application within the environmental perception and mental imagery field is one of most importance to planners. This problem has three major subcomponents: lack of theory, cost, and lack of proven criteria. The lack of theory is likely to be an ongoing problem, albeit not necessarily a critical one for planning applications. The heavy cost demand limits the direct application of the sketch map technique to small scale, small sample situations. (There may be certain exceptions, such as ties with citizen participations as suggested by Goodey.) The lack of criteria is likely to be a short-term problem. Major publications which advance proposed criteria have become available within the last year. Whether these criteria will withstand the test of time is an open question.

FINDINGS

The field of environmental perception and mental imagery has developed a series of shared findings which offset the considerable problems outlined above. These findings take two forms. First is a shared assumption amongst the researchers which, following Moore (1979), will be referred to as the constructivist assumption. The second group of findings relate to what is now known about the

man-environment relationship. Moore's article cited above and an excellent series by Saarinen and Sell (1980) in Progress in Human Geography have provided much needed summaries of the existing research which were unavailable except on a piecemeal basis prior to 1979, and on which this effort relies heavily.

The constructivist assumption is a concept which seeks to explain the existence of mental imagery. While its origin lies in reactions to early attempts at empirical psychology, particularly Henry James, from the perspective of subjective experience, the particular version invoked by Moore is derived from the work of Piaget. Moore (1979) describes this paradigm:

> The basic assumption which underlies most of the recent theoretical and empirical work on environmental cognition is the constructivist assumption. This assumption suggests that the environment is conceived of in different ways by different people. There is no one "environment"--rather "environment" is a mental construct. The environment is imaged differently by different people as a result of different life experiences.
>
> Humans do not apprehend the nature of the environment directly but through a highly developed interpretative process. This process acts as a filter--a scheme in Piaget's terms--and it is these schemata which are the subject of environmental cognition research and theory. (pp. 34-35)

The constructivist assumption might be better called the constructivist process, for there is an active, even aggressive, role usually assigned to the constructive formulation which is best stated by Neisser (1976):

> . . . all information that is picked up, including proprioceptive information, modifies a schema. In the case of movement through the environment, this is an orienting schema or cognitive map. This means the cognitive map always includes the perceiver as well as the environment. Ego and world are perceptually inseparable. (p. 117)

This is clearly different than the early empirical views of consciousness such as James' stream of consciousness. In addition the process allows a place for freedom and dignity, in sharp contrast to classic behaviorism such as advanced by Skinner (1971) or the philosophy of Gilbert Ryle (1949, 1954). Finally, the constructivist assumption now goes farther than the tentative statement of Stea during the early years of inquiry:

> Further, we need not postulate an entity which would arouse the wrath of the late Dr. Watson. The mental maps of which we are speaking need not necessarily be "geography in the head"; indeed, they may be utter fiction--that is, there may be no reportable imagery at all--without the loss of heuristic value (Kaplan & Kaplan, 1978:45).

The constructivist assumption does make the claim that mental images exist--at least within some heads (Sommer, 1978). Further, it includes an element best phrased by Ricouer, "Are we not ready to recognize in the power of imagination, no longer the faculty of deriving 'images' from our sensory experience, but the capacity for letting new worlds shape our understanding of ourselves" (Thompson, 1981:181). Within the constructivist assumption is a strong, active imaging individual. Further it postulates an interactive dynamic process. The validity of the constructivist assumption, its dependence on mental images, and its extremely active role proposed for the individual consciousness is of little concern to most researchers. Instead the assumption has been adopted implicitly or explicitly. As such, it represents a first step in the solution to the theory dilemma currently plaguing the environmental perception and mental imagery research.

Moore (1979) provides the major summary for the second group of shared findings. He provides a list of five findings:

More concretely, it is possible to advance the following conclusions from the work of Lynch (1961) and from subsequent work of others working in the same vein:

(1) Many people think of the physical layout of cities in terms of paths, edges, nodes entered into, landmarks seen from a distance, and districts (Lynch, 1961).
(2) Some people think of the city primarily in terms of routes and build up a comprehensive representation based on routes, while others think of it primarily in terms of areas or districts with a lattice work connecting the various areas (Shemyakin, 1962; Lee, 1964; Appleyard, 1969a, 1970; Rand, 1969; Moore, 1973a).
(3) People's images of the physical and political geography of the world are in terms of easily remembered endpoints (the "Vladivostok effect"), easily remembered shape ("Italian gestalt"), location (Greenland), size or population (the USSR), distinctive islands (Madagascar, now the Malagasy Republic), ocean frontage (Sweden versus the Sudan), and clear and separate outlines (Peru versus Guatamala) (Saarinen, 1973).
(4) People seem to recall roadways and the physical environment of the trip in terms of the following, in order of primacy to memory: bridges, overpasses, the roadway ahead, toll booths, and other elements directly on the route; houses, industry, billboards, and other objects in the near perceptual environment; the skyline and distinctive buildings in the distance; topography; and landmarks; and memory seems to be a function of time in view, ease of putting a linguistic label on the object, object dominance, and general familiarity from past experience (Carr and Schissler, 1969).
(5) People remember buildings first in terms of use significance (settings for activity), then, visibility (siting considerations), and finally physical form or architectural characteristics (contour, size, shape, and so on; Appleyard, 1969b). (p. 37)

Saarinen and Sell (1980) primarily restrict their inquiry to new trends in geography. However, they cite Moore and agree with his summary. The establishment of these very basic sorts of conclusions move the field beyond the early stage of tentative inquiry. They serve to set direction for more substantive research and application.

These findings may seem insignificant beside the considerable problems in the field. However, they represent the field reaching

maturity and signal the end of an awkward and conflict-filled adolescence. The field of environmental perception and mental imagery is very much the heritage of planning. Certainly there had been discourse on imagery for thousands of years and the questions have a place in twentieth century philosophy. However, any empirical or scientific footing--in any sense of those words--dates from Lynch's original work. So in many ways what is evident is the speed of the impact of a planning innovation on the various disciplines involved. Lawerence Mann (1972) charts the movement in the other direction from various disciplines to planning application (p. 357). He finds the average per discipline ranging from 23.5 years to 31.2 years. Only 23 years have passed since Lynch's The Image of the City. In the consideration of Mann's findings the field is on schedule, or perhaps even ahead in terms of development. Intellectual innovation moves in terms of generations. This may seem slow to the individual observer. However, it must be expected and seems inescapable.

RECENT TRENDS

There are four recent trends and works which are likely to change the field of environmental perception and mental imagery. The first trend is represented by the work of Christopher Alexander in A Pattern Language which seeks to develop a language of Design. The second new feature is found in the careful experimentation and theory development undertaken by Kossalyn which addresses the validity of the constructivist assumption and the associated work of Kuippers. Third, the work of Lynch and Appleyard developes a new emphasis on criteria

and application. Finally, there is a loosely grouped series of writers, often called the humanists, who seek to place environmental perception and mental imagery into a very different perspective and tradition.

Christopher Alexander works within his own frame of reference. His pattern language is "fragments of a utopian vision that is primarily concerned with spatial form" (Lynch, 1981:76). The language and vision keep one part of Alexander's work in the context of Solerai or Le Corbusier. However, he also moves beyond this tradition. Alexander advances a series of interconnected models or patterns. These act like hypotheses for performance standards or design criteria. Both the utopian aspects and the patterns themselves are important to the environmental perception field. In a sense they are an inseparable synthesis between a conclusion tentatively advanced from the field and a working through of the spatial implications.

The utopian aspect of Alexander makes his work difficult. He speaks in metaphors and analogy. A few examples will suffice.

> For the Human mind, the tree is the easier vehicle for complex thoughts. But the city is not, cannot, and must not be a tree. The city is the receptacle for life. If the receptacle severs the overlap of the strands of life within it, because it is like a tree, it will be like a bowel of razor blades on edge, ready to cut up whatever is entrusted to it. In such a receptacle life will be cut to pieces. If we make cities which are trees, they will cut our life within to pieces. (Alexander, 1965:402)

There are other arguments against an ecological approach to cities. However, there are few that are so vivid.

The book, A Pattern Language, contains numerous similar passages. Alexander has no doubt that he is correct, seeks no proof

that is typical of a dialectic sense of discovery and proof. Consider this exerpt from A Pattern Language:

> There is abundant evidence to show that high buildings make people crazy. High buildings have no genuine advantages, except in speculative gains for banks and land owners. They are not cheaper, they do not help create open space, they destroy the townscape, they destroy social life, they promote crime, they make life difficult for children, they are expensive to maintain, they wreck the open spaces near them, and they damage light and air and view. But apart from all this which shows that they aren't very sensible, empirical evidence shows they can actually damage people's minds and feelings. (Alexander et al, 1977:115)

This passage is followed by a picture of the prominent San Francisco Insurance building (The Transamerica Building) and a quote from George Orwell's 1984 about an "enormous pyramidal structure of glittering white concrete," the Ministry of Truth (Alexander, 1977: 115). This approach and language create problems. However, the book is important because it seems to have freed the field from the tentative and almost meek attitude common through the 1960s and 1970s. Whether this is an actual effect or whether Alexander represents a crystalization of ongoing trends is open to debate. However, there is a change in attitude at least among the major researchers. Appleyard's early reports on what became the livable streets study are tentative. It is "suggestive" (Appleyard and Lintell, 1972:84). The final version published as Livable Streets is more certain. Similarly, Lynch's Theory of Good City Form differs from Managing the Sense of a Region in its more outspoken style and a willingness to take firm positions (Lynch, 1976, 1981). A purposeful strength has been added to the field in recent years and this dates from the Publication of A Pattern Language.

Beyond the inspirational character of Alexander's work there is a definite value contained in the "Patterns" concept. This is on the basis of two changes in approach. First, there is the "replacement" of needs with tendencies. Second is the cataloguing of the patterns and the sheer scope of the endeavor.

Alexander hopes to replace the needs concept found in design with the concept of tendencies. This is to say he wishes to base design on a behavior-oriented basis. If people tend to walk across an open space, then provision for that action should be made in the design rather than provision for the need to keep a vista uncluttered by pedestrian activity. Jarvis (1980) writes, "The basis of Alexander's approach was the replacement of the idea of 'need' (a generalized and imprecise statement of the kind 'people need. . .') with that of tendencies (an observable pattern of behavior)" (p. 59).

While Lynch raises some questions as to whether this is actualized, except at the very lowest scales of the pattern language, there is no question of Alexander's intent. He seeks to turn the design process upside down, to let human reality influence design and not design try to influence human action.

Unlike the replacement of needs by tendencies which is primarily addressed to the architect, the patterns themselves by virtue of the sheer enormity of the compilation address planners as well. Alexander lists and connects the various available approaches, especially the alternatives available at the city form level and the possible access to their human consequences. There are 253 elements in the language. The first 94 address the regional, city, or neighborhood scale. Here it is totally possible to connect the elements at

either of the three scales and develop scenarios for evaluation based upon Alexander's suggestions. This might provide a strong approach at the policy analysis level. Alexander's work can make a strong claim as the best place to start in such an endeavor based on the sheer volume of the alternatives contained within the language. It is the scope and the scale of the work which define its importance as a recent trend.

A Pattern Language is not without problems. Alexander is very loose with the research record. His language and approach are difficult for the reader more familiar with scholarly reports. His claim that he has produced a form for all cultures and all places and all times is at best an overstatement. However, even Lynch (1981), whose most recent effort is partially a reply to Alexander, writes:

> Yet this is a most important book--the first contemporary attempt of which I am aware to be explicit about the good spatial environment as a whole, and the reasons for its goodness. The patterns themselves are full of much good sense, especially for our own culture and situation. (p. 285)

The theories are untested but the attempt has been made.

Kuippers and Kossalyn provide a sharp contrast to Alexander. Both these researchers in artificial intelligence and cognitive psychology address the epiphenomenal question, the validity of the constructivist assumption. They do so by a combination of computer modeling and careful experimentation.

Benjamin Kuippers attempts to construct computer models of way-finding using mental maps. Writing in the LISP language, he has constructed a program which solves orientation problems on the basis of five categories: routes, street description, heading, boundaries, and

regions. The simulation runs successfully and demonstrates that a cognitive analog could exist. Like most artificial intelligence researchers Kuippers does not make the claim that computer simulation proves the existence of cognitive structures and processes. However, the close relationship between Kuippers' working model and Lynch's categories in The Image of the City taken together start to provide a strong artument for such a validity.

An excerpt from Kuippers' program illustrates his approach. The first section describes the "you are here pointer" which simulates the condition of a person in the environment. Note that not all categories need to be filled for the model to run.

```
YOU ARE HERE:
   PLACE:  (Place description)
   PATH:  (path description)
   DIRECTION:  (1-D orientation:  + 1 or - 1)
   ORIENT:  (coordinate-frame description)
   HEADING:  (2-D orientation:  0 to 360)
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
TURN:
   PLACE:  (place description)
   PATH 1:  (path description of starting path)
   DIR 1:  (1-D orientation on PATH 1)
   AMT:  (amount of turn)
   PATH 2:  (path description of resulting path)
   DIR 2:  (1-D orientation on PATH 2)
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
GO-TO:
   FROM:  (starting place description)
   TO:  (ending place description)
   PATH:  (path description)
   DIR:  (1-D orientation of travel on PATH)
   DIST:  (distance traveled)
```

A route description is a sequence of TURN and GO-TO descriptions leading from an initial to a final place. Since the world is continuous, the route description provided by physical observation must contain no gaps; i.e., a TURN must be followed by a GO-TO on the selected path, and a GO-TO must be followed by a TURN at its endpoint. However, a route description as stored and recalled may contain many kinds of gaps.

. . . . . .

```
PATH:
   NAME:  (name)
   ROW:  (partial order data structure)
. . . . . .
PLACE:
   NAME:  (name)
   ON:  (list of PATHs)
   STAR:  (local geometry data structure) (Kuippers,
1980:134, 136)
```

Kuippers' work with LISP is a trend which indicates the maturity the field as a whole is beginning to reach. This is a very recent trend and as such remains tentative. However, it is potentially an important one insofar as it begins to address very basic questions about the relation between man and the environment and what is perceived and needed by the individual from the environment.

Kuippers relies heavily not only upon Lynch but also upon Kossalyn. Whereas Kuippers seeks to model the large scale environment, Kossalyn directly addresses the constructivist assumption and the mental imagery side of environmental perception and mental imagery. Two of his findings are particularly important. First is the argument against the existence of imagery as epiphenomenal. Second is the work with what he calls "skeleton frameworks."

Kossalyn is involved in a lengthy debate with Zenon Pylyshyn over whether images are functional (i.e., the constructivist assumption) or merely epiphenomenal.

> . . . The issue here is whether images--their spatial properties--are "functional." If images are spatial representations, then to say that they are functional is to say that their spatial properties actually serve some purpose, play some role, in the system. (Emmet, 1981:4)

Kossalyn claims that imagery and especially visual imagery is an integral part of the human consciousness and cognitive system. Kossalyn

claims that images are "quasi-pictorial entities which can be processed" (Emmet, 1981:12). Pylyshyn takes the opposite view and, while the full debate is beyond the scope of this short review, Pylyshyn at this point seems too confined to arguing against Kossalyn's careful attack of computer modeling and cleaver experimentation. Pylyshyn (1981) writes:

> But if that is the case, then it is apparent that claiming an array structure places no constraints on the sorts of phenomena that can be accommodated--that is, that properties of this structure are free empirical parameters. Thus, although one may have the impression that there is a highly constraining core assumption (in Kossalyn's model) that is crucial to the predictive success of the model. (p. 43)

Kossalyn will in turn perform still another experiment, measuring microsecond response differences or perhaps on map scanning, and model these in ALGOL-80. His approach is seen in the following passage:

> Although it seemed unlikely, we worried that perhaps subjects somehow fathomed the purposes of the experiment (although they denied having done so) and so we conducted a more elaborate experiment. In the experiment, subjects first learned to draw a map of a mythical island that had seven objects on it. The objects were placed such that there were 21 distinct distances separating all possible pairs of the objects. After learning to draw the map, the subjects then were asked to image it, and to focus on a named location; each location was named equally often as the initial focus point. Following this, another name was presented; half of the time this was the name of another object. If so, the subject was to scan to that location and push one button; if it did not name an object on the map, he was to push another button. As expected, times increased lineally with actual distance to be scanned. (Kossalyn & Schwartz, 1977:267)

The debate is lively and fascinating. But the importance is that it is occurring at all and that the experimentation has been undertaken for the most part on the side of environmental perception and mental imagery.

Several experiments that Kossalyn has run have dealt with what he calls skeleton frameworks. Here the findings are more directly related to application. Kossalyn has found that individuals have a skeleton image, a sort of vague outline. Further, other parts of the total image are then "hung" onto the skeleton. Kossalyn writes:

> In order to model the constructive process, we were forced to assume that any given object may be represented in memory by more than just a single image and propositional file. We posited that all encoded objects have a "skeletal file," (or the "central shape" to which all else is attached). This file represents information encoded upon an initial look; in addition there may be subsidiary files representing "second looks." In this case, information about details may be represented by files subordinate to the skeletal file. The propositional lists associated with these files must note where on the skeleton the parts belong, and how it is attached. This structure was motivated by the finding that images of objects with more parts required more time to generate if the parts were created simply by cutting up the same object into more setments, and presenting the segments sequentially prior to imaging. (Kossalyn & Schwartz, 1977:275)

What is remarkable about these images is that the information contained is the same regardless of the scale. For example, a person who is asked to image a downtown and then asked to image a whole city will have no significant difference between the number of elements in the images, even if the downtown image is merely a subimage which is "hung" onto the image of the whole city. Kossalyn found great consistency among an individual's images, but considerable variance among the images of different individuals (Kossalyn & Schwartz, 1977). This represents a major new trend in that it moves the field into the examination of very measurable entities and away from qualitative analysis.

The third major trend is represented by the newest works from Lynch and Appleyard. A short review of their contributions are in order to put this new material in perspective.

The original work in the field of environmental perception dates from Lynch's The Image of the City. While there are some psychological and philosophical investigations early in the twentieth century, Lynch's contribution is that of a unique individual. The fact that there may have been four or five works prior to Lynch and several thousands afterwards is a testimonial to his contribution and originality. While many researchers have attributed much of Lynch's effort to the work of Boulding, Lynch did not encounter Boulding's The Image until he was finishing the Bibliography of The Image of the City (Lynch, 1982). Lynch's contribution has consistently been an innovative force in the field. Seldom has he left the cutting edge of the environmental perception and mental imagery explorations. His latest effort continues this tradition.

Appleyard, a student of Lynch's, has played a different sort of role. Where Lynch is innovative, Appleyard is precise. Where Lynch will take a stand, Appleyard will run one more statistical analysis. Lynch has developed the approach, the techniques. Appleyard, often working independently, has provided the sure footing of analysis and precise experimentation.

The most recent work by Kevin Lynch is A Theory of Good City Form. This is a wide-ranging effort which seeks to establish a normative theory for the urban setting. It is not enough to have well designed cities in the sense of Le Corbusier; instead the aim needs to be for a human city and a human-based design. In part this is an

answer to Alexander, and one appendix is called "A Language of City Patterns." However, the core of the effort is the second section of the book bearing the same title as the book itself.

In Part 2, Lynch outlines dimensions of performance for city form. Here Lynch (1981) makes the distinction between performance standards and his approach of performance dimensions:

> What we might hope to generalize about are performance dimensions; that is, certain identifiable characteristics which are due primarily to their spatial qualities and which are measurable scales, along which different groups will prefer to achieve different dimensions. It should then be possible to analyze any city form or proposal, and to indicate its location on the dimension whether by a number or just by "more or less." (p. 111)

Lynch develops dimensions for a wide variety of city elements. It is obviously his intent that a sense of comprehensiveness is needed. One of these dimensions is Sense. There are five components to Sense which can be measured and conceivably analyzed in a matrix form against other dimensions. The importance here is increased by a growing recognition that providing pleasant, livable cities is not merely a nice thing to do; there are definite economic consequences. This is true at the level of a single subdivision or major renewal project. Perhaps even more importantly it is true in the sense of marketing a livable city in the regional competition for industrial and major corporate location. Where labor costs and access are similar, as is common when a decision between specific cities in a given region is being made, the attractiveness of a particular location to middle management and upper management who will live there becomes a major concern. Lynch provides a framework for setting policy to achieve that goal.

Appleyard's most recent effort is narrower than Lynch's work. Over the last decade Appleyard has studied the impact of traffic on residential streets. This intense research focuses on three elements: a study of existing conditions and impacts in San Francisco, the English experience, and a case study of the Berkeley experience in traffic control. The solutions he proposes fit in closely with the planning process and range from mitigation strategies to an inventory of very specific alternatives and analysis procedures. Appleyard feels that the key to creating livable neighborhoods is managing the traffic flow through them. The sketch map procedure was used to analyze the initial study and a definite relationship was found between volume of traffic and the Sense of the individual street. Where Lynch provides an approach at the policy level, Appleyard provides a key to the implementation-oriented part of the planning process. Here the specific recommendation is that to maximize Sense, this sometimes elusive but marketable quality within the framework of a neighborhood, certain steps should be taken regarding traffic situations. (Appleyard et al, 1981)

The connection between imageability and Sense and traffic volumes is a new finding. In itself it is important. However, the recent trend represented by the work of Lynch and Appleyard is primarily significant in that it begins to develop more of an application orientation to the field of environmental perception and mental imagery research which is especially crucial to the planner. Both these efforts have yet to stand the test of time. They remain the first step and the most important of the trends discussed up to this point.

A final important recent trend which deserves mention is the connection to the Humanist movement. The wide range of theory dealing with environmental perception and mental imagery overlaps with the loose cluster of dissimilar writers often referred to as the Humanists. Saarinen and Sell characterize Humanist connections as a major new trend in their 1980 review: "The humanistic upsurge is part of a larger philosophical and social science movement that questions the basic components of the positivist scientific paradigms" (p. 531). In the larger historic sense the debate often has strong phenomenological overtones. While there are writers in the humanistic tradition who do not share the phenomenological background, it is those who do that have dominated the most recent upsurge, a phenomena which Saarinen and Sell characterize as "in full swing."

Giving an exact definition of a "humanist" is difficult. Heidegger (1972) claims, "Every humanism is either founded in a metaphysics or is converted into the basis for a metaphysics" (p. 341). Such a theoretical approach is valid and perhaps enlightening. However, two examples provide a more straightforward approach to definition, the humanistic tradition in planning and the historical basis for phenomenological humanism.

Planners are most likely to be familiar with the Humanism movement through the advocacy movement in planning in the 1960s and early 1970s and through the, for lack of a better term, "livability" movement.

The advocacy movement was humanistic in the way it questioned the basic concepts underlying comprehensiveness, such as singularity

in goal structure being replaced by the pluralism postulate. Certainly the flavor of humanism is present in ideas such as the planner advocate/organizer which was played out in a variety of settings. It is significant that the major planning researchers in environmental imagery and mental imagery clearly place themselves into the advocate role.

> For professionals such differences in perception and production are serious matters. They can unwittingly plan aspects of the environment that have no relevance to the population, while ignoring aspects that are critical. They can put life into a strait jacket for a time. They may unknowingly destroy or damage valued places or build white elephants devoid of meaning or subsequent use. Such misperceptions occurred frequently in Ciudad Guyana despite all efforts at comprehension. Indeed, they have probably occurred in every city, for professionals are still relatively ignorant of their public clients (Appleyard, 1976:2).

These sorts of statements from Appleyard are similar to much of what Jane Jacobs (1961) has to say about the planning profession. The language is milder and the time frame is a decade apart, but the thoughts are the same.

The advocacy movement contained the flavor of the humanistic trend. However, it lacked the sophistication and maturity found in the more recent humanistic effort. The theory and approach of these new theorists finds its application in a new trend within the planning profession, the "livability" movement.

There are some significant differences between the early advocate stances and the livability movement. Lynch, earlier an advocate, states one of the central keys to this difference, "I must confess to believing that outworn hearsay, the public interest" (Lynch, 1981:103). Whereas advocacy represented an attack on basic planning fundamentals,

the livability movement intends an expansion of methodologies and a sophistication of theory.

Unlike some of the writers in the field, such as Alexander, the livability writers search for a normative theory which is both functional and based on user group concerns. This is the quality in Lynch's most recent work that an early reviewer claims, "There is no way that I can do justice to Lynch's own 'place Utopia.' You will have to read it. You will not be surprised that it is foremost a humanistic vision" (A. Jacobs, 1981:357). There is an element of "vision" involved in the livability literature. However, this is a different vision or rather a goal whose value lies not in its achievement, but in the intrinsic value of the progress towards it. In this sense what is expected is a process, not an ideal future state, in which standards replace an ideal configuration.

Finally, the livability movement is characterized by an attention to application and validity. Appleyard's Livable Streets is one example of this. The East Tennessee Community Design Center's range of livable cities and livable neighborhood studies are another example. Both of these examples are primarily practical guides.

Appleyard's Livable Streets is a user-oriented document. The book is divided into three sections:

> Part One is entirely devoted to describing what it is like to live on streets; Part Two concentrates on describing efforts to create more livable streets; and Part Three summarizes the issues and proposes a series of strategies. (Appleyard, 1981:11)

Appleyard's purpose is clear, "This book has been written as much for the activist layman audience as for professional planners and transportation engineers." He concludes,

> At the same time, the quantitative basis for many of the conclusions is available in the summaries of findings and in the tables in Appendix A. The book should be useful, therefore, as an information resource for those who wish to know what the problems are and as a case book of experiences for the education of those who aspire to create more livable streets and neighborhoods. (Appleyard et all, 1981:12)

It is this dual approach, quantitatively sound but with a strong citizen education and user orientation, which characterizes the new humanistic trend in planning.

The work done by the East Tennessee Community Design Center is in a similar vein. The emphasis here is on the difference between this approach and the traditional advocacy process. The first work in the Design Center effort was a model Livable City report (ETCDC, 1978). This was then followed by a model Neighborhood Livability study (ETCDC, 1981). This is immediately recognizable as the traditional planning approach going from the larger scale to the smaller scale. The advocate approach was from small scale to large. A second major difference is the use of a review panel spanning the variety of interest groups. This is in sharp contrast to the advocate approach of organizing large groups and producing a "people's plan."

The Humanist planners as represented by the advocate movement in an early crude form and by the Livability movement in its most recent incarnation are the example of the humanist movement that is most likely to be familiar to planners. It is not surprising that the Humanist planners are most concerned with application as this is the primary concern of planners in general, but not of most Humanists.

At an interdisciplinary level most Humanists tend to be theorists. They share with the Livability movement the concern for

user groups. The extent and quality of this research is varied as was discussed earlier. In general, there are two branches to this movement, based on the particular historic branch of phenomenology adhered to.

Phenomenology is a concept which has been around for several centuries. The terminology is difficult at best. However, the approach may be very simply defined as placing a primary concern upon the human element of experience as a basis for theory, a return to the essence of human experience. The modern version of phenomenology has two major types or approaches, Husserlian and Existential.

Husserlian phenomenology, in the usage here, refers to the works of the originator of modern phenomenology, Edmund Husserl and the hermeneutical works advanced by Hans-Georg Gadamer and Paul Ricouer. It is significant that the clearly stated intent of Husserl is to place psychological inquiry into a more scientific perspective. Gadamer (1976) writes:

> Over against the dogmatic physicalism of Avenarius and Mach, Husserl's idea of phenomenology claims to be true positivism. This is also where the concept of "reduction" has its origin. He means to return to the phenomenologically given as such, which renounces all theory and metaphysical construction. (p. 146)

The latter works in hermeneutics represent an attempt to reconcile Husserl's intent stated above with many of his concepts which were left unfinished at the time of his death. In addition, there is an attempt to reconcile these ideas with the works of the major theorist from the Positivist tradition, Ludwig Wittgenstein. While as Linge points out the success of this effort is unclear, the intent to explore the human, subjective side of experience in a scientific

manner is present in the works of Husserl, Gadamer, and to a lesser extent in Ricouer (Linge, 1976:-xxvii-xxxix).

This trend is best represented by Courtise Rose. Her claim is that sketch maps should be regarded as text in Gadamer's sense or events in Ricouer's usage. They are not maps in any real sense of the word. Instead they are expressions of perceptions and the individual who drew them. This makes the isolated "map" virtually uninterpretable, except in the context of some sort of follow up. This approach implies a more definite procedure orientation in the data-coding process (Buttimer & Seamon, 1979). Rose's conclusion was cited and supported by Saarinen and Sell (1980) and receives some unexpected support from Lynch's contention that the language of city structure, if it is ever fully developed, will probably be a graphic language (Lynch, 1981:351).

The Existential alternative is diametrically opposed to the Husserlian alternative. This branch starts with Merleau-Ponty and continues through the classic existentialists, Sarte, Malurex and Camus. Here the approach is highly individualistic and does not allow for the compatible development through statistical modeling. While Ponty (1972) still allows that phenomenology is the search for the rigor of science he adds to this definition, "but it also offers an account of space, time, and the world as we 'live' them" (p. 317). The treatment is that the last three are separate from the rigors of science and demand a different approach. Here, also, is found strong Marxist ties which characterized some of the existentialist writers.

David Seamon provides the best example of this trend. Working almost exclusively from the works of Merleau-Ponty he has constructed a definitive volume called A Geography of the Lifeworld. Placing the existentialist phenomenological assumptions in the social arena, Seamon (1979) comes to conclusions such as the following one:

> Conventional scientific methods require statistically proper procedures as a prerequisite for legitimate generalization. Groups used for study are subject to carefully defined sampling requirements. Phenomenologically, one person's situation speaks for the human situation at large. (p. 181)

It is the dependence on the individual or on small nonrandom groups which characterizes the research which attempts to back up the existential position. This is in sharp contrast to the theory seen in Courtise Rose's hermeneutical approach.

The philosopher Heidegger stands between these two camps and several humanist theorists depend heavily on his work. Buttimer, who approaches Heidegger through the "lifeworld" concept, is probably best classified as being in the Husserlian tradition. Tuan, who depends on the existential symbolism founded in Heidegger's work, as well as Eastern influences, is definitely in the existential category.

There are other humanist writers. However, it is the phenomenologically oriented humanists, and particularly those in the Husserlian tradition, who have started to seriously question the intent of much of the work in the environmental perception and mental imagery field. They are doing so in a sophisticated manner.

The Humanist tradition provides two major implications for a planner concerned with urban form. First is a change in the way short

range and small areas plans are approached. The second involves Design districts.

The humanist perspective suggests that the small area approach on the short term time frame needs a strong "contextual" element. The treatment of separate systems is inappropriate. Instead, there needs to be a close integration between aesthetic, use, and infrastructure systems. Further, this would need to be done uniquely in each area based on the demands, needs, and tendencies of the local population. This claim of the Livability movement, with theoretical backing from Husserlian position, is in contrast to the existentialist position which would justify a design-oriented approach since each individual speaks for the human condition.

The second implication is that the Design District approach is misdirected. The Husserlian postulate would hold that it is not some architectural form--which would be based on an ideal--but the function and use which interact with individual and group at least in the small areas setting. This casts serious doubts on the qualifications of expert architects to sit on a review board. Instead, it implies a heavy front end research approach. Design Districts would then be individually tailored.

Beyond these specific impacts some Humanists seek to challenge very basic assumptions about scientific approaches. Space and distance, for example, are not constant when used to model human behavior; instead, gravity models need to be corrected with perceived distances. It questions the applicability of basic research techniques which separate value judgments from the individual's perceptions. For

example, preference scales about preferred environments examined separately from the images of that environment are suspect. Some of the writers in the field seek to undermine the very basis of scientific perspective, as was seen in the Bowen quotes. However, any maturity and sophistication is new. It is unclear whether the major trend in the humanist movement will be a direct challenge or an addition to the current practices, as is suggested by the Livability movement and Husserlian theorists. Ricouer's general advice is best heeded, "We shall for the time being refrain from going through that half open door" (p. 181).

The four new trends all represent untested theories. In each case the importance lies in the new direction itself and the need for such attempts to be made. These new trends reflect what is a growing sophistication in what is still in intellectual terms a new field. Which will continue to develop and which will be supplanted remains to be seen.

SUMMARY OF LITERATURE REVIEW

Environmental perception and mental imagery is a large and complex interdisciplinary field. It is plagued by substantial problems in theory, terminology, and application. Only in very recent years have conclusions been reached which can be called shared findings. Even more recently four trends have developed which could change the field considerably. It is these findings and new trends which provide the context for this project. While a new maturity is evident, there is no guarantee that a solution will be found to the considerable

problems. For the planner these problems obscure much of the possible utility. However, environmental perception and mental imagery, as it is approached today, rests primarily on the work and inspiration of a planner, Kevin Lynch. As such, it is the first major impact of the still young planning profession on the academic community at large. This in itself should encourage planners to keep an eye on the advances being made and the debates undertaken.

CHAPTER III

METHODOLOGY

INTRODUCTION

The methodology attempts to guide explorations in four broad areas. These are detailed in Chapter I. The primary objective is the comparison of a group of planners and a selected sample. A secondary related goal is to examine the claim that planners either ignore or misunderstand the views of citizens. Thirdly, the study hopes to combine several analytic techniques in a reinforcing manner. Finally, this study hopes to demonstrate a low-cost, small sample approach to environmental perceptions.

The basic research approach was a comparison of the responses of two groups, planners and users. The total population of planners working on downtown was surveyed insofar as was possible. A systematic sidewalk sample was taken of the second group. Major subgroups were identified in the users groups. Two broad areas were examined, the cognitive system and the identification of desirable and undesirable areas. The first area was analyzed by "Image/Form," organization, shared "images," and element distribution or information space. The second examination was by problem and district identification. The total methodology was dependent upon a number of constraints and objectives.

CONSTRAINTS

There were three limitations on this research: (a) a scarcity of time, (b) a lack of funds, and (c) a diversity of possible analytic techniques. The impact of these factors indicated a small sample, use of non-parametric techniques, and multiple data analysis approaches. These steps are compatible with the objectives listed in Chapter I and do not represent a major compromise.

RESEARCH APPROACH

The research approach is divided into two parts, the survey and the data analysis. The survey is a straightforward process constrained by financial and time limitations. The data analysis is more complex. This is necessitated by the need to integrate a variety of techniques available in the literature.

The Survey Process

The survey process consisted of respondent selection, survey development, pretest, and interviews. In addition to the factors mentioned above, this process was facilitated by the researcher's previous efforts and by good basic data on pedestrians downtown developed by the Center City Task Force (Center City Task Force, 1974). This background greatly facilitated the process of balancing the survey according to anticipated subgroups within the user groups.

Respondent selection. The two groups of interest to this research were planners working in downtown and the downtown user group. The method of selection for each group was markedly different.

The total population of the planner group was sampled insofar as was possible. The population was determined through consultation with Frank Turner, Director of Planning at the Metropolitan Planning Commission (MPC). This list was then checked in consultation with other planners. The total population was initially estimated at 20 to 40. The following operant definition of planner guided this selection:

> The power of planners mostly arises from their specialized knowledge and position within a bureaucratic structure. If the planning system is seen as one having a centre-periphery structure, then planners clearly occupy the centre and furthermore occupy it on a permanent basis. They have at their disposal all the resources of bureaucracy. These resources include the ability to collect, interpret and disseminate a vast amount of information about the authority's environment. . . . Closely related to the planner's role as informant is his role as communicator. The authority as a whole sits at the centre of a very extensive communications system. This consists of interlocking systems of relationships such as the political arena of councillors and their party organizations, and the set off clients, customers and resource providers for a variety of goods, services and demands like housing, community centres. . . . The outputs of a local authority constitute another position of power. (Gold, 1976:39)

The user group is larger and more complex. An initial sample was taken in a systematic sidewalk survey. Two minutes elapsed between each respondent selection. On the basis of known pedestrian routes, four sites were selected as sample locations. These sites were:

1. Market Square Mall
2. Miller's on Henley
3. Union and Gay
4. UAB Plaza.

Difficulties were encountered at the UAB site. These included breezes around the building and increasingly bad weather conditions.

Attempted substitutions were made. However, the success of these were marginal. Most of the uncodable and non-spatial responses to question one came from the fourth sampling site.

Each location required at least 2 days to generate the targeted 20 responses. Preliminary data analysis was conducted simultaneously. This process showed no connection between reason for being downtown or sample location. For this reason a secondary sample of residents was not taken.

Survey development. The initial survey was adapted from a suggestion by Kevin Lynch as indicated in Chapter I. This version has gone through several adaptations based on initial pretest, suggestions by committee members, and a final pretest conducted at Miller's on Henley. The instrument went through three major changes during this period, primarily involving the initial question.

Pretest. The pretest was conducted in two stages. The initial pretest was conducted over a period of months under a variety of settings. This was followed by a pretest at Miller's on Henley. The pretest served to validate most initial assumptions and to improve the interview technique.

The initial pretest involved 24 people under a variety of conditions. While most of the results validated the initial assumptions, several findings differed from expectations and influenced the final instrument and the interview technique. These observations were:

1. People tended to overrespond to "please characterize an area" questions, including full paragraph responses.

2. The subjects' willingness to answer the sketch map question increased when the question was placed in the context of a "game" or situation.

3. Graduate planning students generally made poor respondents.

The final pretest involved 15 people interviewed in the setting of the actual survey outside Miller's on Henley. The results reinforced the initial pretest and added some specifics related to the on-street survey. These are:

1. The necessity of providing a table.

2. Most subjects had difficulty marking the area choices on the map.

3. Street names created a major problem for most people; several spent more time trying to remember names than taking the survey.

The pretest was generally encouraging. The findings of the pretest were incorporated into the final questionnaire.

Final survey. The final survey was conducted as outlined above. The survey itself consisted of the instrument contained in Appendix A and an informal follow-up. The process itself was encouraging. However, weather conditions were at best marginal.

The instrument proved generally adequate. However, there were problems associated with three questions. The question asking educational level in terms of years in school seemed to confuse older respondents. Reason for being downtown did not account for workers who were shopping at the time of the interview. Finally, the income question contained a typing error which was hand corrected and may have

contributed to inflated income estimates. However, the response to the key question, the sketch map question, exceeded expectations. This is covered in detail in the data analysis section.

An informal follow-up was made after each interview. This was done to assist in the understanding of the sketch maps and the areas identified. Most often this process was initiated by the respondent who would talk as the sketch map was drawn or start a conversation after the instrument had been filled out.

The process itself was encouraging. Many respondents obviously enjoyed the first two pages of questions and said so. Almost all finished the sketch map within the allotted five minutes and seemed interested in what was to them a new and unusual technique. This was in sharp contrast to most other on-street interviews undertaken by this researcher. A qualitative review of response quality is contained in the Data Analysis chapter.

Data Coding

On the basis of the sketch maps a series of maps was developed for the planner group and each of the major subgroups isolated in the user groups. These maps are referred to as composite maps to separate them from the original responses.

The first map to be constructed was the base data map. This is simply the aggregate responses of the sketch maps shown on an available base map of the downtown area. It shows the locations of the environmental elements noted by the respondents and the frequencies of the notations expressed both as a percentage of possible responses and as

a summation of individual responses. For the purpose of this map and the other maps described below, the environmental elements were coded as a street block, or a logical division of a block.

The second map constructed was the shared images map. This was a composite map showing the features which were noted by 60 percent or more of each analysis group. The third map contained the problem and desired areas identified in the second section of the questionnaire. This map was done in a manner similar to the base data map.

Data coding is a special problem within the field. The original intent was to follow Appleyard's procedures. However, these are no longer available, as was noted in the Literature Review. Appendix B contains further details on the data coding process.

Analysis Methodology

The data analysis procedures fall into three categories:

1. Intra-group analysis
2. Inter-group analysis
3. Value analysis.

The intra-group analysis separates the user group into internally defined subgroups. The inter-group analysis compares the user groups found in the first analysis to the planner group. The final analysis attempts to trace consequences associated with the "image" of downtown across two variables, identification of liked and disliked areas and characterization of those areas. Specific tests are discussed in the Data Analysis section.

Intra-group analysis. Each group was analyzed for internal differences among major subgroups. For example, differences in degree or specialty may be related to differing perceptions among planners. Major subgroups indicated by the intra-group analysis on the user group form the foundation for the inter-group analysis between the planners and the users.

Both groups were examined for major internal subgroupings. This was done on the basis of background variables and selected perceptual differences as found in the sketch maps. These selected items from the sketch maps became in effect proxies for the differences in cognitive systems. The proxies were the areal extent of the responses, and the level of detail included.

The subgroups found in the planners group were not included in the inter-group analysis as a separate subgroup as was the case with the subgroups found in the users sample. Instead planner's differences were treated qualitatively and possible implications were noted. The total population in the planners group was too small to allow a systematic treatment of possible subgroups.

Inter-group analysis. The inter-group comparison examined four proxies related to the cognitive system. A general analysis of image and form closely followed Lynch's original work. A second concern was organizational structure. Both the order of the responses and a comparison of the response to the templates developed by Appleyard were used to examine organization. Third, the shared images were examined. Finally, the distribution of the element responses was analyzed.

The initial analysis was for the perceived images of the downtown. This analysis was derived from the sketch maps and the base data map. It was essentially qualitative in nature.

This initial analysis involved structuring the forms of downtown through the framework developed by Lynch. In The Image of the City, Lynch developed a "vocabulary" of urban form dependent upon the "syntax" of the environmental elements. This was a highly qualitative process which depended heavily upon the sensitivity and skill of the individual researcher. The responses gathered in the survey were translated into Lynch's format and the planners' responses compared to those of the major user subgroups.

The initial analysis sets the stage for latter comparisons. While form is crucial to any understanding of perception and some understanding can be gathered using this approach, the usage of this technique here is to provide comparability to other research projects and is preliminary to the more complex analysis to follow.

The form analysis followed the image analysis. Here the impact of the form of the CBD on the images was examined. The examination was subjective, qualitative, and tentative. The purpose of this analysis was to tentatively examine the actual CBD's impact on the images.

The organizational analysis had two stages. The first stage was unique to this research and examined the order of the responses in terms of Lynch's vocabulary. The second stage used Appleyard's templates to examine differing organizational styles within the maps

themselves. Both these investigations represented a more in-depth and complex analysis than the examination of form.

The second analysis took the order of the environmental element responses as a proxy for organizational framework. The proxy selection was logically consistent with the artificial intelligence work done by Kuippers. The first two elements considered in the context of Lynch's vocabulary were recorded for each respondent. This created 20 non-repetitive categories (i.e., paths/nodes, landmark/path, etc.). However, the pretest indicated that the number of operational categories would be considerably smaller. The subgroups were compared for variation from the planner group.

The organizational and order inquiry examines the way people manage their images of the downtown. This two-step inquiry bridges the gap between the initial qualitative analysis and the essentially quantitative investigations to follow. At this level the format of the analysis is qualitative. However, the data analysis proceeds on a statistical basis.

The original responses to the sketch map section of the questionnaire were fitted to the organizational styles outlined by Appleyard. These templates are ordinal in character along two dimensions, linear and spatial. Thus, they may be said to be ordered into eight categories varying along the degree of generalization. In practice the procedure is less arbitrary than it appears initially--due to the thoroughness of Appleyard's research. Each subgroup was compared to the planners' results.

The analysis of shared images was more quantitatively oriented than the previous examinations. The base data map for the planners and the major user subgroups provided the input into this step. Two procedures were used, overlays and examination of shared elements.

The shared images analysis first constructed a series of maps showing the images shared by each set of groups and the images unique to each group. This allowed a visual inspection. The second analysis categorized elements as either shared or unique. This dichotimization allowed an investigation on a statistical basis. A measure of association was then used to determine the degree of relationship between group membership and number of shared elements.

The investigation of element frequency and number moved past the general levels of organization and form. Here the examination focused on the elements themselves, a proxy for the content of the cognitive images. The next analysis step investigated the spatial extent and amount of the information in these images.

The technique used to analyze the spatial distribution depended heavily on the concept of information space developed by Gould. This procedure was adapted through the substitution of the sketch maps for the similar but less flexible techniques used by Gould. The procedure allowed interval analysis of the original data.

Gould's original technique constructed an isometric map showing information distribution across Cartesian space. The number of responses for a given environmental element can be expressed as a percentage of all possible responses. This percentage then becomes the value of a specific coded location. The values can then be connected

by isolines to form a three-dimensional surface or be treated as a more conventional isometric, such as a topological map. Either situation is readily illustrated by the ASPEX program or by available Apple software.

The investigation of information space will take the environmental element responses and express them as one of Gould's values. Comparison can then proceed between the user groups and the planner group. A specific implementation of Gould's approach was prohibited by the specific data collected. The alternative detailed below was substituted. Conceptually, it relies heavily on Gould.

The analysis methodology has three stages: a visual display, a test for similar distributions, and a test for significance of differences.

The initial stage is similar to the earlier maps produced as part of the shared images procedure. This examination maps the degrees of differences in values for the elements.

This is followed by a test for similarities in distribution. Here observations were considered as elements and the value taken to be responses per element expressed as a percentage value. The resulting number is an information proxy.

The final stage is a test for significance of mean differences of values. This is an internal test which accesses relative levels of information across the distribution of elements.

Value analysis. The final attempt was to analyze values associated with the images as was revealed by the identification of

problem and preferred areas and characterization of those areas. Here the examination is speculative.

The first stage is the identification of areas selected by each group and the associated frequencies. Differences and similarities will then be enumerated.

The characterization responses, the adjective, analysis intended to examine the value used in determining area identification and assist in guiding a final conclusion. Unfortunately, unexpected responses prohibited this inquiry, except in a highly tentative manner. This prohibited treating the last stage as a decision process. The problems associated with the adjective analysis are covered in more detail in the data analysis section.

SUMMARY

The research methodology is a comparison of users' and planners' "images" of the Knoxville CBD. An on-street survey of users and an office survey of planners were conducted after a lengthy pretest. The data analysis strategy moves from qualitative to quantitative. It combines several analysis approaches in a reinforcing manner.

CHAPTER IV

DATA ANALYSIS

INTRODUCTION

A great variety of analytic techniques exist which could be applied to the responses collected. Based on the literature review and the particular formulation of the research question, eight approaches were initially selected. These approaches range from simple qualitative review to more conventional quantitative methodologies. It is hoped that the combination of techniques in a single study will provide a more comprehensive examination of the material solicited through the interview process.

Several of the approaches initially selected had to be altered or replaced. A specific implementation of the information space concept outlined by Gould and White (1974) proved incompatible with the data collected. To use this technique it is necessary to assume a continuous surface of values. However, the response revealed a discontinuous value pattern, and to interpolate the collected values to model a continuous surface would have involved assigning several values to individual buildings, i.e., one value at the door, a second value 30 feet inside, etc. The graphic analysis of information space as pursued by Gould was incompatible with the realities of the small area research project.

A second technique which was replaced was the examination of relationships between extent of the sketch maps and areas in

identification. This approach was called into question by Lynch's report that positive and negative formulations of the sketch map question elicited different sorts of responses (Lynch, 1980:69). In addition Kossalyn's work with the "skeleton" frameworks modeling casts doubt on the meaning that could be assigned to any such analysis. This is supported by a recent article by Kuipper (1982). All three sources were reviewed after the initial formulation of the data analysis approach.

Finally, a part of the examination of element number which addressed the non-spatial aspect of the responses was eliminated. The intended analysis was very close to the use of element number as a basis for subgroups designation. As there were no significant subgroups found on the basis of element number, the related technique later in the data analysis would have produced the same conclusion and was thus extraneous to answering the research question.

In each case a substitution was made to preserve the intent of the effort toward demonstrating the supporting nature of the analytic techniques. The final selections are detailed above in the Methodology section.

QUALITATIVE OVERVIEW

There was some question that the on-street sample and limited time of the responses would adversely affect the quality of the responses. While there was evidence of fatigue in the last part of the questionnaire, the sketch map responses were of better or equal quality to those which have been published. Appendix C shows some sketch maps

collected during this research and examples of maps solicited during other projects. Some of the on-street maps exceeded the quality of the planners' sample which was administered in a more amenable office setting. The relatively high quality was a pleasant and unexpected result, especially in consideration of less than ideal survey conditions encountered in late November through January.

ORGANIZATION

The data analysis chapter is organized into three broad subsections. These sections are:

1. sample characteristics
2. subgroups analysis
3. inter-group comparison.

The first section, sample characteristics, is approached from an internal standpoint and in comparison to other research projects. The second section, subgroup analysis, examines the major breakdowns of the user sample gathered in the on-street interviews. The third section, planners and subgroups comparisons, consists of six related analyses. These six are:

1. Image/Form
2. sequence/organizational style
3. shared images
4. information space
5. area analysis
6. adjective analysis.

A discussion of these techniques is provided in the methodology above.

SAMPLE CHARACTERISTICS

The sample was examined both in terms of the internal variables and in terms of the relationship to samples found in other research projects.

The interview included 124 individuals. Twenty-four of these were involved only in the pretest and thus do not enter into the data analysis process. Twenty-four were planners. The remainder were solicited in the on-street survey and constitute the user group. An additional 15 individuals were involved in a final pretest outside Miller's on Henley Street. However, this pretest primarily involved specifics of the interview technique, such as the need for a table and interaction with the respondents, as opposed to the survey itself.

User Characteristics

A total of 76 individuals agreed to take the survey. This is approximately one out of four who were asked to take the survey. Nine of these individuals either dropped out after reading the first question, or more often produced a nonspatial response to the first question. Nonspatial responses are valid, but could not be analyzed. Sixty-seven individuals completed all or most of the questionnaire and constitute the major basis for data analysis. The small number of dropouts and nonspatial responses is significant and is addressed below.

TABLE 4.1

SAMPLE CHARACTERISTICS

Perceptions of Downtown		Downtown Rediscovered
68%	20-39 years old	65%
58%	Male	60%
37%	Live in W. Knoxville	30%
68% (over 3 years)	Length of residency	50% (1-5 years)
50% (shopping)	Reason for being downtown	80% (work)

The characteristics of the usable sample were strikingly similar to a much larger on-street survey taken as part of a Spring 1981 Synthesis class at the Graduate School of Planning. The comparable characteristics found during the Downtown Rediscovered Synthesis Project and in this project are shown in Table 4.1. The differences between the higher shopper levels are probably due to a different phrasing of the question. When shoppers who report frequent trips downtown are included in the workers' sample, the percentage working downtown approaches 80 percent. Many workers also shop downtown. In this project respondents who answered that they were shopping right now, but also work downtown, were coded by the first response, i.e., shopping.

Sample Relative to Other Studies

The sample group in this project was markedly different than the samples found in other similar projects. Lynch's initial study concentrated on office interviews. "But because articulate volunteers were needed for these early efforts, the sample was quite unbalanced as to class and occupation, being primarily middle-class, professional and managerial" (Lynch, 1960:152). Appleyard's Guyana sample comes from a very different culture. Other researchers depend heavily on student populations (Saarinen, 1976; Gould, 1976; Richardson, 1981; Stienitz, 1968). Still other researchers have relied heavily on very young respondents (Ladd, 1970). Conclusions reached on this basis could well differ greatly from those developed out of an on-street survey.

The sample was also different in the responses to the sketch map question. Both the low number of drop-outs and the quality of the

responses were exceptional. This is especially true in consideration of the inherent constraints of the on-street interview format.

Numerous researchers have reported difficulty in getting responses to the sketch map question (Appleyard, 1976, 1981). Sommer even goes so far as to suggest that a large number of people simply do not visualize images. "People who think in images often doubt that others do not. People who lack imagery, on the other hand, are skeptical that anyone has it" (Sommer, 1978:1). Goodey experienced considerable difficulties with the sketch map question (Goodey, 1974). One-third of the respondents in Appleyard's Guyana study were unable to produce any sort of map "even after extensive coaching" (Appleyard, 1972:282). In consideration of the research record, a drop-out and nonspatial response total of only nine individuals is exceptionally small.

Even more striking than the high response level was the quality of the responses to question one, the sketch map question. It was anticipated that these would be of lower quality than those found in other projects due to the on-street interview format. However, this was not the case. Instead, the quality of the responses was generally above those found in other projects. This may be partially explained by the extensive pretest. A more likely explanation is that since the question was directed toward a small area the responses were more detailed as a result. This second explanation seems likely in view of Kossalyn's finding that information remains constant across scale. Thus a map with five elements at a city scale would be too vague to

have great value, but a map with five elements showing only one block face might be quite useful.

Summary

The sample group is not large enough to statistically infer results to the total population. While the random selection process was followed and similarities between the characteristics of the sample with samples found in other recent research give reason to believe that the results are probably representative, a conservative approach prohibits such a direct claim. Further, differences between this sample and other samples in related research projects should be considered in weighing any results against conclusions previously advanced. Finally, the sample differed from other projects in terms of a low non-response rate and an unexpected high quality of spatial (i.e., mapped) response.

INTRA-GROUP ANALYSIS

Both the user group and the planner group were examined for major subgroupings. The existence of significant subgroups is suggested in the literature (Lynch, 1981); Appleyard, 1976; Moore, 1979). Lynch (1960) writes, "There seems to be a public image of any given city which is the overlap of many individual images" (p. 46). However, sociological or economic variables have been hard to isolate. Kossalyn (1976) and Sommer (1976) suggest that sociological variables may not play a major factor. The planner group was analyzed qualitatively with only characteristics enumerated. The user group was subjected to a more detailed analysis.

The planners were a varied group. Fifty-four percent had plan- nine degrees, 16 percent were architects, and 29 percent had degrees in other fields. The average planner was a white male earning between $15,000 and $35,000, and had been in town for 14 years. The group was about evenly split between private and public sectors. With a high degree of consistency the planner group had not taken the Knoxville Heritage Tour or ever heard of Kevin Lynch. The group totaled 24 respondents. They produced 21 usable responses. Three of the initially identified population were not interviewed. Two were unavailable despite five phone calls. One had moved. In one case, only one of two partners was interviewed.

The planner group was typical of what one might find in any city, except that the vast majority of those holding advanced planning degrees had attended The University of Tennessee.

The user analysis proceeded through a comparison of areal extent and level of detail (see Appendix B) against the background responses solicited on the last two pages of the questionnaire. A comparison was also made between extent and element number to check for the influence of the data coding process and for the impact of other than socio-economic variables.

The first two examinations looked at the effect of social economic variables against two ways of dichotomizing sketch maps, areal extent and level of complexity. Areal extent is the perceived extent of the CBD as indicated by a response. Three classes were initially developed to categorize areal extent. One response may be either less than or equal to or greater than the base map (see Figure 4.1). The last two categories were combined. The level of detail is

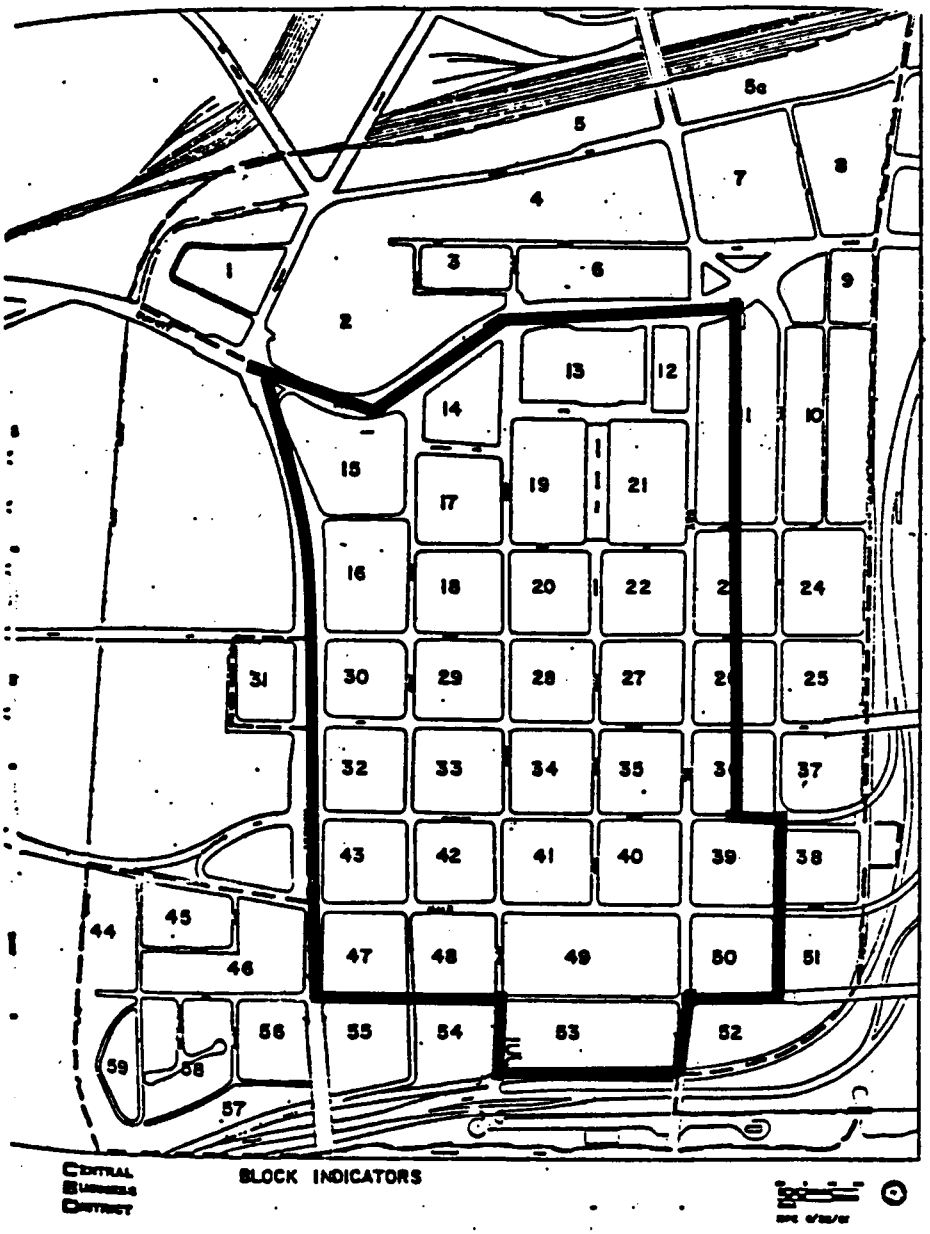


FIGURE 4.1

BASE MAP

a proxy which looks at how many environmental elements (see Definitions, pp. 2-3) are contained within a given response. Once again the process is determined through an interactive data coding approach.

There is a crucial relationship between the two approaches. In logical terms there is a possible but not a necessary connection between areal extent and level of detail. This means that the larger a perceived boundary, the more environmental elements could be included. However, there is an equally valid argument that larger boundaries are a function of greater generalization and, in fact, level of detail is constant only within the individual. This is the position of Kossalyn covered in the literature review. Here both approaches were developed independently and coded independently. They function as independent approaches. There will be a check for mutual dependency in the second section of the subgroup analysis, areal extenr vs. level of complexity.

Level of Complexity

The first analysis explored the relationship between 12 social-economic and activity variables and the level of complexity within the sketch map responses. A first run was made using Guttman's asymmetric lambda (lambda a) which treated the level of complexity as a series of independent "interval" categories. This showed no relationships. A second run was made which collapsed level of complexity into categories such as 0-9, 10-19, 20-29, etc. Two relationships were found:

1. a moderate relationship between age and level of complexity (lambda a = .457)

2. a low moderate relationship between occupation and level of complexity (lambda a = .294).

Both relationships fail to explain over 50 percent of the error.

Areal Extent

The areal extent analysis examined the 12 variables and their relationship to the perceived extent of downtown. Lambda a was again used. The areal extent analysis produced consistently lower values than did the level of complexity. The highest observed relationship was with age (lambda a = .294).

Summary of Social-Economic and Activity Analysis

Both attempts to divide the responses into subgroups produced very low relationships. There is a possibility that the small sample size may be a factor. While the sample size is well into the median range for environmental perception and mental imagery research and is extremely large for a single researcher, it is low for social research.

Areal Extent vs. Level of Complexity

Other possibilities exist. Social-economic variables do not enjoy any status as major factors in environmental perception and mental imagery research. Instead, unknown psychological factors, sometimes considered as a complex interplay of social variables, are more commonly found. Another possibility is that the two classes are mutually dependent. The next analysis examined these possibilities.

Lambda and Lambda a were used to examine the possibilities. Sommer's d was also used to improve the results by an interpretation on the ordinal level. Several possibilities were examined.

1. A high symmetrical relationship in combination with two high asymmetric relationships would indicate a mutually dependent relationship.

2. One high asymmetric relationship would indicate selection of the variable held independent as the key variable for further analysis.

3. A low Sommer's d in combination with the conditions in 2 above would indicate that further analysis would not be profitable beyond the nominal level.

The symmetrical lambda yielded a value of .4. However, lambda a with level of complexity as the independent variable yielded .074. This was one of the lowest values found during the subgroup analysis. Holding extent as an independent variable yielded .750. Thus condition 1 is not true and the classes are independent. Also, condition 2 is true and areal extent is the key variable. Finally, Sommer's d yielded a .8 value with areal extent as the independent variable. Thus condition 3 is not true and further analysis beyond the nominal level is potentially profitable.

To reiterate, the areal extent vs. level of detail analysis indicated three conclusions:

1. Areal extent and level of complexity are functionally independent.

2. Areal extent is the key variable.

3. Analysis is potentially profitable at levels higher than the nominal level.

To ease analysis by balancing subgroup size, a decision was made to use two subgroups:

1. Subgroup 1 (group 1) which contains responses with an areal extent less than the base map (Figure 4.1).

2. Subgroup 2 (group 1) which contains responses with an areal extent equal to or greater than the base map (Figure 4.1).

Subgroup Summary

Two subgroups were found based on the perceived areal extent of downtown. The division is in keeping with Kossalyn's postulate and suggests some psychological factors are a larger determinate than the elicited socio-economic factors. However, there were definite differing tendencies between the two groups (see Table 4.2). This suggests that the importance of socio-economic variables is minor, or involved as the complex interplay of a multiplicity of variables. A larger sample may have been able to improve the analysis. Social-economic factors may play a role which is obscured by the small sample size.

INTER-GROUP ANALYSIS

The inter-group analysis is a bettery of examinations which were outlined in the methodology section. The tests for statistical significance were all conducted at the .01 level of significance. They follow the same series of research hypotheses. This series is:

1. H_0: There is no difference between the planner group and group 1 as shown by the variable examined.

   H_1: There is a difference between the planner group and group 1 as shown by the variable examined.

2. H_0: There is no difference between the planner group and group 2 as shown by the variable examined.

   H_1: There is a difference between the planner group and group 2 as shown by the variable examined.

3. H_0: There is no difference between the group 1 and group 2 as shown by the variable examined.

TABLE 4.2

SAMPLE CHARACTERISTICS BY SUBGROUP

	Variable	Group 1	Group 2
1.	Residency	73% Knoxville	44% Knoxville
2.	Reason for being downtown	46% shopping	55% shopping
3.	How often downtown	46% more than once a week	52% more than once a week
4.	Mode of transportation	76% car	70% car
5.	Section of town	39% west	50% north
6.	School	65% 16 or more years of school	67% 16 or more years of school
7.	Length of residency	80% more than 3 years	46% 1 to 3 years
8.	Graphics training	73% NO	71% NO
9.	Taken Knoxville Heritage tour	83% NO	95% NO
10.	Drawn a map before	88% NO	100% NO
11.	Occupation	39% blue collar or low skill	40% white collar
12.	Income	56% under $15,000	50% over $15,000
		Extent less than base map n = 46	Extent greater than or equal to base map n = 21

H_1: There is a difference between group 1 and group 2 as shown by the variable examined.

The measures of association which are used in this analysis are conducted at the .01 level and categories such as "low" and "moderate" are taken from Champion's guidelines (Champion, 1979:302). The shared hypothesis and levels of analysis are intended to introduce a greater consistency between the various examinations.

Image/Form Analysis

The first level of analysis was the examination of the Image and Form of the perceived downtowns. This analysis is qualitative in nature and follows much the same guidelines as Lynch's original investigations. This was an attempt to provide a context for most of the following investigations and should not be underrated, because of its lack of rigorous analysis.

The noticeable absence of nodes was intentional. In such a constrained area as Knoxville's CBD, the difference between nodes and landmarks is difficult to determine and undoubtedly would vary between researchers analyzing the same data. Nodes in both Appleyard's (1976) and Lynch's (1960, 1976) works tend to appear as an element of the sequential urban experience, such as a strip commercial district. It would be easy to conclude that nodes are not relevant to the CBD experience. While that conclusion may have validity, the absence of nodes in this research is a result of a conservative approach to the data. Here nodes and landmarks have been grouped together and both are referred to as landmarks.

The images of all three groups differed. The planner group tended to agree most with user group 2. However, the planners' mental maps also contained elements of the views held by group 1. Other elements such as east-west paths and minor landmarks tended to be found only in the planner group. The image maps are shown in Figures 4.2, 4.3, and 4.4. A CBD base map is shown in Figure 4.1, page 86. No scale is shown, as techniques to produce image scales were not employed.

There are shared elements among all three of the groups. Most of these are congruence in the estimation of major landmarks. Other similarities relate to the grid system and the neglect of State Street.

All three groups rank the TVA towers as a major feature of the CBD. Not surprisingly the EXPO 82 site was included with a high frequency by all three groups. The site was under construction during the survey and associated construction projects were in progress throughout the CBD. A lesser landmark, Miller's, received a consistent rating from all three groups, 12-1/2 to 25 percent. The City and County Building is located on the south end of the CBD. This structure received 50 to 75 percent ratings from both on-street groups. The planner group rated this structure slightly higher. The United American Bank building received an identical treatment. The user group gave Market Square Mall high ratings. However, it received a slightly lower rating from the planner group.

Inclusion of the grid pattern within the CBD was common to all groups. However, there was significant differences between the three groups as to the exact location, extent, and nature of the grid.

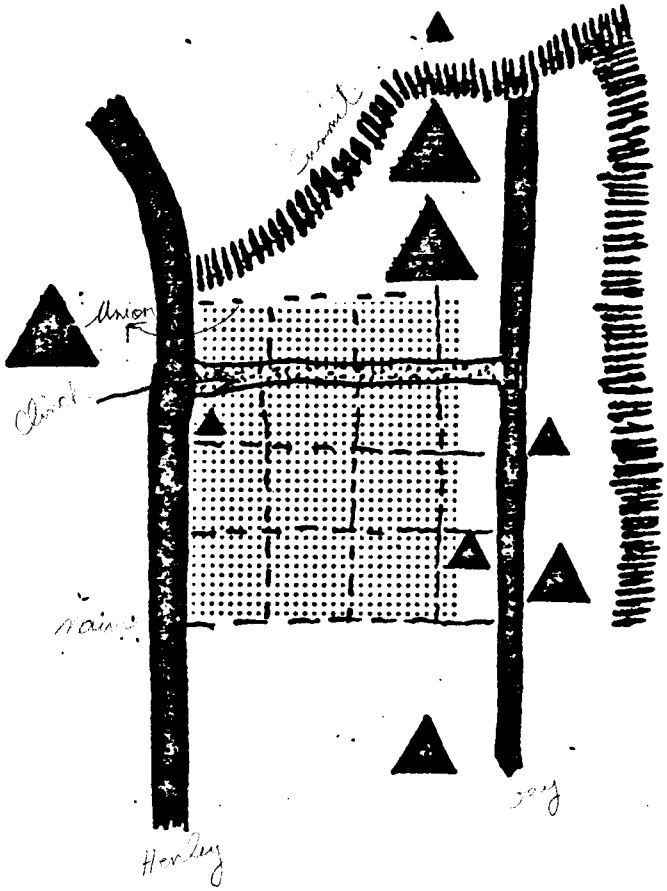


FIGURE 4.2

GROUP 1 IMAGE
(EXTENT LESS THAN BASE MAP)

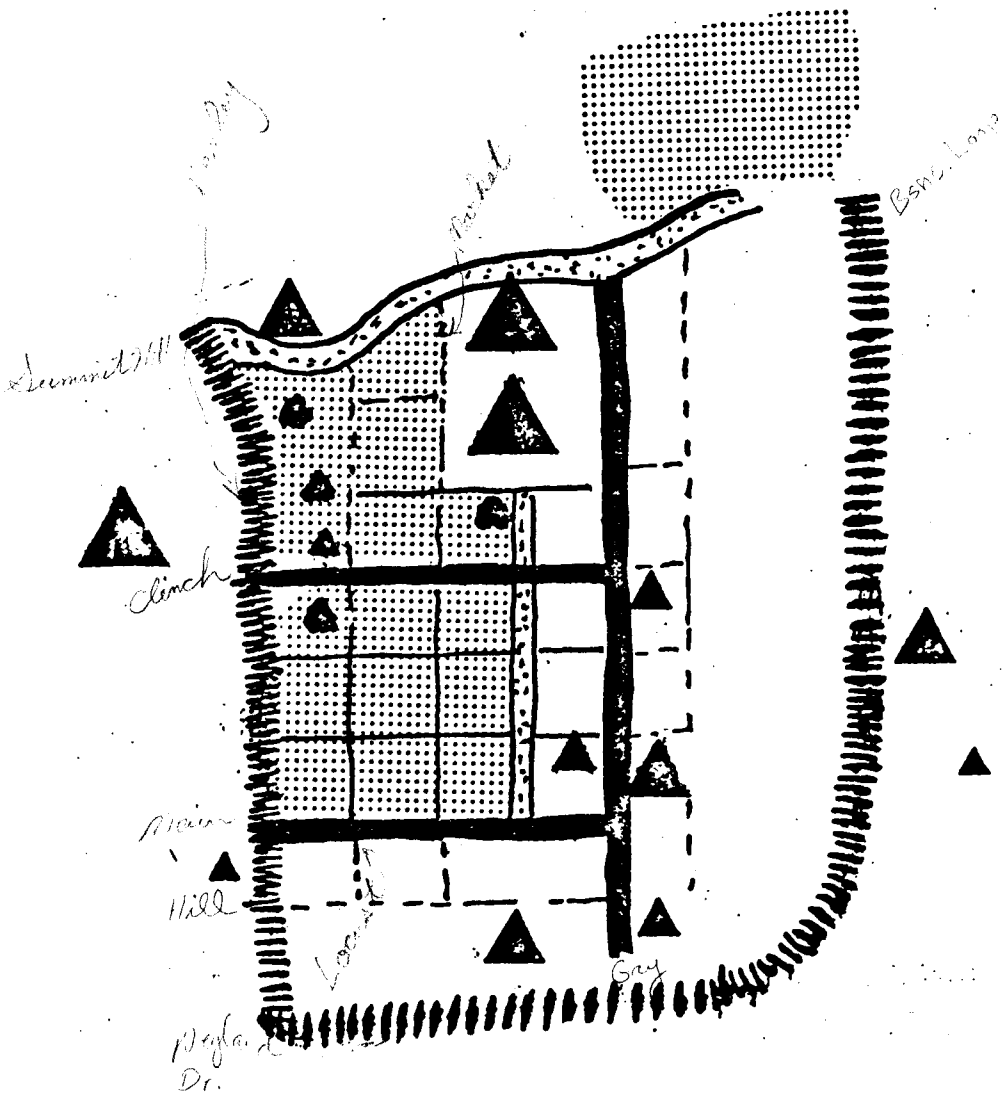


FIGURE 4.3

GROUP 2 IMAGE
(EXTENT EQUAL TO OR GREATER THAN BASE MAP)

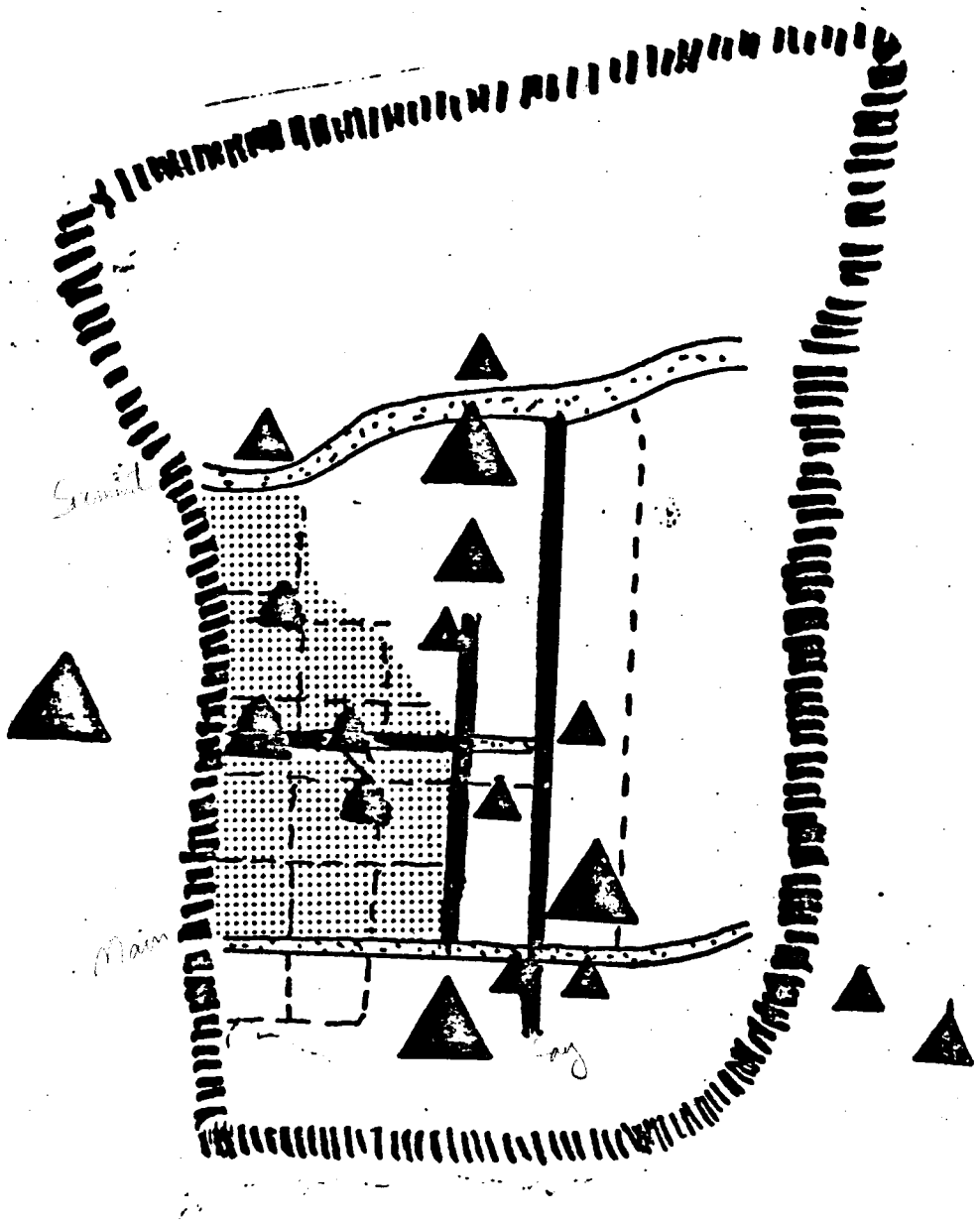


FIGURE 4.4

PLANNERS' IMAGE

Despite this, the grid itself was a major element in the responses solicited from all groups.

The final congruence in responses was the treatment of State Street. State Street was given a low rating by groups 2 and planners. Both were under 20 percent. The first user group excluded State Street completely from the CBD borders, even though they included the Civic Coliseum which lies across the business loop from the heart of the CBD as a landmark.

Differences. The planner group differed from both the user groups in a number of ways. The planners' responses were different than the subgroups in terms of boundaries and specifics of the grid system. However, in each of these cases the differences also appeared in the subgroups themselves. Both user groups differed from the planner group in terms of east-west paths and the inclusion of historic landmarks.

The group 1 respondents gave little emphasis to the grid system. While included, it was a secondary concern; it was only marginally a part of the CBD. This group located the grid system between Main, Gay, Union, and Henley Streets. It is an undifferentiated area without significant landmarks.

The group 2 responses treated the grid system differently. For this group the grid was larger, extending to Summit Hill on the north, but confined to the area east of Market Street. There was a tendency to extend the grid southward to Hill Avenue. However, this was not consistent throughout the group. Finally, several landmarks were

indicated within the grid system, and the grid was split between the north and south sections along Clinch Avenue.

The planner group placed less emphasis on the grid than did group 2, but more than group 1. Like group 2, the planners divided the grid into a north and south section. Here the division was along the proposed East-West Mall, and the distinction between north and south sections of the grid was more definite. The planners excluded from the grid section the triangle immediately west of the TVA towers, but did extend the grid itself to Summit Hill on the extreme northwest boundary.

The three groups treated boundaries differently. Where it is easy, and correct, to speak of the CBD as being well bounded in a geographic sense, this is not the case in a perceptual sense.

Group 1 placed the east boundary of the CBD somewhere east of Gay Street and west of State Street. The boundary lay between blocks and is marked by the sharp fall in elevation. There was no definite southern boundary for this group. Instead the maps tended to "drift off the edge." Both Henley and Gay Streets were shown apparently crossing the river; but with the exception of the City and County Building, there were no responses south of Main Street. Surprisingly, the east edge received similar treatment. Henley Street was treated as a path, and the Expo site appeared as a landmark east of Henley Street. Once again there was no definite boundary. The north of the CBD was well bounded in contrast to the south and east. Here the boundary followed Summit Hill to the TVA towers and then swept

southward to exclude the Kendrick Place and the residential uses on Locust Street (since demolished).

Group 2 placed the boundaries in more definite locations and closer to what one might expect in a geographic perspective. The east boundary was the Business Loop. The south boundary was Neyland Drive. The west boundary was Henley Street. However, the Expo site was included as an outlying district of the CBD. The north boundary was less defined than the other three. Group 2 treated Summit Hill as a path, but excluded the Summit Hill areas from the CBD. Thus, Summit Hill west of Gay formed a weak boundary. East of Gay, the Jackson Avenue/Vine area was included in the CBD by this group and the limited role of Summit Hill as a boundary was diminished. There was no northern boundary along the north-east CBD.

The planner group placed the boundaries of the CBD in a manner similar to the group 2 responses. The north, east and south boundaries were almost identical. There was some marginal difference in the south and east boundary intersection. Here planners tended to connect the two boundaries. There were two patterns to this connection. The first was to connect these at a 90° angle. An infrequent response was to curve inward to exclude Maplehurst east of Henley from the CBD. Unlike the second group, the planners identified the north boundary as the Southern Railroad/I-40 Interstate. This approach was similar to what night be expected from a geographic analysis of the CBD boundaries.

The differences in boundaries of the CBD were extreme. Group 1 responses indicated a much smaller CBD than either group 2 or the

planner group. The latter two groups sketched more defined and geographic responses than did group 1.

The user groups perceived the east-west paths and the importance of historic structures differently than the planner group. While these differences are more striking in the comparison of group 1 and the planner group, they are contained in both groups 1 and 2.

The planners placed the major east-west path as being the proposed but uncompleted East-West Mall. Both groups 1 and 2 placed this path on Clinch Avenue. There was a slight tendency among planners to place this path in connection with Market Street as dividing the CBD into four more or less equal sections. Group 1 treated Clinch as a permeable edge beyond which the grid system breaks down. Group 2 treated Clinch as a major path nearly as prominent as Gay and Market which serves to divide the northern grid section from the more distinct southern section of the grid. There was no indication on any of the users' maps that an east-west corridor in combination with any north-south path divides the CBD into four sections. This is in sharp contrast to a number of planners' maps.

Historic landmarks were assigned different roles by the planner and the user groups. In contrast to Evans, Smith and Pezdek (1982), the "older" group 1 listed only two historic landmarks, the Bijou and the Tennessee Theatres. Group 2 included the Arnstein Building/Union Cafe, YMCA, and Kendrick Place. The only historic structures without significant use patterns included by group 2 were Blount Mansion and the old City Hall. However, this group did include the Jackson Avenue district which is on the National Historic Register. With the

exception of Jackson Avenue, the planner group included the same historic landmarks as group 2. In addition, they included the Customs House, White's Fort, the Andrew Johnson, and the old County Courthouse. They did not include Blount Mansion. The planners' historic landmarks tended to reflect current projects. In contrast the user groups reflicted primarily use and, in the case of group 2, architectural coherence in combination with emerging use significance.

The perceptions solicited were two-fold. First, there was a shared infrastructure of major design elements. Second, there was variance in perceived boundaries, landmarks of secondary importance, and the nature of the grid of east-west paths between groups. This shows that although there is a basis for common understanding, there is a potential for significant confusion over what is the CBD. This is true not only between planners and citizens, but even more so between differing user groups.

Form analysis. The relationship between the responses to the sketch map question and the observable downtown showed apparently drastic differences between the groups. The role played by the form of the downtown on the images is at this stage of analysis more subjective than the examination of the images themselves. Nine observations are advanced based on the relationship between the images solicited and the numerous walks through the CBD taken by the researcher from Summer 1981 through Spring 1982. These nine observations are discussed below.

1. Group 1 tended to focus on the Gay Street area. This is the historic retail core of the CBD. They routinely excluded

residential areas from the CBD. For this group one part of the definition of the CBD is the absence of residential usage at street level.

2. Group 2 treated landuse differently. Here the focus was divided between the Market Street area and Gay Street. This group also included Jackson Avenue as a major part of the CBD. Here the residential areas are isolated. Maplehurst was excluded. However, the Union and Locust residential node was included as a separate district. Where the first group tended to hold the historic pattern of the CBD, the second group built their image upon pedestrian access and use. Thus for this group Henley Street was a barrier--as opposed to a path--and the southern commercial section of the grid was split from the northern residential and mixed-use section.

3. The planner group tended to be closest to the group 2 responses. They split between the two sections of the grid. However, the split is along a proposed, but uncompleted, project, the East-West Mall. Jackson Avenue did not make a significant appearance, nor did State Street. For the planners the CBD is a well bounded area with larger expanse than was seen in the other groups.

4. Architectural elements appeared to play an insignificant role in shaping the "images" of the CBD. However, architecturally coherent districts such as Jackson Avenue had some impact.

5. Large scale design elements had a visible impact on the responses. This was evident in the Market Street corridor with the highly visible TVA towers on one end and the City-County Building on the other. The grid system was another example.

6. Use seemed to play a significant role in the responses. This was especially true of street level use. Parking lots disappeared from the "image" of the CBD. State Street, which serves as a parking area for the CBD on the southern end, was a forgotten area. With the exception of the Jackson Avenue region, there were no references to the upper stories of any structure within the CBD which were not major landmarks, such as the UAB building or TVA towers. This is surprising when one considers that the upper stories of buildings were visible to the on-street respondents while they were taking the survey, and many would even glance around them while they were drawing sketch maps.

7. Historic structures were virtually absent from the users' maps and played only a minor role in the planners' responses. Again the exception was the Jackson Avenue area in group 2's responses and structures with definite use, such as the Bijou, Tennessee Theatre, and Union Cafe/Arnstein Building. The controversial Fouche' Block received mention only from planners who work for or with the local Historic Society.

8. There seems to be some relationship between pedestrian traffic volume as outlined in the Center City Task Force study (Center City Task Force, 1973) and the responses solicited in the on-street responses. However, there may be a secondary variable involved. Some combination of pedestrian and vehicular volume may be more closely related.

9. There was a tendency for the planner group to perceive the East-West Mall in combination with Market Street as splitting the CBD

into four more or less equal sections. The perception that the mall system splits the CBD is one held exclusively by planners with an architectural background. It is also held by the researcher. However, it is in complete contradiction to the responses solicited from the on-street survey.

The nine observations on the role played by the form of the CBD on the responses solicited from the three groups are tentative. Generally there seems to be a concentration on the use, what Appleyard and Evans refer to as "use significance." In addition there is a definite role played by large scale design. Three unexpected relationships were found. First, there was a low emphasis on historic structures. Second, architectural considerations were virtually nonexistent in terms of their impact on the images. Finally, the East-West Mall concept found in some planners' responses seems to be totally incompatible with the perceptions solicited from the on-street sample. See also Towards A Livable Downtown (Weeks, 1982) for further details.

Image/Form summary. The initial analysis is qualitative. The images held by the subgroups are straightforward. The terminology and concepts are easily abstracted from the sketch maps and the approach has been replicated on numerous occasions (Evans et al., 1982). Key to the success of this method is avoiding treating the responses as geographic maps. Instead they are graphic representations, or messages (Buttimer & Seamon, 1979; Kuippers, 1982). Thus, the conclusions are necessarily tentative and nonspecific. The analysis revealed definite differences between the three groups. The planner group was

most similar to the user group 2. The first user group is essentially dissimilar in its responses to the other two groups. The role of the form of the CBD on the responses was tentatively examined. Differences were found between the groups. As with the image analysis, group 2 and the planner group exhibited a greater similarity than did either group with the responses of group 1 in terms of form.

Organizational Analysis

The second stage of analysis was the examination of the statistical significance between organizational styles used by different subgroups. The first test examined the sequences used to draw the sketch maps. The sequence was taken from the vocabulary developed by Lynch in The Image of the City. This was a nominal level investigation. The second examination was based on Appleyard's analysis of organizational styles in Planning a Pluralistic City. These templates can be considered as ordered according to complexity. Therefore, this second analysis was conducted on the ordinal level.

The X^2 analysis of sequence was conducted by collapsing the tables into two categories based on the first element indicated and application of Yates' correction factor. Category 1 was indicating a boundary first; Category 2 was indication of any other element. The analysis yielded differences between the planner group and group 1 (X^2 = 14.02, probability of .01). A slightly less dramatic result was found for differences between groups 1 and 2 (X^2 = 7.19, probability of .01). The probability associated with the X^2 for the planner and group 2 differences was significant at the .05 level (see Tables 4.3 and 4.4).

TABLE 4.3

SEQUENCE ANALYSIS

X^2 ANALYSIS

	Boundaries	Other Elements
Planners n = 21	20	1
Group 1 n = 43*	1	42
Group 2 n = 19*	11	8
Planners/Group 1		$X^2 = 14.02$
Planners/Group 2		$X^2 = 4.56$
Group 1/Group 2		$X^2 = 7.19$

*See data coding in Appendix C re classification of uncertain responses which results in slightly varying n sizes for groups.

TABLE 4.4

SEQUENCE ANALYSIS

Z TEST

	Boundaries	Other Elements
Planners n = 21	.91	.02
Group 1 n = 43	.08	.92
Group 2 n = 19	.58	.41
Planners/Group 1		Z = 15.08
Planners/Group 2		Z = 2.66
Group 1/Group 2		Z = 4.91

The tentative implication is that there is greater similarity between the planners' sequence responses and group 2 responses than between either the planner and group 1 responses or group 2 and group 1 responses. The differences between group 2 and the planner group were not enough to reject H_0.

The tentative result was then examined using the Z test. Here again the cells were collapsed into the categories of boundaries first and the broader category of any other element. "The Z test for proportion differences examines two samples and the proportionate distribution of some nominal dichotomous characteristic between them" (Champion, 1981:227). The test was for significance at the .01 level.

The Z test results supported the tentative result from the X^2 test. Differences were found between the planner group and group 1 responses (Z = 15.08, probability of .01). Differences were found between the group 2 and group 1 responses (Z = 4.91, probability of .01). A lesser difference was found between the planner group and group 2. Between these groups a low Z value was estimated of 2.66. This is inadequate to reject the H_0 that these groups are similar. This advances the tentative conclusion found in the X^2 analysis that the planner group and group 2 are more similar to each other in regard to sequence of responses than either group is to group 1.

The examination of sequence used two statistical tests to determine the significance of the differences among the three groups. X^2 was used with Yates' correction factor to test for differences at the .01 level of significance. The Z test for proportions was employed for a similar test at the same level. In both cases the tables

were collapsed into two nominal categories, drawing boundaries first and drawing any other element except boundaries first. In both cases the results showed considerably more differences between the responses of group 1 and those of the planners and group 2 than between the responses of the planners and those of group 2. In the case of the X^2 test the difference between the planner and group 2 responses was not significant to reject H_0. The Z test showed no significant differences at the .01 level between the planners and group 2.

Organizational styles. The examination of organizational styles is closely related to the sequence analysis. The styles are based upon the work done by Donald Appleyard in Guyana which were published as Planning a Pluralistic City. The Templates are shown in Figure 4.5. Here the examination employs the Kolmogorov-Smirnov (K-S) Two Sample Test. Appleyard outlines eight organizational frameworks which are marginally ordinal in complexity. These function as two sets of ordinal-related patterns--one based on sequential organization styles; the second based on spatial organizational styles. It was anticipated that sequential styles would not be solicited in the context of a CBD study. However, a small number of sequential maps were found. These were all within group 1 and are not included in the investigation.

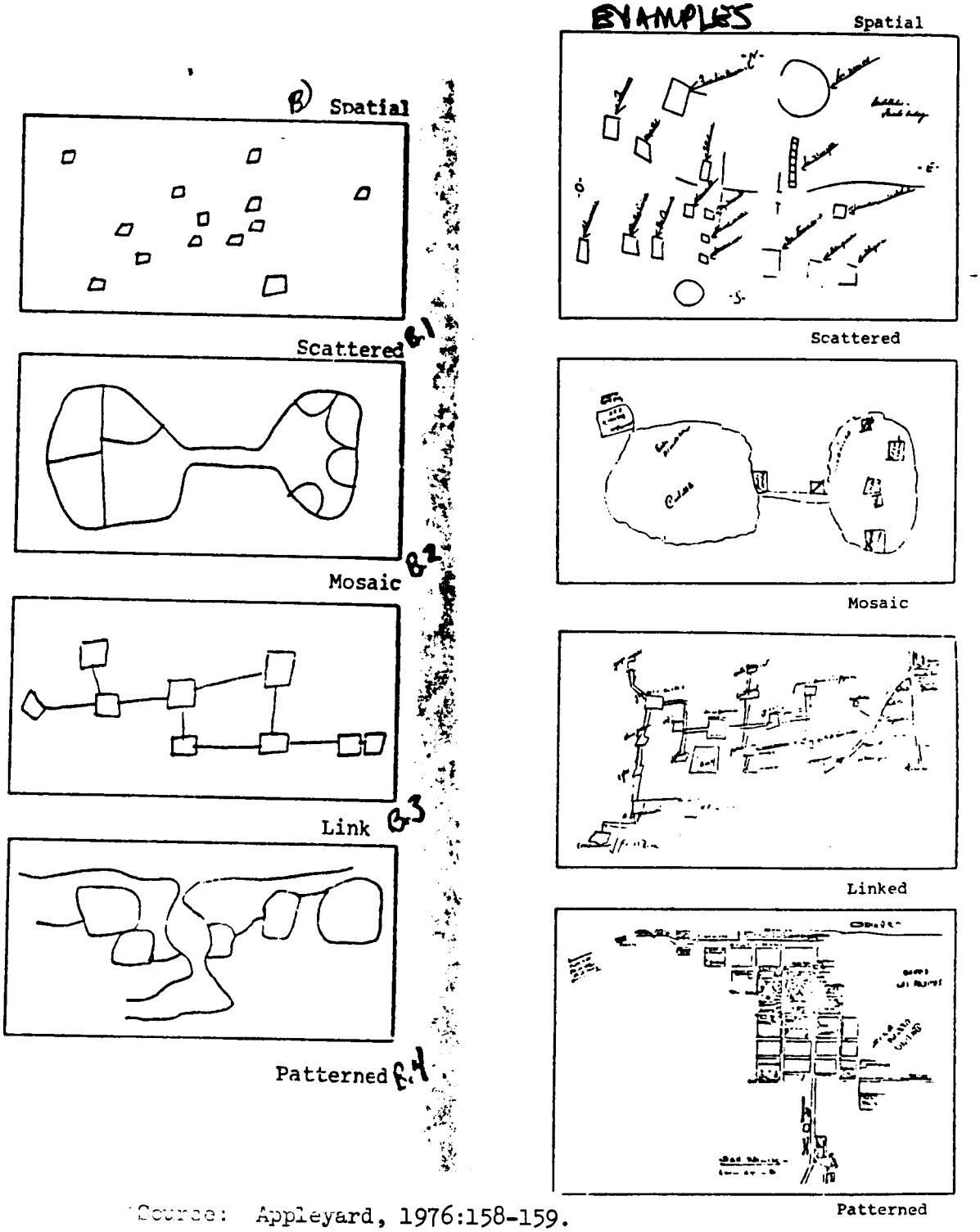
The analysis using the Kolmogorov-Smirnov Two Sample Test supported the previous examination of sequence (see Table 4.5). The differences between the planner group and group 1 was large (D = .67, critical value of D = .43, probability of .01). An even larger

TABLE 4.5

ORGANIZATIONAL STYLE ANALYSIS

	Scattered	Link	Mosaic	Pattern
Planners n = 21	5%	19%	24%	52%
Group 1 n = 43	-	4%	19%	66%
Group 2	72%	7%	19%	2%

	D Values	Critical D
Planners/Group 1	.67	.43
Planners/Group 2	.81	.42
Group 1/Group 2	.25	.49



Source: Appleyard, 1976:158-159.

FIGURE 4.5

ORGANIZATIONAL STYLES AND EXAMPLES

difference was found between groups 1 and 2 (D = .81, critical value of D = .42, probability of .01). However, no significant difference was found between the planners and group 2 (D = .25, critical value of D = .49). The K-S test revealed a more dramatic distinction between the similar responses of the planner group and group 2 and the dissimilar responses of group 1 along the variable of organizational style.

Summary of Sequence and Organizational Style Analysis

The subgroups identified in the subgroup analysis were compared to the planners' responses along two variables, the order of the responses to the sketch map question and the style of the maps in terms of Appleyard's templates. Two statistical tests were used to examine the sequence analysis. The X^2 statistic with Yates' correction factor was used for an initial analysis of sequence. This produced the result that there was a greater difference between the group 1 responses and the responses of the other two groups than between group 2 and the planner group. This trend was verified by the Z test for differences in proportion which found no significant difference at the .01 level between the planners and group 2 according to sequence of responses.

Both the difference between group 1 and the planner group and group 2 and group 1 were found to be significant beyond the .01 level. This conclusion was further supported by the analysis of organizational styles using the Kolmogorov-Smirnov Two Sample Test. Here the resultant D values exceeded the critical value of D only when differences involving group 1 were examined. No significant difference was found

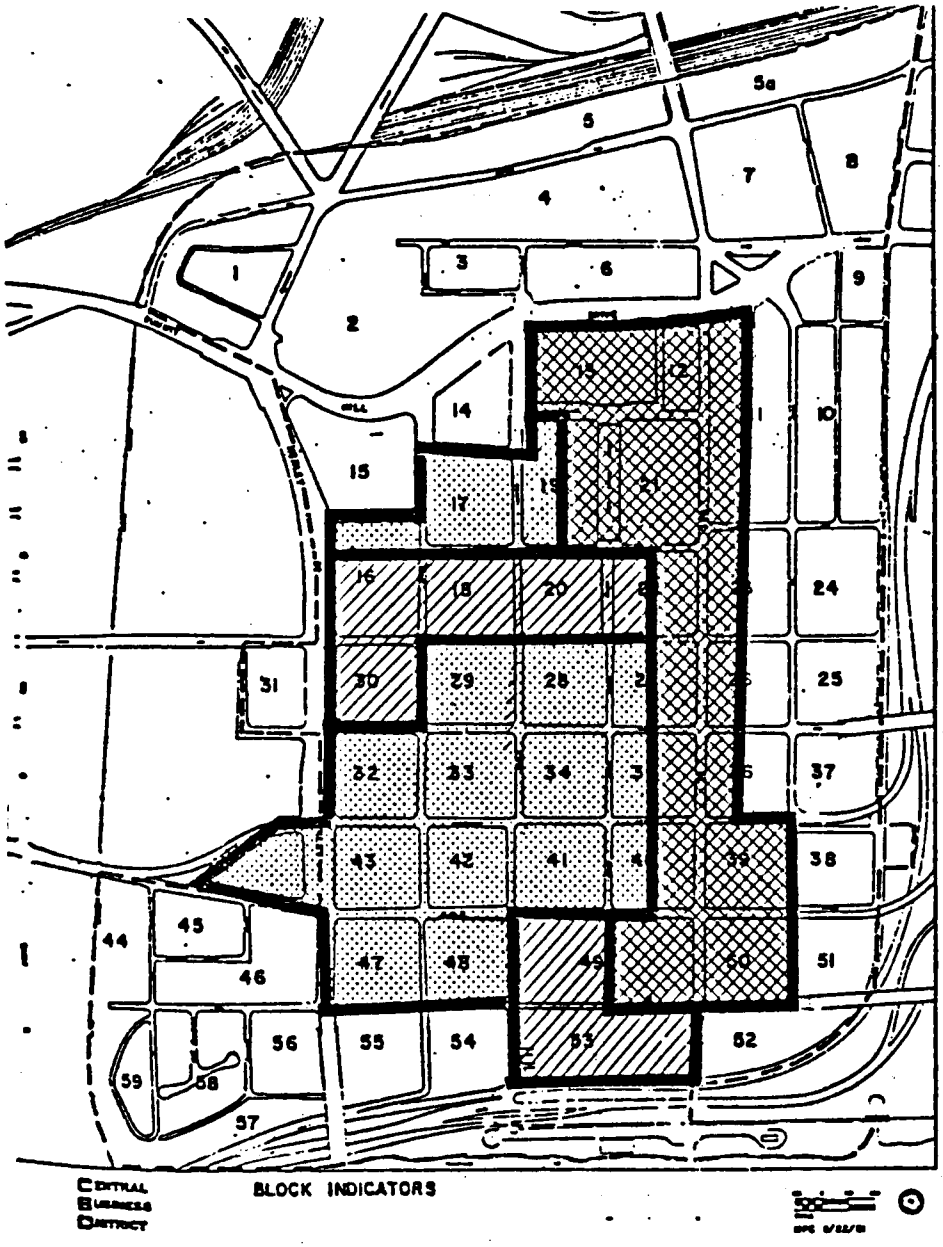
between the planner group and group 2 according to organizational style.

The sequence and the organizational style analysis deal with implied organization of the cognitive structure. The subgroup analysis indicated some unknown psychological variable or a highly complex interplay of sociological variables as forming the basis for distinction between subgroups. This analysis sets the basis of differences between all groups on a similar footing. In terms of the sequence and organizational framework analysis, there is a great similarity between group 2 and the planner group. However, there are significant differences between both planner and group 2 responses when they are compared to group 1.

Shared Image Analysis

The shared image analysis charts the spatial implications of the differences found in the previous analysis. This analysis attempts to measure the degree of overlap between groups. The first level of analysis is graphic. This follows the McHarg overlay technique to produce categories such as overlap between planners and group 1, planners and group 2, and group 1 and group 2. The second level of this analysis uses Guttman's lambda and lambda a to examine the degree of association between the elements shared by each group. For the purposes of this analysis a 60 percentile score was required to mandate inclusion as a shared element within a given subgroup.

The graphic display is based on the 60 percentile elements within each group. The composites showing the 60, 40, and 20 percentile elements by group are shown in maps 5, 6, 7 (see Figures 4.6,



60

40

20

FIGURE 4.6

GROUP 1 COMPOSITE

4.7, and 4.8). The 60 percentile map is based on the 60 percentile elements found in each group. The 60 percentile elements were combined to produce the 60 percentile overlap may shown in map 8 (see Figure 49).

The graphic display shows a definite pattern. The group 1 map is contained in the group 2 map. The group 1 map is also contained in great part in the planner map. Finally, the planner map is contained within the group 2 map with the exception of two elements. The shared image of the planners is then somewhere between the shared images of the other two groups.

The lambda a test underscored this conclusion. Here lambda a was used to measure the association between group membership and the number of shared or not shared elements. The initial analysis was an examination of two groups and the images shared between them. In this case a lambda of 1.00 would indicate equivalence, while a lambda of 0 would indicate a completely dissimilar image. All lambda a's were in the .5 range. This indicates that a moderately high overlap exists between all groups.

A second analysis using lambda in its symmetrical formulation furthered the initial conclusion of the lambda a test. Using a cell format identical to that used in the lambda a examination, this analysis yielded a 0 value for lambda in all cases. This indicates that the relationship is a one-way relationship. The combination of the lambda analyses suggests that the hierarchy indicated by the visual analysis is in fact a valid one. The group 1 shared responses are contained within the planner responses. Group 2 in turn contains both

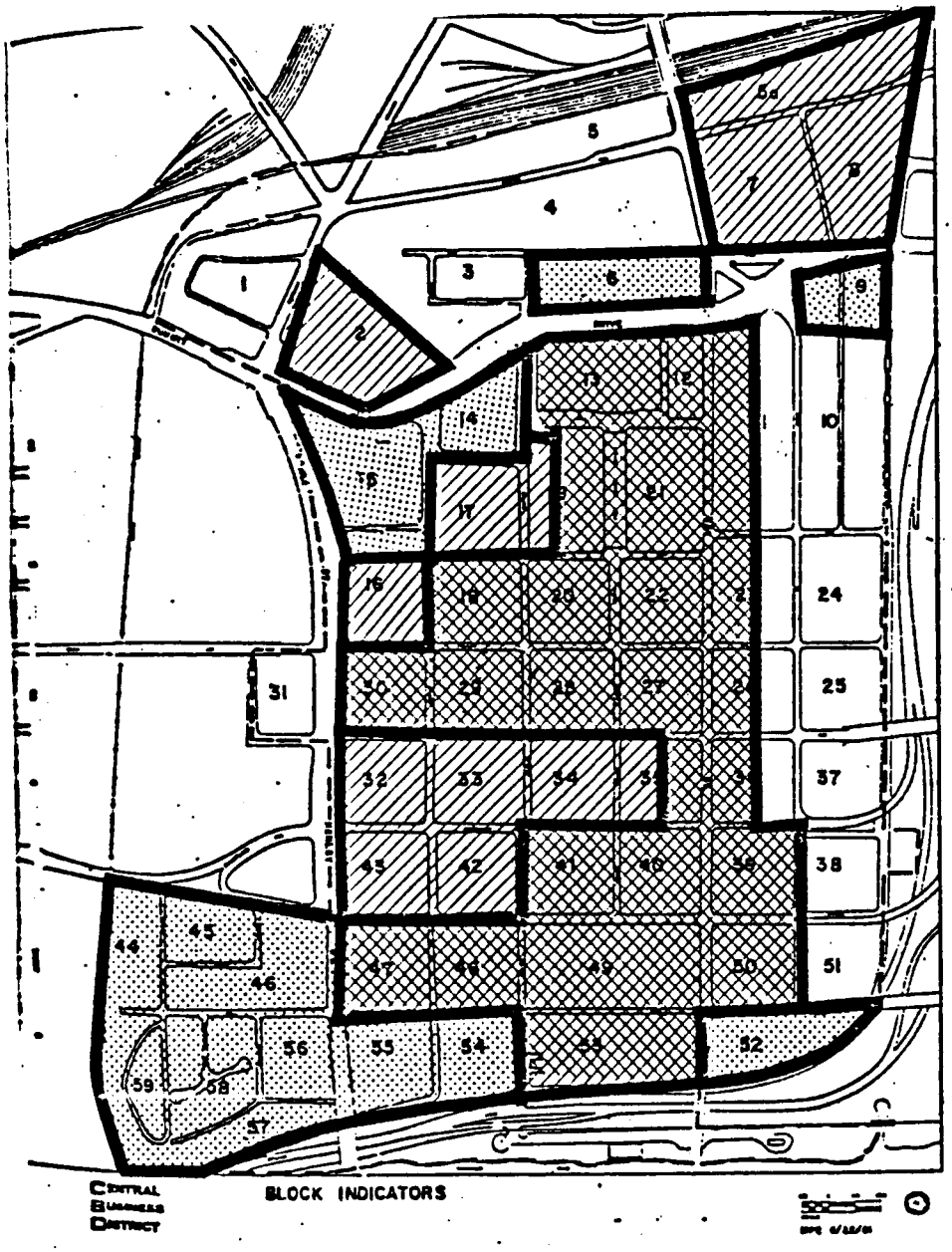


FIGURE 4.7

GROUP 2 COMPOSITE

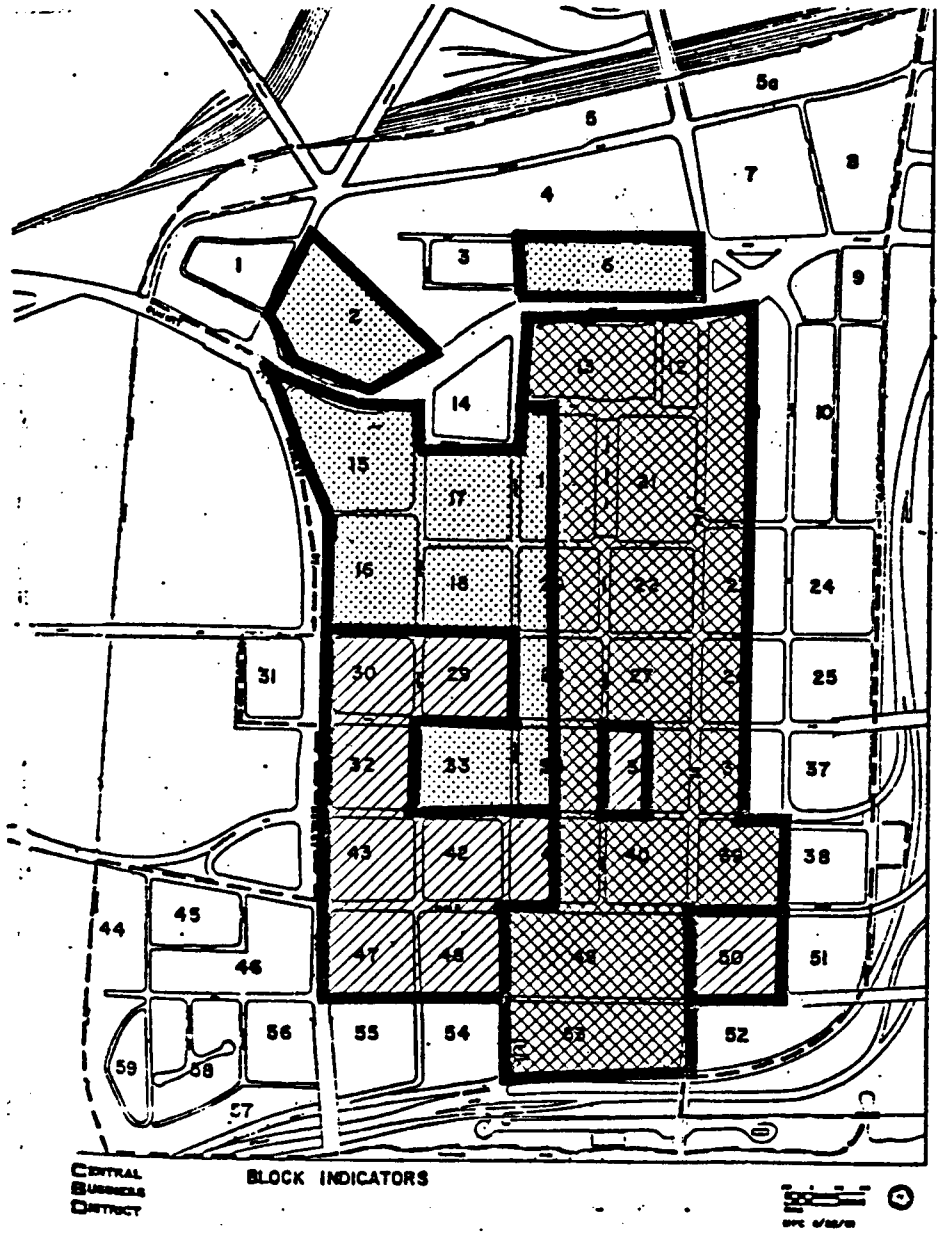


FIGURE 4.8

PLANNERS' COMPOSITE

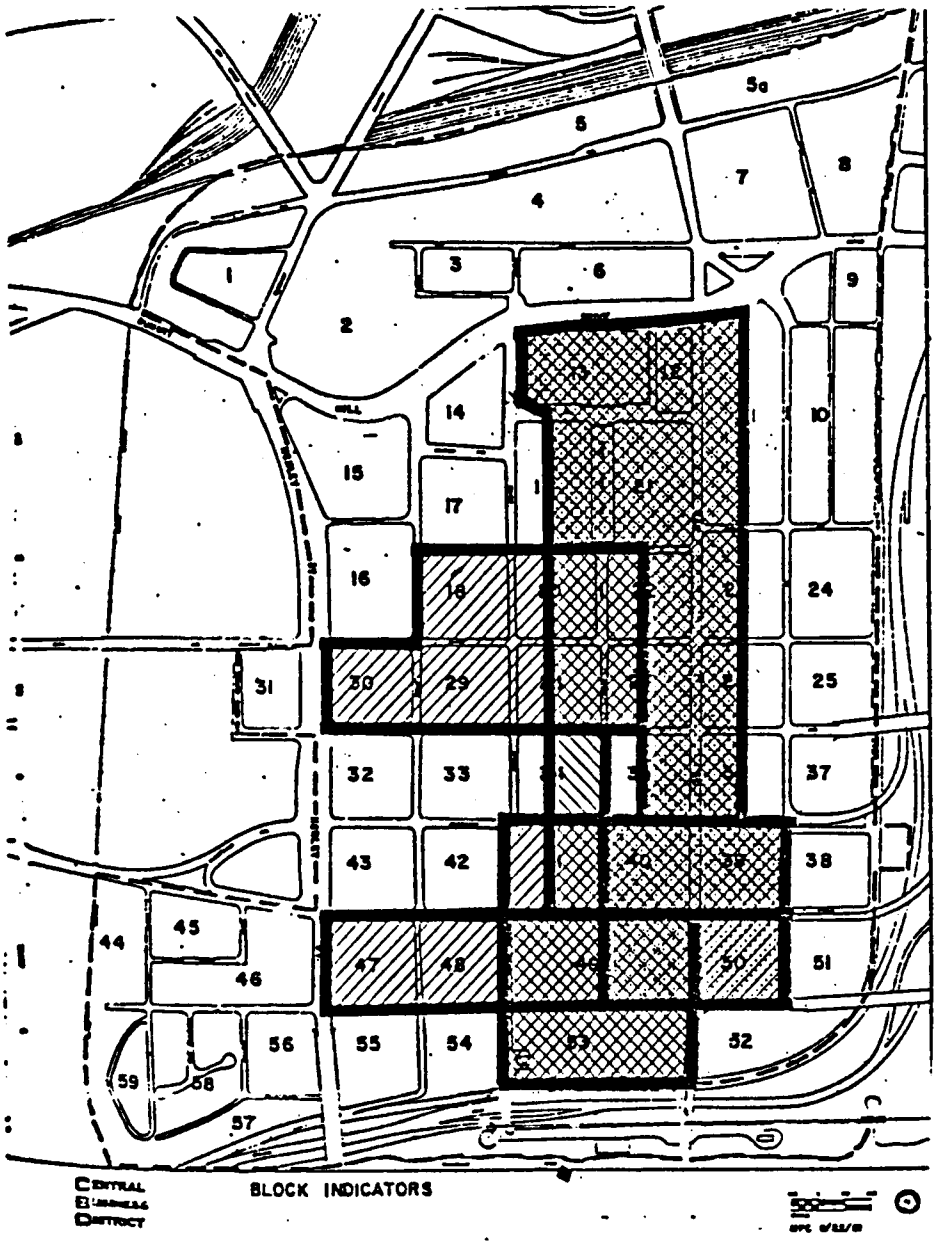


FIGURE 4.9

SHARED IMAGES

the planner responses and the responses of group 1. Al alternative formulation of this conclusion is that the planner responses strike a balance between the responses of group 1 and group 2.

Information Space

The information space analysis examined the amount of information contained in the sketch map responses. Here the number of elements per response was taken as a proxy for information content. Like the examination of element frequency, the examination of information space proceeds on both a visual and a statistical level. Maps showing the differences in information levels were constructed. Eta, the correlation ratio (η), was then used to analyze the association between the levels of information by subgroup to examine distribution. The T test was then applied to determine if differences in information levels existed.

The maps shown exhibit definite differences in the patterns of information. Once again the maps of the planners and group 2 are similar, as is shown in map 10 (see Figure 4.11). The major differences between these groups relate to the treatment of the Jackson Avenue area with less crucial differences found in the grid area. Both groups' information space maps differed with group 1. However, the differences here are not as great as those seen in the previous analysis. Maps 9 (Figure 4.10) and 11 (Figure 4.12) show the differences between group 2 and group 1 and the planner group and group 1.

The Eta statistic was used to examine the differences between subgroups in the number of responses per element treated as a percentage of the maximum number of responses for any element in a

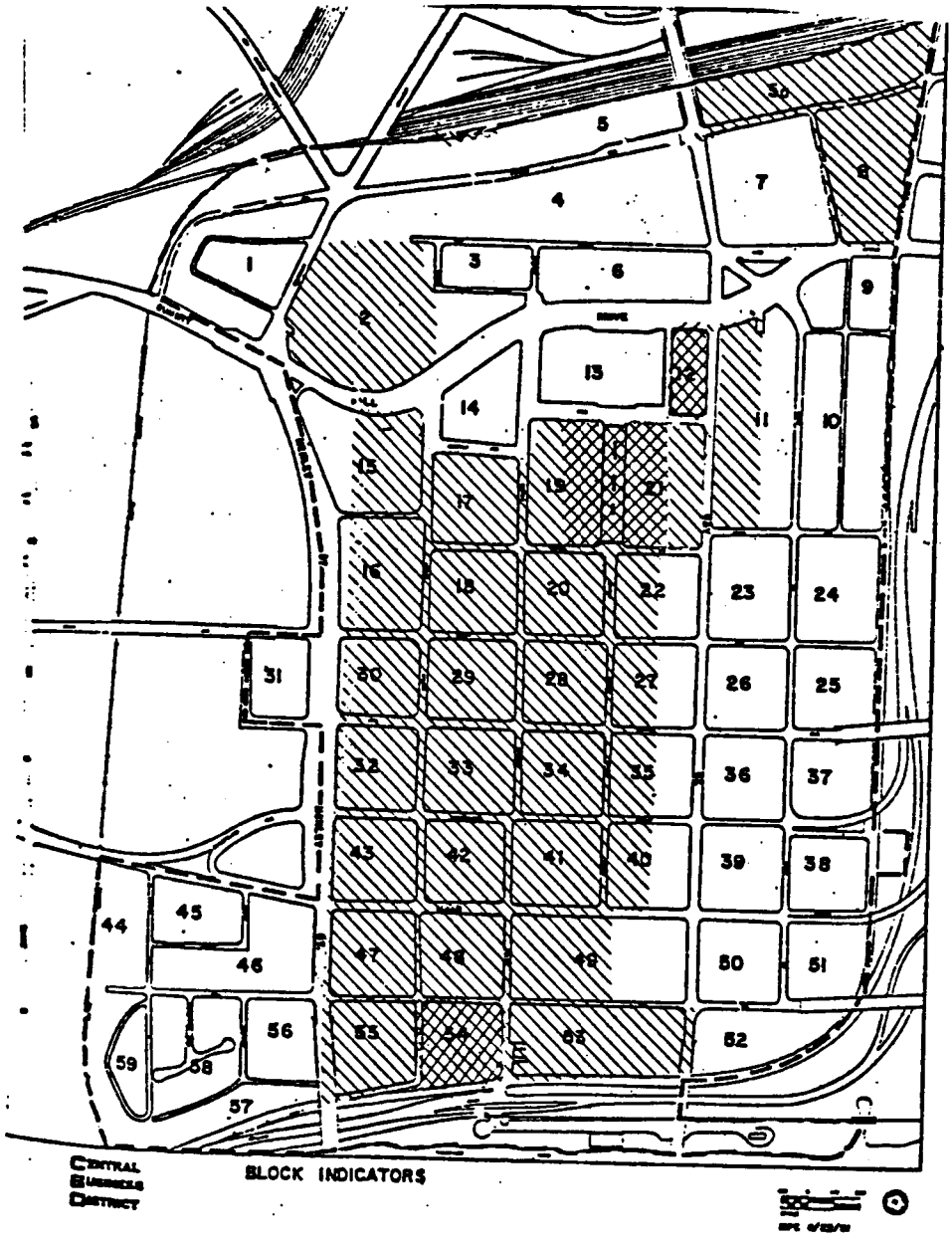


FIGURE 4.10

INFORMATION DIFFERENCES,
GROUP 1 AND PLANNERS

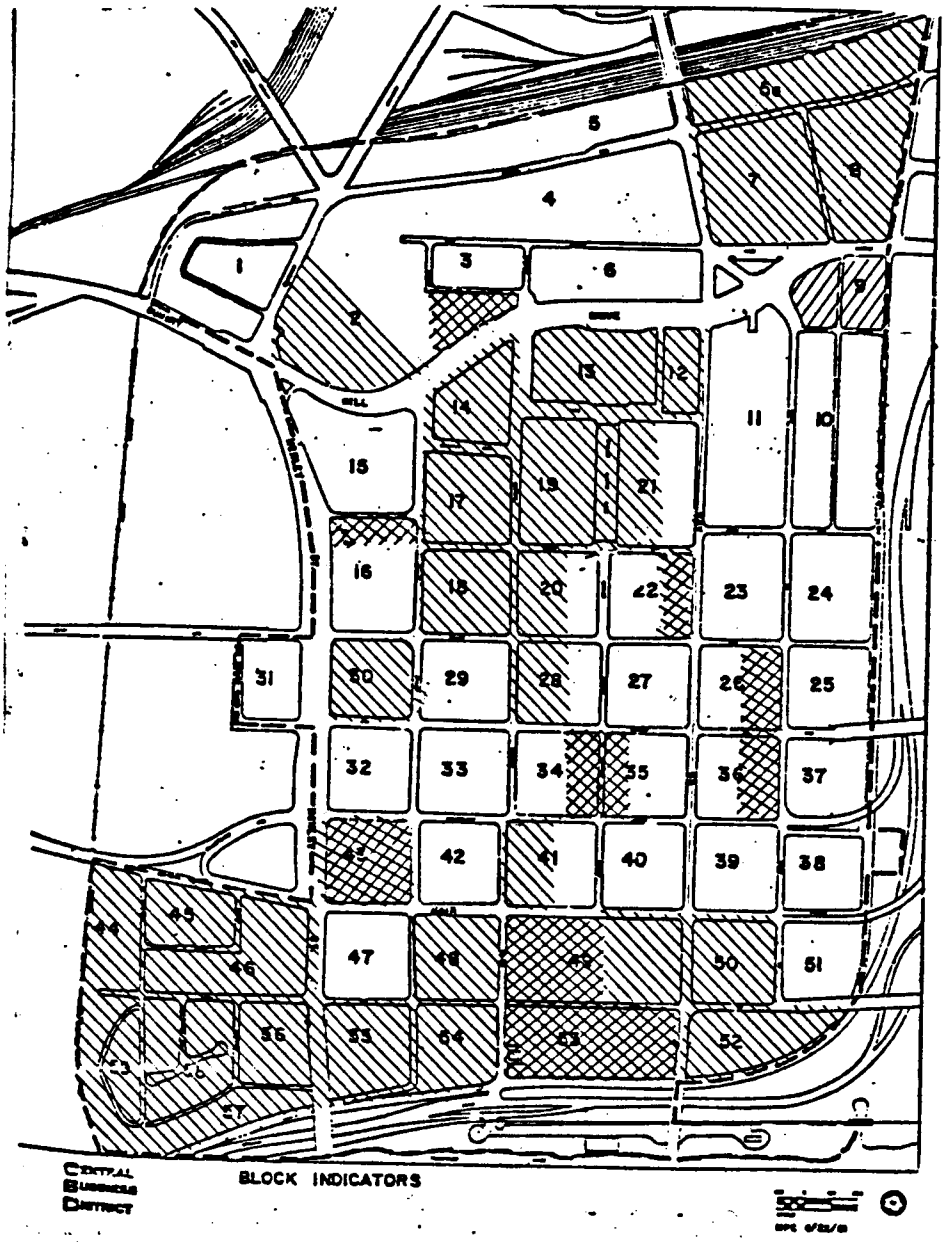


FIGURE 4.11

INFORMATION DIFFERENCES,
GROUP 2 AND PLANNERS

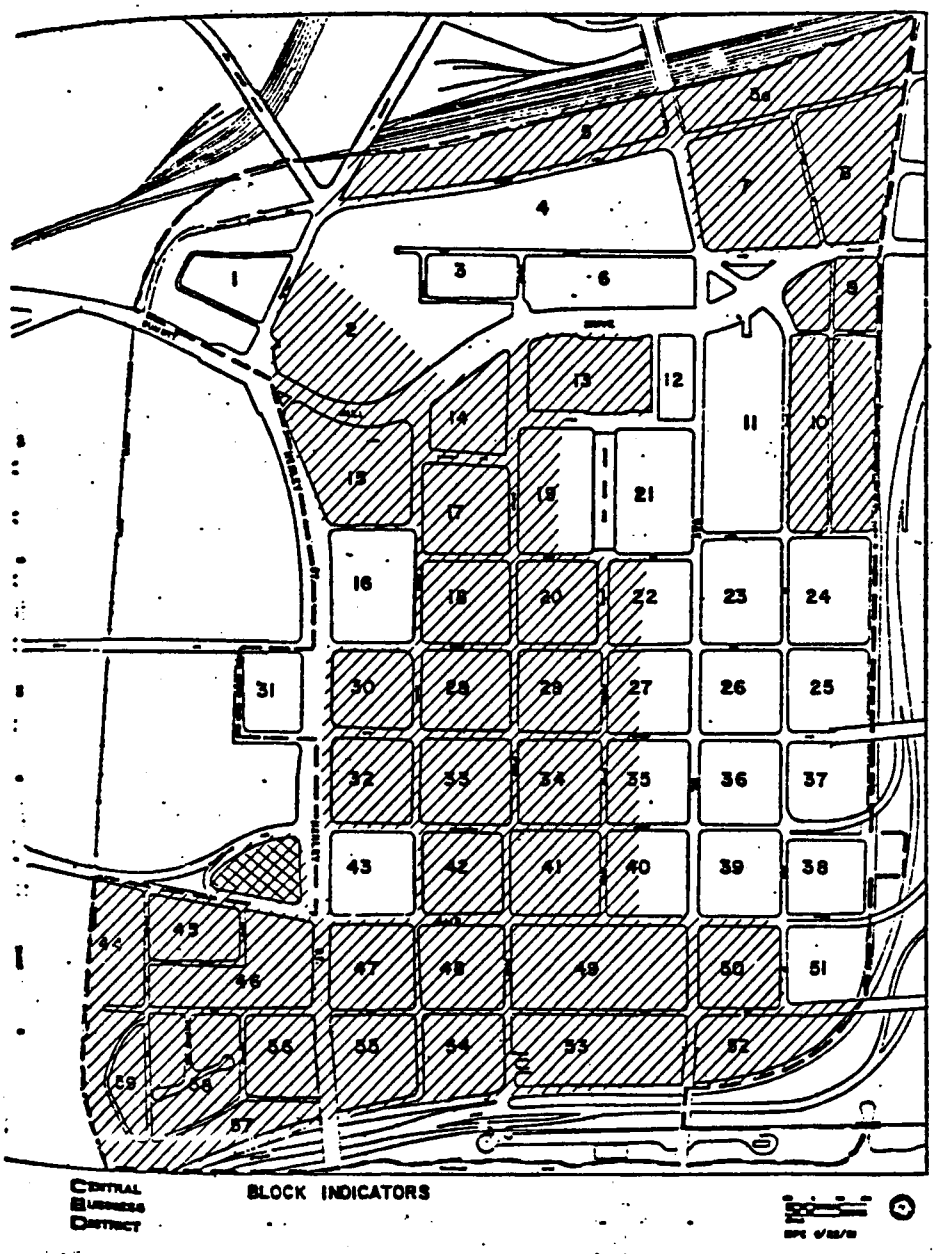


FIGURE 4.12

INFORMATION DIFFERENCES,
GROUP 1 AND GROUP 2

particular subgroup. This allowed inquiry into the consistency within the subgroups. (A group with a statistically different information level from another group, when this level is expressed as a percentage of the maximum response for that subgroup, would indicate that there are problems with the original divisions into subgroups.) The particular implication would be that one subgroup was identified and the other responses were forced into one category with a resultant diffused "image" for that group. However, if this is not the case, then the T test can be used on the number of responses per element to determine whether there is any association between groups and the information proxies.

The initial examination of the information space resulted in low values from the Eta statistic with F values that were significant at the .01 level. An of .22, a low association, with a PRE of .05 was found between the planner group and group 1. An of .24, a low association, with an associated PRE of .057 was found between the planner group and group 2. The examination between groups 1 and 2 saw the largest value, .36, with an associated PRE of .13. This last value is a moderate association. However, it is not high enough to warrant a reexamination of the initial subdivision. The initial Eta test showed no significant association between the information proxy and individual subgroups. This allows the conclusion that the subgroups are internally consistent and allows the T test to be run without concern for a possible error introduced by a pluralistic image within one of the groups (see Tables 4.6 and 4.7).

TABLE 4.6

ETA VALUES
(ASSOCIATED PROBABILITY = .01)

Planners vs. Group 1	η = .22 PRE = .05 F = 8.73
Planners vs. Group 2	η = .238 PRE = .057 F = 3.8
Group 1 vs. Group 2	η = .36 PRE = .13 F = 14.47

The T test analysis showed significant differences in the information proxy between both the planners and group 2 when compared to group 1. However, no difference was shown between the information levels found in group 1 and the planner group and group 2. The examination of the planner group and group 1 yielded a t value of 3.16 which is significant at the .01 level. The examination of the planner group and group 2 produced a t value of .9 which is not significant at the .01 level. The final examination of the difference between group 1 and group 2 resulted in a t value of 4.30 which is significant at .01 level. Thus the T test showed significant differences between the planner group and group 1, and between group 1 and group 2. However, no significant differences were found between group 2 and the planner group (see Table 4.8).

TABLE 4.7

INFORMATION PROXIES BY ELEMENT

Element Number	Planners	Group 1	Group 2
00	11	04	24
01	5	19	29
02	5	11	24
03	100	48	71
07	16	11	29
11	63	30	71
12	52	19	76
15	74	66	100
16	63	66	88
17	16	04	12
20	16	26	12
21	68	37	47
22	58	26	53
23	58	26	76
24	89	26	82
25	89	26	82
26	100	88	88
28	100	100	94
29	16	19	12
30	89	70	82
31	52	33	47
32	42	30	47
33	42	22	47
34	84	22	41
35	84	26	35
36	89	88	88
37	89	88	94
38	16	07	06
39	16	07	12
41	63	44	94
42	63	30	60
43	42	33	65
44	79	33	71
45	68	26	76
46	89	93	88
47	87	93	94
48	16	11	06
49	16	11	18
51	47	44	47

TABLE 4.7 (Continued)

Element Number	Planners	Group 1	Group 2
52	42	41	65
53	37	48	71
54	74	51	71
55	74	51	65
56	95	100	88
57	89	96	88
58	16	11	18
59	16	11	18
61	42	26	18
62	37	22	47
63	32	26	53
64	74	93	88
65	95	78	88
66	89	78	82
67	16	11	18
68	16	07	18
71	26	11	24
72	11	11	35
73	74	66	88
74	42	60	65
75	11	00	24
81	31	07	53
82	11	00	06
83	11	04	00
84	05	00	00
85	31	07	35
86	21	07	06
87	21	15	41
88	21	04	47
89	16	07	41
91	05	07	12
92	05	00	18
93	11	07	18
94	21	11	35
95	21	04	41
96	16	04	41

TABLE 4.8

T-TEST

Planners/Group 1	t = 3.16	probability	.01
Planners/Group 2	t = .9	probability	.01
Group 1/Group 2	t = 4.3	probability	.01

The examination of the information space had three stages of analysis. Visual maps were produced which showed the differences between the three groups in spatial terms. Eta, the correlation ratio (η), was used to examine the association between membership in a subgroup and the information level expressed as a percentage of the maximum score for a given subgroup. While Eta does not examine statistical significance, this procedure indicated that the subgroups themselves were internally consistent. Thus the T test would not be biased by a pluralistic group which might distort the mean values as an abnormal distribution would. Eta produced low to low moderate association values which indicated consistency within the subgroupings. Finally, the T test was run to examine differences in the information contained in the sketch maps as expressed by the information proxy. The T test showed differences between the planner group and group 1 and between group 1 and group 2. There was no significant difference found between the planner group and group 2.

This result is in keeping with the previous analysis. While there are differences between the planner group and group 2, none of the differences were significant for the variables examines. In

contrast, group 1 was different from the other groups on every variable examined. The differences in information content are especially important. The implicit cognitive structure postulated by the constructivist assumption would be expected to change to accommodate differing amounts of information. Thus, the information space examination shows marked differences along information levels which may be determining variables.

Area Analysis

Each respondent was asked to identify four areas of the downtown: (a) the most in need of improvement, (b) the most desirable, (c) the most potential for improvement, and (d) the least potential for improvement. While a few nonspatial answers were received, most answers referred to a specific locality in downtown. There was a surprising continuity between groups in the most frequent choices in each category. However, there was considerable disparity between the second most frequent choice in each category. The treatment of Gay Street was strikingly different between groups.

Despite geography and planning predictions, an "area" does not necessarily have a spatial component. Seven percent of the responses were of a nonspatial nature. Among these, lack of parking and access were the major categories. One respondent even listed "City Council" as the area of least potential. A nonresponse to the identification of the area of least potential was common among the planner group. It was also a secondary response among user group 1. Since nonresponse was often an expression of a particular attitude, such as "all the

areas have potential" or "no part of downtown is very desirable," a nonresponse was considered a valid, but not a codable, response.

The codable responses were surprisingly similar. All three groups agreed as to the first ranked area "most in need of improvement," Jackson Avenue/Area 4, (see Figure 4.13) and the "most desirable area," Market Street/Area 2. All groups also listed Jackson Avenue as the area with the "most potential for improvement." However, there was a tie between Gay Street/Area 5 and Jackson Avenue within the user group 1. Identification of the area with the "least potential" produced a curious disparity. User group 2 selected State Street. User group 1 selected Jackson Avenue. The planner group produced a tie between State Street and Jackson Avenue. This was surprising, especially in view of the disparity between images of the downtown and the general neglect of Jackson Avenue which was the clear choice of all groups as the area with both the "most potential" and the "most need of improvement."

The second choice in each category of response was dissimilar and without a major pattern between the groups. Both user groups listed Market Street as the area with the "most potential" after Jackson Avenue. However, there was no agreement within the user groups in terms of the second most frequently cited area in any other category. The planner group responses did not agree consistently with either user group.

The most striking difference was in the treatment of Gay Street. This was a low priority area for the planner group. Only 4 percent of the planners thought that Gay Street was the area "most in need of

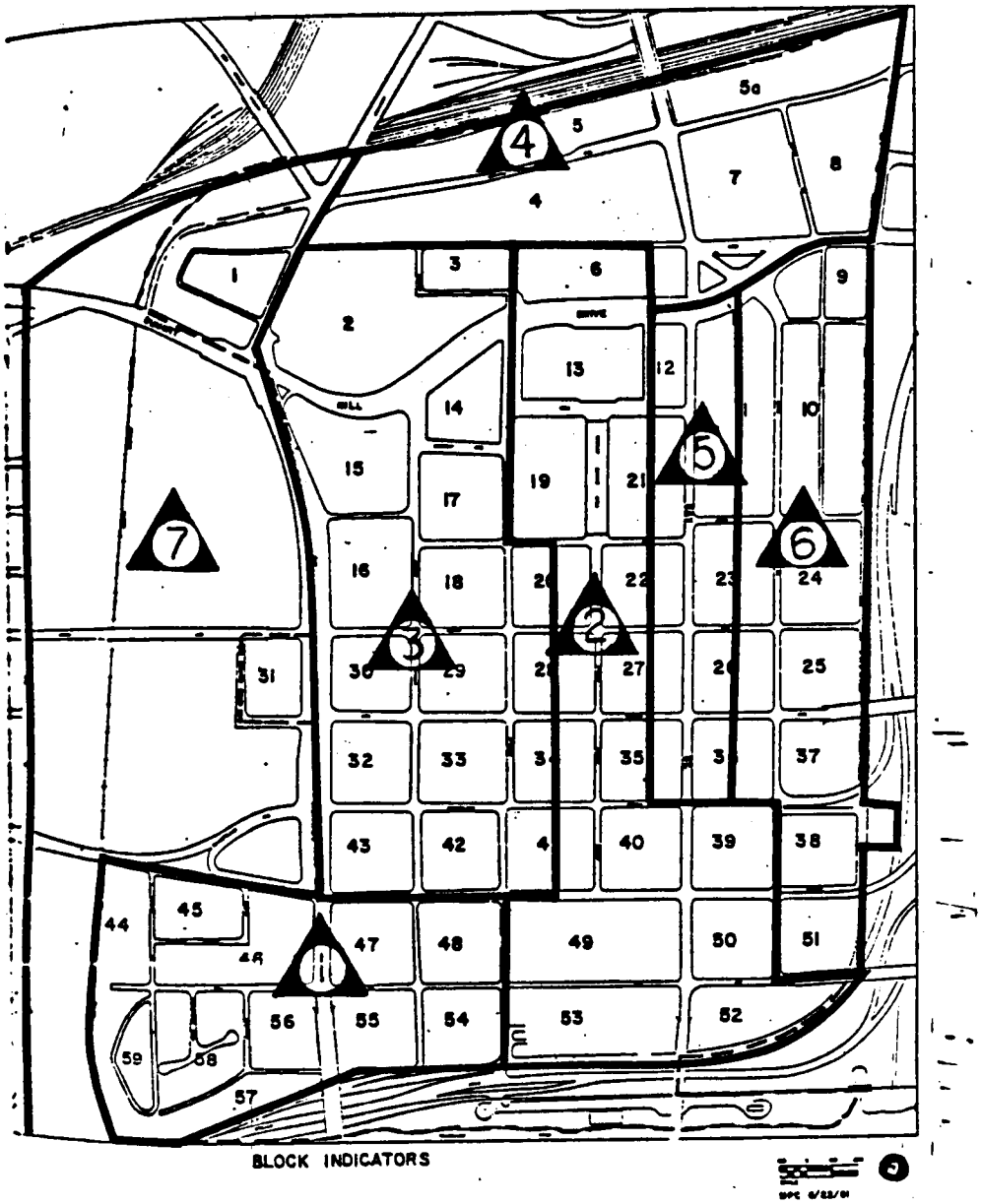


FIGURE 4.13

SUBAREAS

improvement" and only 8 percent thought that Gay Street had "the most potential for improvement." None of the respondents in user group 2 felt that Gay Street was the area with either the "most potential" or the "most in need of improvement." User group 1 rated Gay Street second as the area "most in need of improvement." They felt that Gay Street, along with Jackson Avenue, had the "most potential for improvement." Five percent of group 2 felt that Gay Street was the "most desirable" in comparison to 13 percent of group 1. Twenty-one percent of group 1 and 16 percent of group 2 felt that Gay Street had the "least potential." None of the respondents in the planner group felt that Gay Street had the "least potential." Gay Street produced a variety of responses from the user and planner groups. The areas identified by each group showed great similarities when compared to the differences found in the "images" held by the groups. Much of the observed differences between the groups revolved around Gay Street. The problems associated with Gay Street are long standing and the design solution currently in place received major national criticism before it was constructed (Gruen, 1964).

Except for Gay Street the consensus for the three groups is striking. Jackson Avenue was felt both to have the "most potential" and to be the "most in need of improvement." Market Street was the clear choice as the "most desirable" area of the CBD. While State Street/Area 6 and Jackson Avenue were regarded by some as areas with the "least potential," State Street was a heavy favorite for this designation in sheer numerical terms.

Adjective Analysis

The final analysis was of the way respondents in different subgroups characterized the areas identified in questions 2, 4, 6, and 8. It was anticipated that the adjectives used could be grouped and then a statistic of significance applied to determine if significant differences existed. However, the responses from both groups 1 and 2 were not amenable to this approach. Thus, values which might have been indicated from the adjective analysis could not be extracted in a systematic way. This represents a shortcoming of this research project.

The user groups responded to the characterization questions with "pointing" answers over 50 percent of the time. Instead of the expected response of describing an area as "run down" or "interesting," the more common response was "between such and such streets" or "on the northeast." This sort of response greatly aided the area identification analysis. However, it is hard to compare to other sorts of responses in a meaningful way. This reduces the value of the adjective analysis.

The responses which were solicited and were appropriate to the analysis undertaken tended to fall into three categories. The first category is an adjective borrowed from design or economics, such as "focus" or "low land values." The second sort of adjective is one which reports a current condition, such as "run down." The final sort of adjective is one which relays an impression, such as "pleasant to walk through" or "interesting."

All subgroups contained responses from all three categories. There was a tendency for the planner group to respond with replies from the first two categories. Both user groups tended to respond with replies from the second two categories.

Whether these tendencies are significant is an open question. What is more directly indicated here is that the survey attempted to extract too much information from the respondents at one time. The adjective analysis was not at the core of the research project and any conclusion which might have been reached would have been tentative and, at best, charted a direction for further research. In consideration of the "pointing" responses solicited, no conclusion can be reached through this analysis which can be said to be meaningful. However, the tentative conclusion that there might be some differences remains and like any conclusion which might have been reached by a more indepth statistical investigation indicates only that another study would be potentially beneficial.

SUMMARY

A series of tests were run on the data solicited from the interviews. With the exception of the last examination, the series was successful and produced a consistent result. The subgroup analysis produced two major user subgroups based on perceived extent of the CBD. Group 1 was significantly different from group 2 across all variables tested. Group 1 was shown to be different from the planner group in the same tests. Although there were some differences observed in the subjective analysis between group 2 and the planner

group, no differences were of significant magnitude to reject H_0 in any of the tests.

The data analysis depended upon the identification of areal extent as the key variable for definition of major user subgroups. It was noted that there are some apparent social economic relationships. However, the small sample size may have clouded the impact of some of these variables. If further research indicates that this is the case, then the areal extent may be taken as a proxy for those variables. However, there is no indication in the literature that social or economic variables play any major role in perceptions with the possible exception of values, an area which this project did not address.

CHAPTER V

SPECULATIONS

It is traditional to write a conclusion to a research project. However, in the field of environmental perception and mental imagery, such an exercise is presumptuous. Instead, the "conclusion" to this research is a speculation on four areas:

1. What the findings mean.
2. Whether the various techniques are reinforcing.
3. Implications for planners.
4. Whether planners ignore or misunderstand citizen's perceptions.

MEANING

The question of what the findings mean is closely tied to the question of what the sketch map responses are. Given the constructivist assumption and observations during the interview process, two "conclusions" are forthcoming. First, the responses are clearly not maps; instead they are messages or more simply graphic responses. Second, they probably serve to identify the functioning aspects of the CBD's spatial design. This implies two related explanations for observed differences: either intrinsic differences in the cognitive structure implicit in the constructivist assumption or differing information content "forcing" a difference in cognitive structure.

Both explanations have a strong basis. However, this researcher tends to support the second.

The constructivist assumption provides some guidance for interpretation. Under this assumption an environment is "managed" partially through an "image"--though not necessarily a visual image--of that environment. Thus, the responses are not maps. Instead they are a graphic representation of the "internal image." This is the position of Courtise Rose (Buttimer & Seamon, 1979:. Kuippers (1982) provides a detailed examination in his recent article on the "map" metaphor.

The constructivist assumption was discussed in some detail in Chapter II. To review briefly the assumption claims that experience is not direct but is mediated through "filters" or "schemata." Unlike environmental determinism these filters are not fixed, but can be actively manipulated and changed by the individual.

The speculation that the responses show the functional aspects of the CBD's spatial design is more tentative. Three factors support this argument. First is the phrasing of the research question which asks essentially for the positive elements of the CBD and assistance in getting around. A negative formulation would have produced markedly different responses (Lynch, 1981). Second is the fact that almost all respondents finished within the allotted time. Thus, the responses are not partial responses showing only part of the respondents "image." Finally, both the question and the time limitation mandated that the respondents give some priority in their responses. There is no implication that everything in downtown that was known to the respondent appears on the sketch map. Instead only the most important are likely

to appear. Given the formulation of the sketch map question, the most important should be the spatial design elements of the CBD which are used by the respondent when traveling through the CBD. The sketch maps most likely reflect the spatial design which works.

These conclusions find a general support in the literature. The studies of Goodey (1974) lead to a similar conclusion. Kossalyn's work on "skeleton frameworks" is supportive at a theoretical level (Kossalyn, 1977). Isolation of relevant spatial design features has been a concern of research since Lynch's The Image of the City, and this project seems to do precisely that.

There are, of course, alternate explanations from both the extremes of the field and from specific disciplines. Without the constructivist assumption, the sketch map is inappropriate and any results questionable. An interpretation from a behavioristic standpoint would wonder about activity patterns. A traditional architectural position would probably not allow the validity of any user group view; any problems are simply the result of not understanding the designer's intention. The list could go on. However, this research is in the field of environmental perception and mental imagery. As such, it is obligated to work within that framework. The "conclusions" listed above are the most reasonable both in terms of the research project and in the context of the field.

There are two alternative explanations for observed similarities and differences in the responses. One can postulate that there are differing ways with which people "construct" the "image." The alternative is to postulate that increased information "creates" the "need"

for a more complex organizational framework. This can quickly become a circular argument as both possibilities have considerable support. However, this researcher tends to lean toward the second postulate.

The first postulate can be summarized as follows. There are different ways to construct images. These vary in complexity, detail, and generalization. At the time of the interview the respondents were "organizing" their "images" in a certain manner. Thus, different responses were produced. The "why" of a particular organizational style is unknown. Explanations range from genetics to complex socio-economic combinations or "lifeworlds" in Buttimer's terminology. In any event, information contained is determined by organization.

The second postulate is similar to the first except that information levels "create" a need for certain organizational approaches. Whereas the first explanation is sociological, this second postulate is derived from information science. An analogy from computer science is relevant. If only a small amount of data is needed, a list will suffice to store it. Greater data needs can be contained in "arrays" or "packed arrays." However, if a great amount of information is needed, as in modeling, a three dimension surface an equation might be used to generate data rather than storing individual observations. This second explanation simply means that the more information needed or possessed, the greater the sophistication and degree of generalization in the cognitive organization.

The researcher tends to support the second postulate for several reasons. It is straightforward and does not create large "black boxes." It is implicit in Appleyard's templates. It would explain

why socio-economic variables have been difficult to correlate with responses.

The second explanation is internally simple and does not leave large unexplained areas. This postulate traces out a straightforward causal chain. There are no unexplained variables, no "magical" influences. It is the clearest of the two explanations. In terms of Ockhans Razor it is the clear choice.*

The concept is implicit in Appleyard's organizational styles. The fact that the analysis involving these templates produced results in keeping with the other analyses suggests that the validity of their initial assumptions is also valid.

Finally, this would explain why socio-economic variables have produced low correlations with images in study after study. If they are simply not active or have a secondary impact, then low correlations would follow. This, also, would explain the major contradictory study, Lynch's Los Angeles study. Here differences were found between socio-economic groups. However, given that information is obtained through movement through environments and that Los Angeles is a vehicular city, the low access to personal transportation could be considered a major determinant. This possibility is expressed by Lynch (Lynch, 1976).

The best explanation may well lie between the two postulates. In any event the argument is intrinsically theoretical. Both explanations share an assumption of a close relationship between information and organizational style. For the purposes of this speculation the

---

*". . . use of the concept of supposition (suppositio) in the significative analysis of terms." (Runes, 1962:218) Explanation of the facts with the fewest given assumptions.

second explanation is adopted. However, quite similar "conclusions" could be reached on the basis of the first postulate.

TECHNIQUES

This project initially set out to show that a variety of techniques and approaches were mutually reinforcing. This goal was set back somewhat by the poor fit provided by Gould's information space. The similar results across the sequence of tests are an indication of the reinforcing nature of the approaches. However, in the context provided by the constructivist assumption, the techniques should be seen as groups of two compatible approaches, not merely different techniques producing similar results.

The constructivist assumption implies a peculiar relationship between "images" and "values" which forms the basis for this compatibility between techniques. While the content of a person's image is determined by "values" as well as exposure to the environment, this use of value is better stated as a simple bias and not necessarily a conscious one. The work of bias in combination with exposure is then the "image," or in Piaget's terms, "filter." However, a different sort of value is involved in decision making. For example, one may value efficiency. When asked to name a problem area, the respondent valuing efficiency could be expected--in the context of this simplistic example--to respond with the least efficient area in his bias/exposure image. Thus, one has two sorts of images involved, an informational image and a value related image or the decision image. While these

two images can be conceptually separated, responses generated by a survey are essentially composites of both kinds of "image."

Separation is a function of data analysis. This takes two sorts of tests, a value oriented subjective test and an "information" based objective test. What is shown by this research is that there are two comparable approaches which are reinforcing. The Image/Form and the area analysis are the subjective value oriented approaches. The other successful techniques are information based. The adjective analysis, had it been successful, might have served as a connection between the two.

The "conclusion" suggests that a greatly abbreviated data analysis approach would be valid. This approach might first use extent to identify intrinsic subgroups. This could be followed by an Image/Form analysis. Depending on the study's scope, Goodey's limitation to paths, landmarks, and possibly districts might be applicable. Appleyard's approach to organizational styles could then be applied to assess informational differences and to quantify the subgroup differences. An area analysis could then be performed.

The above series of analyses would greatly reduce the data coding and analysis load. This would place the coding time around 15 to 30 minutes per response. This is still somewhat high for large samples. However, it is considerably shorter than the approach pursued in this project.

Most of the time savings relate to the use of Appleyard's templates. First, these are quick, easy to apply and provide a reasonable proxy for the more complex approaches to distinguishing

significance between subgroups. Second, this project successfully replicated the approach. In combination with Evans et al.'s (1982) replication of the verbal interview, the approach is placed on a footing similar to that enjoyed by Lynch's. While minor changes are needed according to the demands of the project, the essence of the approach seems reasonably valid.

This project indicates that there are two approaches to data analysis, a value and an information approach. An ideal sequence is suggested which considerably eases the data coding process.

IMPLICATIONS FOR PLANNERS

The sketch map technique, as well as the larger field of environmental perception and mental imagery, has three implications for planners. These are:

1. citizen participation
2. small area planning
3. teaching.

The first impact is minor. The second represents a major impact. The third is a recognition of current trends.

Citizen Participation

Citizen participation is a necessity for the planning process. At the citywide or regional scale public meetings, polls, and goal processes seem to function well. At the district, area, and neighborhood scale the techniques needed to effect a vital participation process are ignored or couched in mystic terms such as "effective interpersonal communication skills." Professional organizers and

trained leadership have long recognized that the group dynamics are not mysterious; they are straightforward and simple. The key to this process is a series of exercises to achieve two goals, one of which is especially suited to the sketch map technique.

Organizers have sought two effects when running a public meeting: limiting repetitive and confrontational comment and getting the group to focus on the issue at hand. The first is marginally amenable to the sketch map technique. The second is highly amenable.

The first goal relates to an assumed need for an immediate concrete impact from comments. This is usually accomplished by simply writing comments on long sheets of paper hung on the wall. If the group is asked to sketch out the area in question, then each individual would be providing his/her own reinforcement. On its own, the sketch map is probably not adequate; however, as an additional technique, it has utility.

Focusing people's attention on the issue at hand is more complex. Many planners with whom this researcher has been associated seem to assume that the major purpose of a public meeting is the issue or area at hand. Organizers take an opposite standpoint. People come to any meeting for a variety of reasons; the issue addressed by the meeting is usually a low priority. Thus, group exercises are used to focus the meeting.

These are almost always "paper and pencil" exercises surprisingly similar to the sketch map technique. For example, one meeting called to find a new organizational structure was started by asking the participants to draw what "the organization should look like."

The specific exercise allows the individuals to focus on the problem.

The sketch map technique is a valid one to achieve the goal of focusing a group. As two 5-minute exercises, one "what I like map," one "problems map," it is a small investment in time and energy. There is an added benefit in data which can be analyzed by skilled personnel.

Small Area Planning

This project has shown that in a constrained area the sketch map is an effective way of soliciting detailed information about people's perceptions. Since the small area is most sensitive to design and design changes are easier to effect in a small area, design considerations should enter into the small area planning process.

A variety of design controls and processes exist. Zoning influences building design by setbacks. Design and historic districts attempt to effect stringent design standards from an a priori architectural viewpoint. Given architecture's low impact found in this project, a different approach is suggested.

This different approach places heavy emphasis upon two processes. It is closely related to the English "critical area" approach (Jarvis, 1980; Appleyard et al., 1981; Greater London Council, 1976). The process can be outlined as:

1. initial surveys
2. policy development
3. strategy project development
4. implementation.

Implied here is a larger, more comprehensive process. Whatever the importance of design, it does eclipse social, economic, and environmental considerations. Nor is this a departure from a traditional needs-problems-policy-strategy process. Here only the areas which are altered are outlined. Finally every small area is not amenable to this approach. Instead its impact is on specific areas where several conditions exist. These conditions are:

1. a genuine need for protection, such as transitional area or a high visibility such as a CBD;

2. A high potential for low-cost governmental leverage exists, such as a Community Development target area;

3. adequate interest from the private sector in terms of loan availability or some other capital distribution mechanism.

In any form sketch map analysis will be costly and simply should not be used where implementation is unlikely.

The initial survey could be done in a variety of settings. The sketch map could be used to isolate the working design elements, the problem areas, and with a slightly different format, the valued amenities. If this was incorporated into the public hearing format, a considerable savings in cost would be accomplished.

The second stage is policy development. Lynch provides the outline for developing policy from the data collected in the surveys (Lynch, 1981). Following these guidelines policies could be developed. These could then be combined with other policy recommendations based on economic or environmental conkerns. The introduction of a more comprehensive approach to design considerations at the policy level is a definite break with traditional design approaches.

The strategy and project development stage is another break. Here the emphasis is on implementation. Strategies relate to a specific regulatory or program approach. Project development is the identification of specific government action and intervention.

Strategy has two components--regulation and programs. Unlike project development these would involve several of the problem areas identified or even the total area.

Regulatory approaches are traditional. Regulation on new development provides an example of what this might look at. In an area with large numbers of small lots the regulations on open space restrictions could be relaxed under certain conditions. If porches were considered a valued amenity by the residents, porch space might be counted as open space. While specifics need be tailored to each area, the innovation is who identifies which tradeoffs are made.

Program development would then form the incentive program to reinforce the regulatory concerns. Unlike regulations, programs can place whatever restrictions are necessary on the recipients as long as they are nondiscriminatory. Thus, a developer might receive a low- or no-cost construction loan if the development conforms to certain "design performance dimensions" identified during the planning process. Using the infill example above, the developer might have to provide street plantings, adequate lighting, or even an apartment for a low-income elderly person.

Project development represents direct governmental action to complement the regulatory and incentive action. While moving the environmental building blocks around is clstly and unlikely to occur,

changes in some elements and preservation of others are common. Local road improvements are a major way of changing design. Preservation of landmarks--whether a structure, retail node, or open space--is a way of reinforcing design. At this level specific needed projects and previously proposed projects with definite impact could be identified and guidelines developed.

The final stage, implementation, remains as tricky in this scenario as in any other. However, there are three internal strengths which should assist implementation. First is basing design on user's knowledge of what works for them. This creates a lobby group for the implementation stage. Second is the tempering of design policy with other considerations at an early level. Thus the less feasible recommendations are not developed. In addition the critical area approach recognizes that the concerns are interrelated; the policy synthesis allows the support for an economic policy to be shared by the relevant design formulations. Finally, the development of specific regulations, programs, and policies creates a strong implementation tool in and of itself at the small scale.

The planning scenario outlined above is hardly radical. The major differences are the inclusion of design in the traditional land use, economic and environmental approach, and its confinement to a limited situation.

The first change is indicated by recent trends as well as by this project. At the level of a CBD architectural design, considerations are second--and a distant second at that--to traditional planning concerns such as land use and transportation in forming perceptions.

Even the detailed approach provided by Alexander is more concerned with access, a very practical planning consideration, than with architectural concepts.

The second difference is related to the connection between detail in the sketch responses and scale. The scenario depends on soliciting a large amount of information. Kossalyn's work, Appleyard's most recent study, and this project demonstrate that this can only be done at a small scale.

Even here there may be a high cost factor. The needed information levels suggest the use of three questions: "Sketch what you like in an area," "identify the problem areas," and "sketch the individual street you are most familiar with." A common area such as a CBD or retail area might only require the first two questions. A considerable streamlining of the data coding process would be needed to make the whole scenario practical in any but highly critical areas. Even if those obstacles were overcome, the management costs of developing and maintaining a multiplicity of special programs in a large number of areas are prohibitive of implementation in every area.

The scenario outlined above is an example of the kind of process which would use the sketch map technique in combination with other findings from the field of environmental perception and mental imagery. It is becoming increasingly clear as the research record grows that planners routinely propose changes and developments which have major impacts on perceived design. This fact, in combination with a growing concern that design has economic and social consequences, indicates that if any degree of comprehensiveness is to be achieved,

design must be worked into the planning process. This remains impractical at the large scale, but where design has the most impact, integration cannot be ignored.

Teaching Implications

Since the early sixties Lynch's work has been used in planning schools. This use is of two forms. The first is the use of the concepts, such as nodes and landmarks, as a way of thinking about spatial form. The second is the use of the sketch map technique to either encourage synthesis or to point out environmental elements.

The reference to Lynch in a footnote in a planning report is a common enough occurrence to make comments about the use of Lynch's concepts unnecessary. They can provide a framework for talking about cities and even regions.

The second usage is less widespread. The logic is that working from the postulates used to explain the results in the first section of this chapter, one can further suggest that to ask a student to sketch an area under study is to ask that student to synthesize the information known about the area in spatial terms. Once the generalized spatial consequences have been made explicit, then a framework has been developed to "hang" additional information on.

Stein provides an example. A recent letter from Professor Stein at Cornell contained a "test" he administers twice during a design course. During the test the students are asked to draw Ithaca. Figure 5.1 contains Stein's questionnaire.

Cornell University
DEPARTMENT OF CITY AND REGIONAL PLANNING

May 3, 1982

Ernie Weeks
Mograr #2
Knoxville TN 37917

Dear Ernie Weeks:

In response to your letter I continue to ask students in my classes to do cognitive maps of the city of Ithaca. But this activity is not structured, and is not related to any research I am doing - or have done. My approach is to ask students to draw a map of the city on the 1st day of classes. (Sometimes I ask them also to do a map of the Cornell Campus and their home town.) I repeat the assignment at the end of the semester. My purposes are several. Most obvious is the attempt to determine if the students' understanding and knowledge of the city's physical organization has changed during the 14 week period. Usually it has, but I can't detect whether my course or other influences have caused the change.

A more important purpose is to grab their attention immediately so that they start thinking and looking at the physical environment. This is part of a 3 week component on environmental awareness which leads-off my planning design course. I use a number of other exercises during that period, all aimed at causing the students to look and see. The mapping exercise is a useful tool to start with, together with a brief "exam", a copy of which is attached.

The third purpose is to use mapping to show how people structure their environment mentally. I review all the student maps and provide a list of the features that appeared most often. I also separate out the maps of those who are new to Ithaca from the old-timers. (Actually, I have found very little difference in maps relating to length of residence in the city.) This mapping material is used again when I cover Kevin Lynch's research, about half-way through the course. The fact that the students went through the mapping exercise makes it possible to use Lynch's work more effectively.

That's about all there is to the work I've done. I hope this is of some use to you.

Sincerely,

Stuart W. Stein
Professor

SWS:as
enclosure

FIGURE 5.1

LETTER FROM S. W. STEIN

NO NAME PLEASE, Use Identification Symbol here _____

CRP 554 INTRODUCTION TO PLANNING DESIGN FALL, 1981
MR. STEIN

EXAMINATION

Fill in answers in the space provided, or circle your choice. Answer all questions. Put DK, for don't know, if you can't answer a question.

How long have you lived in Ithaca? _____

Undergraduate course of study? _____

Grew up in a: big city medium-size city (over 100,000) small city (25-100,000)
suburb of one of above small village (under 25,000)
rural area moved around a lot none of these

I came from: a foreign country New England states Middle-Atlantic states
the south the Midwest the Rocky Mountain states
the upper Midwest the Far West the Southwest other

Own a camera: yes no If yes, do you use it regularly? yes no

---

1. What is the direction followed by State Street or Seneca Street in downtown Ithaca? east/west north/south DK

2. In what direction are you looking when you go out of the front door of Sibley and look across the Quad towards the clock tower? _____

3. What is the approximate distance in feet (or meters) from Sibley to the clock tower? _____

4. Approximately how many acres (or hectares) are there in the Arts Quadrangle (the space between Sibley and Olin Library)? (1 hectare = 2.471 acres)
_____

5. Have you heard the library clock tower bells play tunes? yes/no If yes, at what time or times do they play? _____

6. What time did the sun set yesterday? _____

7. (Don't look at your watch!) How many minutes has it been since this class started? _____

8. What is the color of the wall in the hallway on the first floor of West Sibley (where the CRP offices are located)? _____

9. What is the color of the rug in the reception room of Sibley 106? _____

10. What is the color of the walls in your bedroom? _____

11. What color shirt did I wear at last Tuesday's class? _____

12. How high is the ceiling in this room? _____

FIGURE 5.1 (Continued)

CRP 554 EXAM PAGE 2

13. How tall,in meters or feet, is the Olin Library (the building at the opposite end of the Quad from Sibley) ? _____

14. How tall, in meters or feet, is the Johnson Art Museum? _____

15. How many steps down are there from the outside door near 102 to the Arts Quad? _____

16. What is the material of these steps? _____

17. Is there a handrail on these steps? _____

18. What is the building material of most residential structures in Ithaca (general impression)? _____

19. What is the building material used on the outside front (Quad side) of Sibley? _____

20. Approximately what year was Sibley built? _____
Approximately what year was Olin Library built? _____
Approximately what year was the Johnson Art Museum built? _____
Approximately what year was Sage Hall built? _____
Approximately what year was Day Hall built? _____
Approximately what year was I born? _____

21. Was Sibley built at one time or in parts? _____

22. When you think of "suburb", what images come to mind? _____
_____
_____

23. When you think of "small town", what images come to mind? _____
_____
_____

24. When you think of "big city", what images come to mind? _____
_____
_____

25. Where would you prefer to live? suburb/small town/big city/other_____.
any of these_____

26. Where do you think it would be best for families with small children to live? suburb/small town/big city/other_____ any of these____

27. Where do you think it would be best for elderly people (65+) to live? suburb/small town/big city/other_____any of these____

28. Where do you think it would be best for single young adults to live? suburb/small town/big city/other_____any of these_____

29. Where would you like to live right now? suburb/small town/big city/ other_____any of these_____

FIGURE 5.1 (Continued)

The use of the sketch map as a teaching tool has seen application. The precise effect, its utility, and its strength are unexplored areas awaiting further research.

PLANNERS' VERSUS USERS' PERCEPTIONS

The final question relates to a long history of accusations against planners. Jane Jacob's (1961) formulation is the best known of these and her The Death and Life of Great American Cities is still the best source for details. Others have advanced these claims, including the current president, in emotional and political formulations. However, John Brunner (1965) provides the most insightful and eloquent statement in his novel about politics and planning, The Squares of the City.

> I forebore to tell him (it would have been very unkind) that although I had never set foot in Vados, I almost certainly knew more about the city than he did--more indeed than any of its citizens. (p. 9)

Whatever the formulation, the implication is that by training or predilection planners along with certain other bureaucratic "fellow travelers" plan changes which have no relation to the actual circumstance. The constructivist assumption provides a slightly different formulation. The hypothesis becomes that either the informatin images or the value images are essentially different between planners and users.

This project held the value images more or less constant. The respondents, whether users or planners, were predominately middle class, white service workers. Thus, the traditional cultural factors

often associated with values, such as race and income, were not major factors in the responses. However, differences were observed between user and planner groups. These differences seem most related to information levels. If this is, in fact, the case, then at least part of the argument in question is invalid. In fact, a range of information levels was observed. The planner group was in the middle level, not the top, in terms of information.

The three analyses which did address the value content of the response showed some differences in the images. With two exceptions these tended to reject the argument which has been advanced.

The exceptions are noteworthy. The importance of historic structures seemed to be primarily a planning fascination. The second was the East-West Mall concept which was simply incompatible with users' images.

The historical bias is difficult to assess. Evans et al.'s (1982) finding that historic structures were important to the elderly was not replicated. Evans used select groups and a different format, a recall technique, which may account for differences in conclusions. The recall approach asks "What do you know?" Here the question was "What is important?" Another difference was the locations involved. The last fact suggests a likely explanation. Quite simply, individual structure preservation may be a "planners" issue in Knoxville, and an important concern in Evans' study area.

The East-West Mall was a concern only of planners. Even here it was a minor element. This seems most likely to be a factor of current projects: the planners who worked with the East-West Mall

included it. As the project is not completed, it is not surprising that it was incompatible with the users' maps.

Both these differences can be explained in terms of time. Images are not temporal, just as they have no absolute scale. Thus, images can be "projected" forward into time and manipulated as a part of scenarios. Both differences can be explained in terms of time differences. It would not be surprising to find planners who regularly deal with 20-year time frames to hold images which reflect that time frame. This mandates another look at the argument in question. Accepting the time explanation, one is initially forced to agree with Jacobs that, yes, there are differences. These differences are well illustrated by the comparison between group 1 and the planner group. However, this does not unsatisfactory explain group 2.

Projections into "the future" are also seen in group 2. The most prominent of these is the emphasis on Jackson Avenue. This old warehouse district is seen by group 2 as the area of greatest potential within the CBD. Given the current conditions found on Jackson Avenue, any potential is unquestionably a projection into the future.

Given that both groups exhibit a degree of "future tense," the explanation must be a shared characteristic between them. Information content provides the most likely explanation. This allows rejection of the essential elements in the arguments in question.

However, this is not to say that there are not differences, particularly in differing cultural situations. It merely reduces considerably the force of the arguments advanced by Jacobs and others. If the unexplained difference is confined primarily to cultural terms,

then it only restates a central tenet contained in cultural analysis. Given that culture is a determining factor, why should a planner be immune from or somehow outside the normal human constraints? To suggest otherwise would be ludicrous. As is shown by this project, the assertion that planners form a different subculture is equally absurd.

The arguments advanced by Jacob and others find no basis for support within the context and the results of this project. Cultural bias is not excluded, and certainly the political and emotional sides of the argument remain untouched. In fact, the argument is correct insofar as it suggests that differing views are held. However, the suggestion of professionwide "myopia" or misunderstanding was not consistent with the most likely explanation, difference in information levels between planners and the general public.

SUMMARY

Speculations were advanced in three areas. The constructivist assumption was used to interpret the results. The following conclusions were advanced:

1. Value and information oriented approaches are compatible.
2. There seem to be three planning applications for mental mapping: teaching, citizen participation, and limited small area planning.
3. No support was found for a "specialized" planners' image. Thus, the arguments of Jacobs and others were found to be incompatible with the data collected.

In addition to the above conclusions, it was noted that information level seems to be a prime candidate for explaining differences within the responses. Two similar explanations were examined which explain the variations found. However, no firm conclusion could be established.

As the field of environmental perception and mental imagery continues to mature, the speculations advanced here may well prove untenable. It is a dynamic field and one that has undergone radical changes without reaching very basic consensus on a number of issues. While the future remains uncertain, it is certain to be interesting--and controversial. It is in that context that this project was undertaken and the above conclusions offered.

The final disposition of this project is tied to the "livability movement" discussed in the literature review section. Blaut and Stea (1971) write, "Long ago John Dewey asserted the principle that scientific beliefs are judged by their utility--are validated by practice" (p. 4). Buttimer writes, "The livability of residential environments has become one of the most urgent challenges facing our industrial cities" (Buttimer & Seamon, 1977:21). Whether this urgency is recognized and met is the key question. "All discourse, we shall say, is realized as event," claims Paul Ricouer (1981), "but understood as meaning" (p. 167). Without knowledge of the event's final unfolding, one can only speculate upon the meaning.

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APPENDIXES

APPENDIX A

QUESTIONNAIRES

Questionnaire Draft 2

1) In the space provided below please sketch a map of Knoxville's Downtown. Pretend you are drawing a map for a friend from out of town.

2) On the map you have just done please indicate the area you feel is most in need of improvement by an "X".

3) Briefly, why did you choose this area?

4) Please indicate the area you feel is the most desirable on the map you have drawn by a "2".

5) Why did you choose this area?

6) On the map you have just drawn please indicate the area with the most potential for improvement by a "3".

7) Why did you choose this area?

8) On the map you have just drawn please indicate the area you feel has the least potential for improvement by a "4".

9) Why did you choose this area?

PLEASE TURN TO NEXT PAGE

BACKGROUND INFORMATION

Please circle answer
which best describes you

1) Are you a resident of:

Knoxville, Knox. Co., OTHER

2) Why are you downtown?

work shopping resident OTHER

3) How often are you downtown?

once a year once a month once a week
more than once a week

4) How do you usually get to downtown?

bus car walk bicycle

5) What part of town do you live in?

Northwest Northeast South East West

6) What was the last year of school attended?

7 8 9 10 11 12 13 14 15 16+

7) How long have you been in Knoxville?

non-resident less than 1 year 1-3 years more than 3

8) Age?

under 25 25-35 35-65 over 65

9) Sex?

male female

10) Have you ever taken Knoxville Heritage's downtown walking tour?

Yes No

Please answer the following
questions as accurately as possible.
ALL ANSWERS ARE CONFIDENTIAL

1) What is your occupation?

2) Which word best describes you job?

__skilled labor __unskilled labor __clerical
__administrative __professional service __technical
__student __other

3) Please indicate your annual salary range.

__under 10,000 __10,000 to 15,000
__15,000 to 25,000 __over 25,000

4) Have you ever been asked to draw a map of downtown before?

__yes __no

(PRESURVEY ONLY)

1) Was it difficult to draw a map of downtown?
__yes __no

2) What was the hardest question to answer?

3) What would have made this survey easier to respond to?

4) Please rate the difficulty of this survey on a scale of 1 to 10, with 1 as very difficult and 10 as very easy.
___rating

#2 Pretest

THESIS QUESTIONNAIRE

1) In the space provided below make a quick sketch of Knoxville's Downtown. Pretend you are going to mail this quick sketch to a friend who wants to know what the downtown is like.

2) On the map you have just drawn please indicate the area you feel is most in need of improvement by a "1".

3) What one word or short phrase best describes this area?

4) On the map you have just drawn please indicate the area you feel is the most desirable by a "2".

5) What one word or short phrase best describes this area?

6) On the map you have just drawn please indicate the area you feel has the most potential for improvement by a "3".

7) What is the one word or short phrase that best describes this area?

8) On the map you have just drawn please indicate the area you feel has the least potential for improvements by a "4".

9) What one word or short phrase best describes this area?

****

PLEASE TURN TO THE NEXT PAGE

BACKGROUND INFORMATION

Please circle answer
which best describes you

1) Are you a resident of:

Knoxville, Knox. Co., OTHER

2) Why are you downtown?

work shopping resident OTHER

3) How often are you downtown?

once a year once a month once a week

more than once a week

4) How do you usually get to downtown?

bus car sidewalk bicycle

5) What section of town do you live in?

Northwest Northeast South East West

6) What was the last year of school attended?

7 8 9 10 11 12 13 14 15 16+

7) How long have you been in Knoxville?

non-resident less than 1 year 1-3 years

more than 3

8) Have you had any training in graphic skills (drawing, map-making, drafting, painting)?

yes no

9) Have you ever taken Knoxville Heritage's downtown walking tour?

yes no

10) Have you ever been asked to draw a map of downtown before?

yes no

Please answer the following
questions as accurately as possible.
ALL ANSWERS ARE CONFIDENTIAL

1) What is your occupation?

2) Which word best describes your job?

skilled labor unskilled labor clerical

administrative professional service

technical or research student OTHER

3) Please indicate you annual salary range.

under 10,000 10,000 to 15,000 15,000 to 35,000

over 35,000

4) Age _____

5) Sex

Male Female

FINAL

Thesis Questionnaire

1) A friend is coming in from out of town who wants to see the most important and interesting parts of downtown. Please draw her a quick sketch map to help her get around. Street names are not important.

2) What area of downtown do you feel is most in need of improvement? area around the lake

3) What one word or short phrase best describes this area? run-down

4) What area of downtown do you feel is the most desirable? Tennessee.

5) What one word or short phrase best describes this area? great

6) What area of downtown do you feel had the most potential for improvement? type right

7) What is the one word or short phrase that best describes this area? promising.

8) What area of downtown do you feel has the least potential for improvement? Around gay street.

9) What one word or short phrase best describes this area? deteriorated.

****

PLEASE TURN TO NEXT PAGE

BACKGROUND INFORMATION

Please circle answer
which best describes you

1) Are you a resident of:

Knoxville, Knox. Co., OTHER

2) Why are you downtown?

work shopping resident OTHER

3) How often are you downtown?

once a year once a month once a week

more than once a week

4) How do you usually get to downtown?

bus car walk bicycle

5) What section of town do you live in?

Northwest Northeast South East West

6) What was the last year of school attended?

7 8 9 10 11 12 13 14 15 16+

7) How long have you been in Knoxville?

non-resident less than 1 year 1-3 years

more than 3

8) Have you had any training in graphic skills (drawing, map-making, drafting, painting)?

yes no

9) Have you ever taken Knoxville Heritage's downtown walking tour?

yes no

10) Have you ever been asked to draw a map of downtown before?

yes no

Please answer the following
questions as accurately as possible.
ALL ANSWERS ARE CONFIDENTIAL

1) What is your occupation?

Part time research analyst.

2) Which word best describes your job?

skilled labor unskilled labor clerical

administrative professional service

technical or research student OTHER

3) Please indicate you annual salary range.

under 10,000 10,000 to 15,000 15,000 to 35,000

over 35,000

4) Age 29

5) Sex

Male Female

#4

What area of downtown do you feel is most in need of improvement? WINNERS
U AREA

what one word or short phrase best describes this area? WAREHOUSE

what area of downtown do you feel is the most desirable? MKT. SQUARE

What one word or short phrase best describes this area?

What rea of downtown do you feel has the most potential for improvement? feel.

What one word or short phrase best describes this area? Mkt St.
pot --> underused potential

What area of downtown has the least potential for improvement? CENTRAL / EAST AREA (whole area)

What one word or short phrase best describes this area? "blighted"

BACKGROUND INFORMATION

what degrees do you hold? from which schools ? when were they awarded?

AUBURN '71

'72

What was your academic specialization? ARCH.

What has been your professional specialization? Public Planning system

Current employer?

Current position or job title?

How long have you been with your present employer?

What is the most recent project you have worked with in downtown ?

Are you familar with the work done by Kevin LYNCH? yes

GENERAL BACKGROUND

How often are you downtown?

How do you ussually get downtown? drive

How long have you been in Knoxville? 69 since

Have you ever taken Knoxville Heritages downtown walking tour? yes

AGE 48
SEX M

Annual Salary range

20,000

APPENDIX B

DATA CODING

DATA CODING

The problems associated with data coding were covered in the literature review section. Insofar as was possible Appleyard's approaches which were detailed in his 1976 book were used. However, these were insufficient to serve as a complete guide for this project. This necessitated a lengthy process of criteria development and revision which is covered below. Much of the data coding is traditional, such as socio-economic responses; others are less familiar. The details of the less familiar coding processes should receive some consideration in evaluating the final results. The extent coding, area identification, organizational style coding, and element coding are outlined below.

The coding process itself is an interactive and repetitive attempt to find the best fits for the data collected and to meet three criteria. These criteria are:

1. Each coding determination or category series should be considered adequate only if it accounts for 85 percent or more of the codable responses.

2. The process itself should introduce sufficient binds on the researcher in order to prevent unintentional biases.

3. The responses must not be considered as maps.

On the basis of these considerations, a general procedure was followed. First, guidelines were developed using Appleyard wherever possible to describe a response which fit a certain category. A first run was then made on the 15-20 responses or as many as necessary to

determine the goodness of fit of the guidelines. The initial criteria was then changed to reflect the data being examined and subsequent runs were made on randomly selected responses until the number of responses which could be categorized equaled or exceeded 85 percent of the total codable responses.

Once a determination had been made of a specific data coding procedure, the following approach was employed. First, an initial examination was made of all codable responses. Second, the responses were coded according to the final guidelines. The result was coded on a separate piece of paper from other results and was transferred to a master list at the conclusion of the other data coding process.

The examination for codable responses was fairly consistent across the various data coding procedures. Generally, a response could not be coded for one of two reasons. Either the response was on too large a scale to be coded (see Appendix C) or it was not in spatial form to start with. There were some exceptions to this in the extent and the sequence codings. Some responses could be coded for extent which could not be coded for elements. Sequence coding presented a different problem. Here the actual coding was done at the time of the interview. However, repetitive sequences were discarded. Thus, a response showing only landmarks was considered uncodable. The follow-up interviews contributed greatly to ease the problems associated with data coding.

The extent coding was the most difficult procedure to develop. A base map of the CBD was obtained and responses were compared to this map as to whether they exceeded, equaled, or were less than the area

shown on the map. Criteria were developed to take care of isolated landmarks and districts shown as outlying to the CBD or in loose association with the central image shown in the response. After each run of the process the boundaries of the base map were changed so that the area considered as equal to was lessened and the criteria updated. The process took about two days to complete. The final base map is shown in Figure B.1. The final criteria were:

1. Isolated landmarks were not considered in the extent analysis.

2. Indication of the Expo site was not considered in the extent analysis.

3. Indicated boundaries were taken to be the final determinant of extent, except when boundaries were shown in association with outlying districts such as Ft. Sanders or Morningside.

4. Distant districts which were indicated at the end of a path were not considered as part of the extent analysis. For example, one respondent shows the Smoky Mountains at the remote end of Henley Street.

The area identification coding was similar to the extent coding. Here the replies to questions 2, 4, 6, and 8 were charted on the base map and clusters were identified. The boundaries of these clusters were expanded until most of the responses were accounted for. This produced an undifferentiated mix between "area" responses, such as Jackson Avenue, and building responses, such as the old Court House. Thus, there was some clouding of the data. However, most of the responses were of the area category. The resulting divisions are

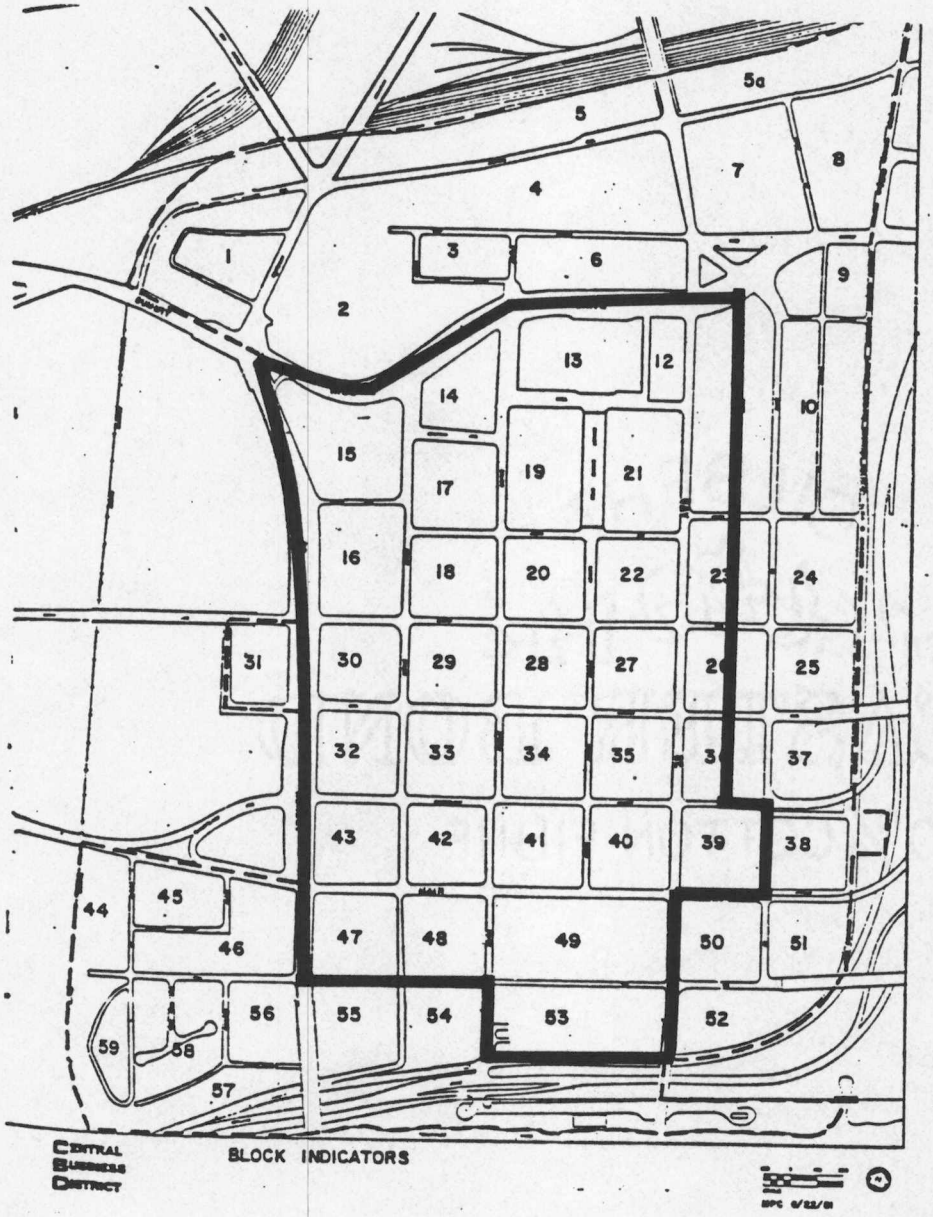


FIGURE B.1

EXTENT BASE

shown in the data analysis section. An additional response type, area 8, was developed to group nonspatial responses, nonlocation specific responses, and specific location responses which did not fit into one of the areas developed.

Organizational style coding followed Appleyard more closely than any of the other procedures. A detailed discussion of this process can be found in Planning a Pluralistic City (Appleyard, 1976). Additional information of specifics proved unavailable.

Two specific changes were made in terms of Appleyard's approach. First, the responses were coded twice, a week apart, after the final guidelines were developed. Differences between the two separate codings were assigned to the lower of the two designations for the planners and the higher of the two designations for the user groups. This was done to mitigate any subconscious biases in favor of the planners' maps by the researcher who shares a similar training and background.

Second, distinction between Mosaic, Link, and Pattern Maps was clearly defined. Most of the maps Appleyard examined were sequential, which is expected at the scale of his investigation. However, almost all the responses in this project were spatial. Thus, a need was felt for a more specific examination. The four templates are outlined below (Appleyard, 1976:160 for the original distinctions).

Cluster and Scatter: No change.

Mosaic: Any map which showed a district and showed the spatial relationship to other environmental elements was considered a Mosaic map.

Link: A map which exhibited places and districts and their linkages. In this case the treatment of roads was confined to paths.

Pattern: A map which relied upon the road system for its structuring. These usually incorporated features of other than just roads, but clearly indicated some roads which were not paths between indicated districts or landmarks.

The categories are structured, as Appleyard notes, in an overlapping manner. This is in the order of complexity, with Patterns as the most complex, Link and Mosaic next, and Cluster and Scatter as the least complex.

Thus, the coding first asked, "Is a response a Pattern response?" and if not, proceeded through the remaining categories until an appropriate category was found. While the examples shown in the original seem exclusive, Appleyard (1976) makes clear they are not, and this research project adopted the same position (pp. 156-161).

Appleyard employed map "errors" to help classify the responses. This was not done in this study for two reasons. First, it implicitly treats the responses as actual maps. Second, the usage was primarily with the large-scale sequence maps under study and was unnecessary with the responses found in this study which were almost exclusively spatial and "local" maps, in Appleyard's terminology (Appleyard, 1976:156-160).

The organizational style coding was the easiest of the data codings done from the sketch maps. The templates Appleyard developed proved to be extremely efficient and applicable despite the different culture in which they were developed and the passage of time since their development in the early 1960s.

The final coding process was element coding. This was the most difficult and time consuming of the data coding steps. First, the elements themselves were identified. Second, criteria were developed to account for specific problems associated with the data. The final process contains three biases which limit its applicability in other situations.

Identification of the environmental elements to be coded took three attempts. An initial attempt was made on the basis of lots. This proved too detailed. A second attempt was made based on city blocks. Although this was a more successful approach, it distorted the area between State Street and Market Street. For example, a response indicating a block on Gay Street would be coded the same as a response on State Street immediately to the east. The third trial was primarily city blocks with substitutions made along Gay, State, and Market Streets in the form of north-south block faces. The final trial proved successful and a sample coding sheet is shown in Figure B.2.

Several criteria were developed to assist in the element coding process. The final criteria were:

1. Landmarks were coded first.

2. Streets were coded second.

3. Districts were coded on the basis of areas previously developed.

4. External paths were not coded.

5. Boundaries were not coded.

6. "Errors" in landmark placement were coded in their actual, as opposed to indicated, locations.



FIGURE B.2

SAMPLE CODING SHEET

7. Landmarks external to the coding map were not coded.

8. Questions were resolved in favor of not coding an element.

The above criteria proved sufficient to account for 85 percent of the usable responses.

There are several problems associated with this procedure which limit its applicability to other research. These are:

1. The process is marginal when used with sequential maps.

2. The block face/city block combination can underestimate some responses when combined with criteria 8. There are two examples of this: (a) Kendrick Place development is located at a break in the grid system and is probably underrepresented; (b) nodes will tend to be underestimated. As indicated earlier, the node category was not used in this project. However, in examining linear development, it is essential and difficult to reconcile with the block face/city block format.

3. The format is not immediately applicable to computer generated displays. A researcher wishing to use Gould's original methodology would have to employ either the difficult SURF2 package, or make significant interpolations to employ SASGRAPH, ASPEX, or Calcomp packages. A smaller scale project would encounter fewer difficulties. A larger project would magnify this problem.

4. The process does not handle the "dead" areas or low response areas explicitly. A researcher interested in that phenomenon would expend considerable unnecessary time following this approach.

5. Changes in perception over time did not enter into the element coding process. A researcher investigation change over time would probably find element coding unnecessary.

The problems need to be weighed against two advantages provided by element coding. These are:

1. It allows an interval analysis of the responses without treating the "sketch maps" as actual maps.

2. For a researcher primarily interested in accessing the physical environment's relationship to the responses, it allows a direct analysis. This is vastly superior to the regression approaches based on pseudo-interval scaling imposed by some researchers (Evans, et al., 1982; Appleyard, 1976). A Piosson distribution with a X^2 variant can be used to access actual density difference against

various hypothetical distributions, thus allowing direct and simple evaluation. It would require a larger study area than found in this project.

These benefits outweigh the considerable time involved in element coding.

Summary

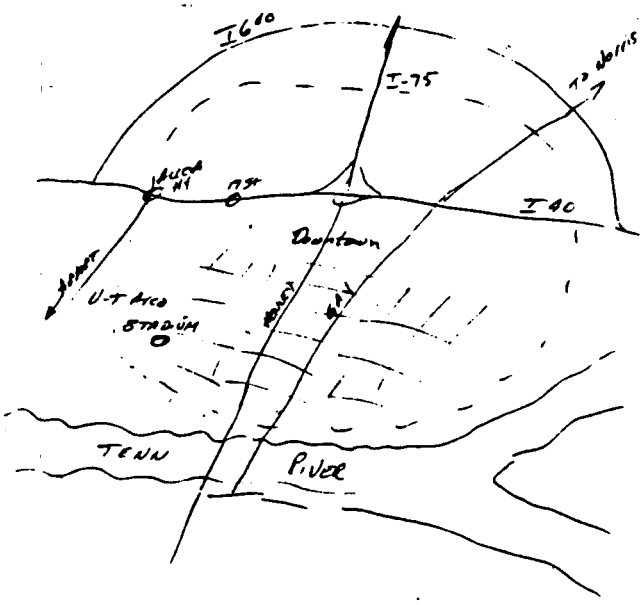
Data coding of sketch maps inevitably introduces biases. The process outlined above attempts to ameliorate implicit biases. Of the various coding approaches, Appleyard's templates proved the most efficient and least time-consuming. The element analysis was the most time-consuming. It produced a valuable asset for this research. However, its applicability is constrained and, unlike the other coding procedures, would not be recommended to most other researchers.

APPENDIX C

SKETCH MAP EXAMPLES

SKETCH MAP EXAMPLES

The core of the research project is the sketch maps drawn by the respondents. The sketch map question format provided a respondent-oriented approach to the research. This has an immediate advantage of eliminating some of the more subtle biases involved in constructing the questionnaire. While the selections included do illustrate sections of the text, the very human aspect of the responses is equally important. This quality tends to get lost among statistics and references. However, it should not be ignored. Each response reflects the individual as well as the environment. A separate project could easily be devoted to the human and subjective attributes found in the responses. But perhaps the responses speak best for themselves. The next few pages exhibit some of the diversity, humor, and life found in the responses.

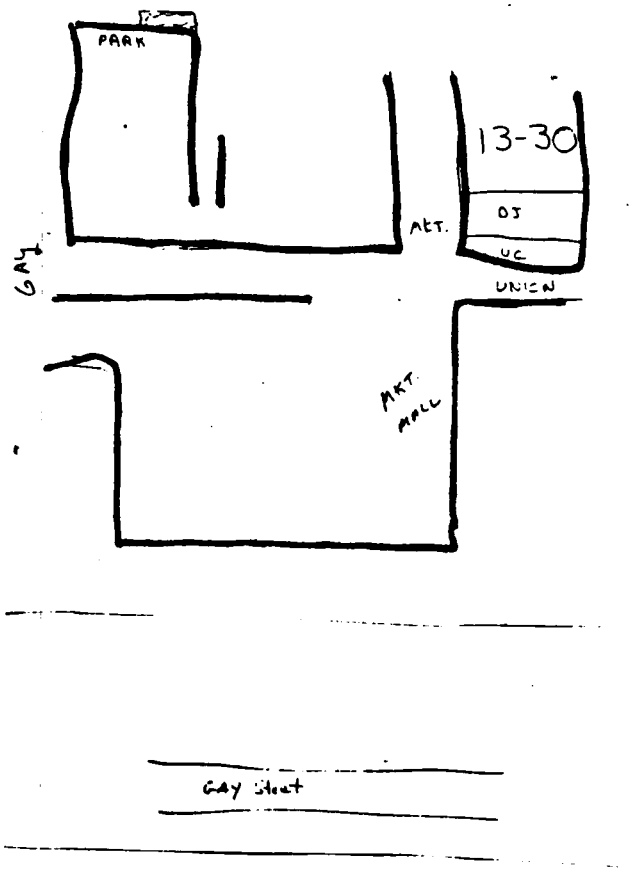


I would not advise any of my friends to come downtown, because as yet there is much more a "town lift" job to do & I doubt if exposed civic renovate - help downtown much at all.

I have lived in Georgia for the past 4 years and have recently moved back to Knoxville. I use to enjoy going down town when lived here before, but now it hurts when you walk down Gay Street and see all the building down there for rent or Sale sign like and more stor

FIGURE C.1

THREE UNCODABLE RESPONSES



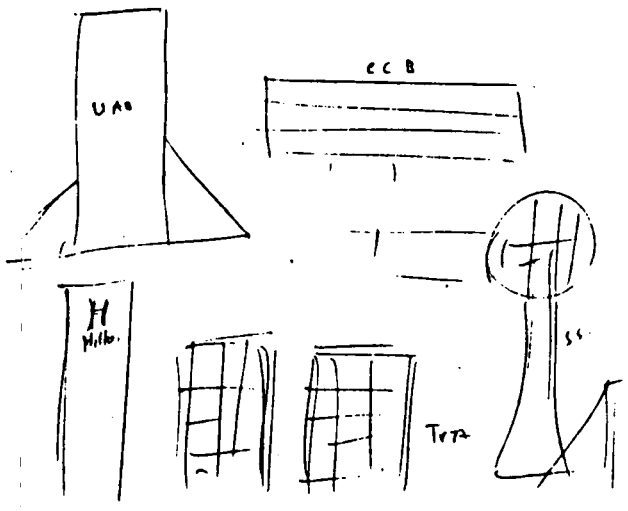


FIGURE C.2

SOME RESPONSES MADE LITTLE SENSE WITHOUT THE FOLLOW-UP INTERVIEW.



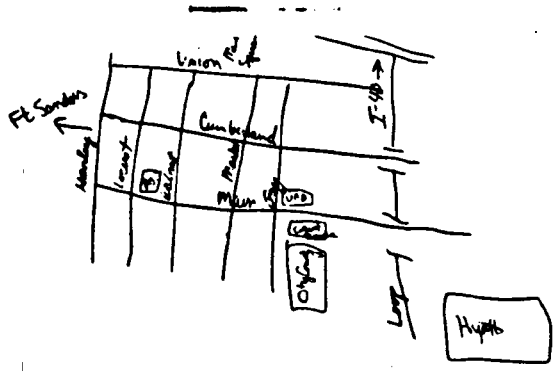


FIGURE C.3

DISORIENTATION WAS COMMON AND WAS OFTEN ASSOCIATED WITH THE GRID SYSTEM.

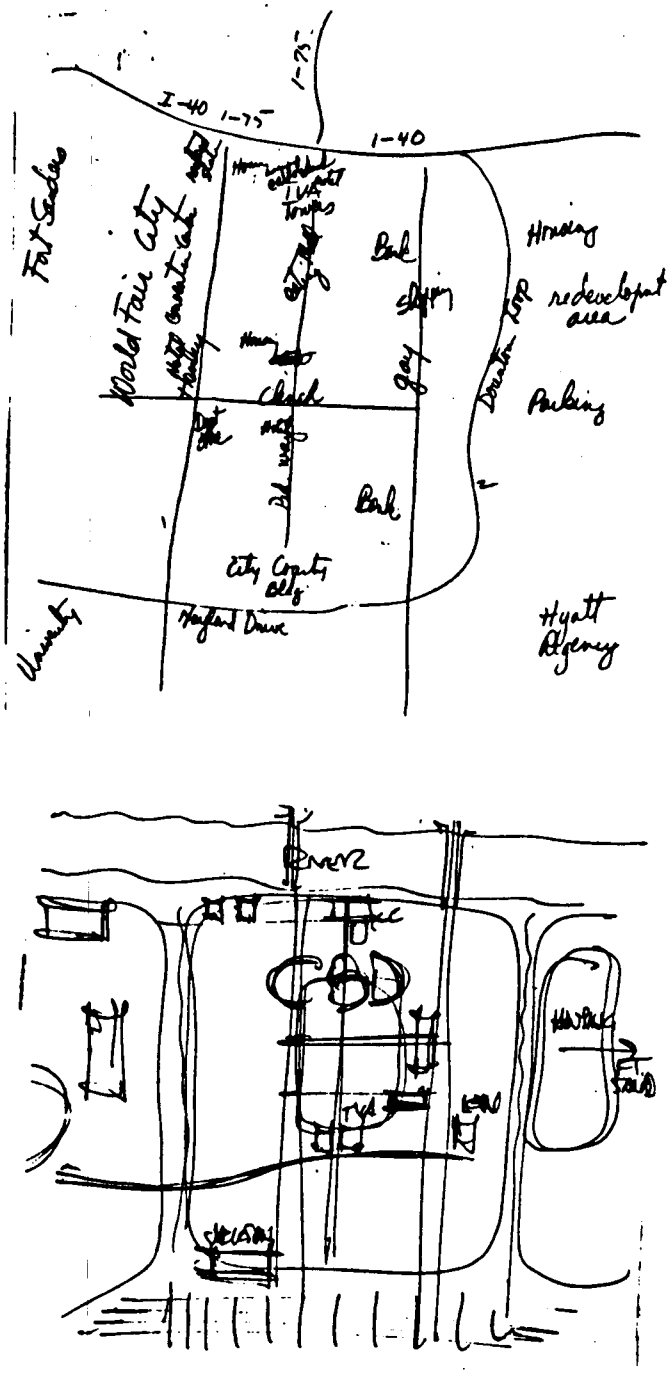


FIGURE C.4

STYLE VARIED GREATLY. EACH RESPONSE CONTAINS SOME UNIQUE QUALITIES WHICH REFLECT THE INDIVIDUAL.

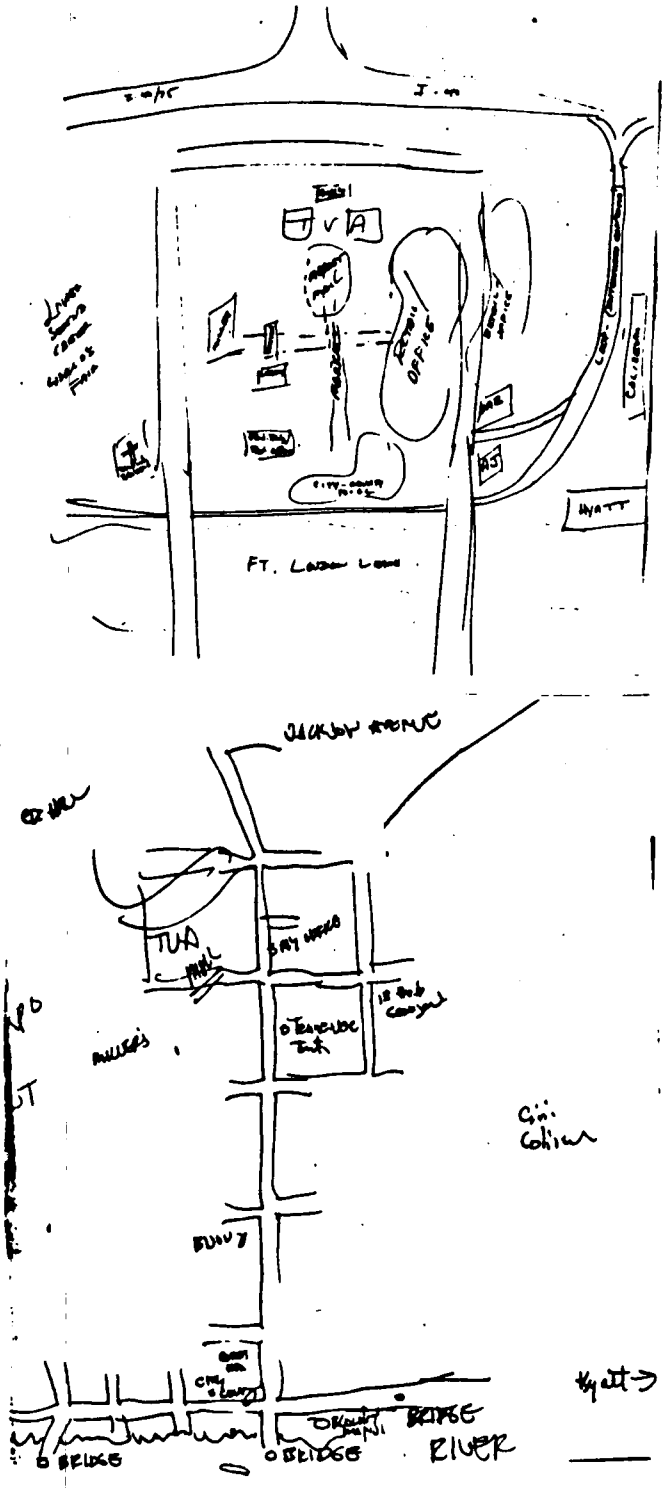


FIGURE C.5

THE DEGREE OF GENERALIZATION VARIED BETWEEN RESPONDENTS.

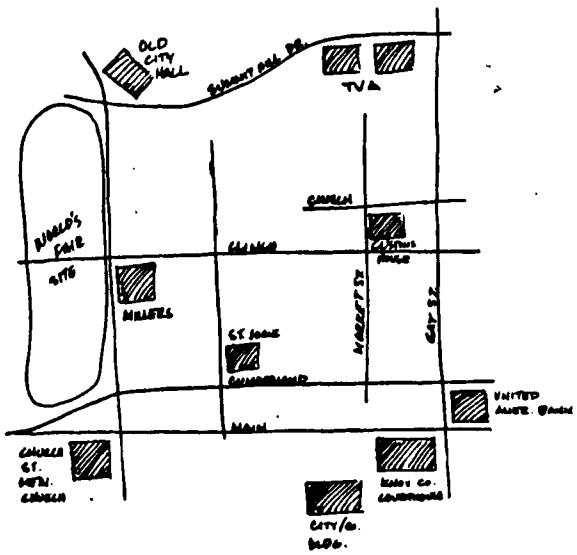


FIGURE C.6

GRAPHIC SKILL WAS GENERALLY HIGH
AMONGST THE PLANNERS.

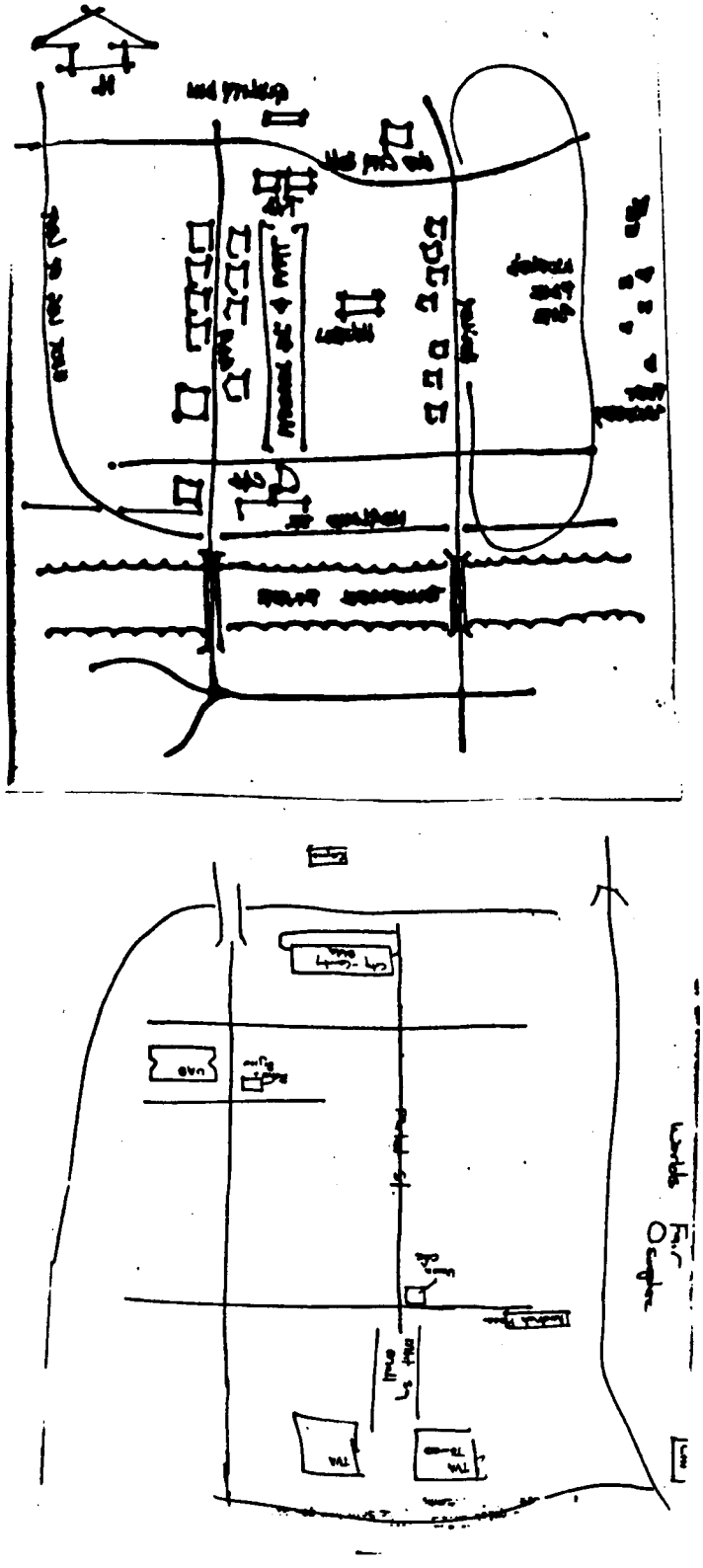


FIGURE C.7

MANY PLANNERS CENTERED THEIR RESPONSES ALONG MARKET STREET.

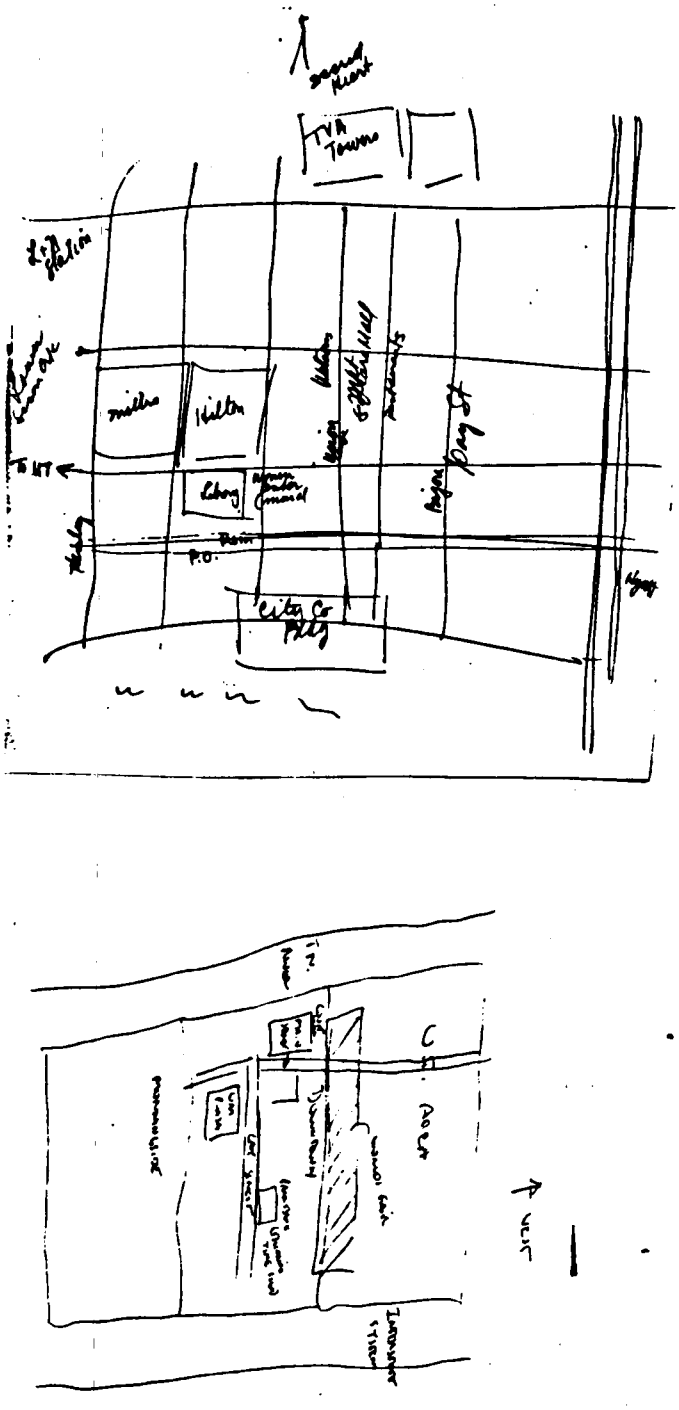


FIGURE C.8

VARIATION IN SCALE CREATED A LONGER CODING PROCESS.

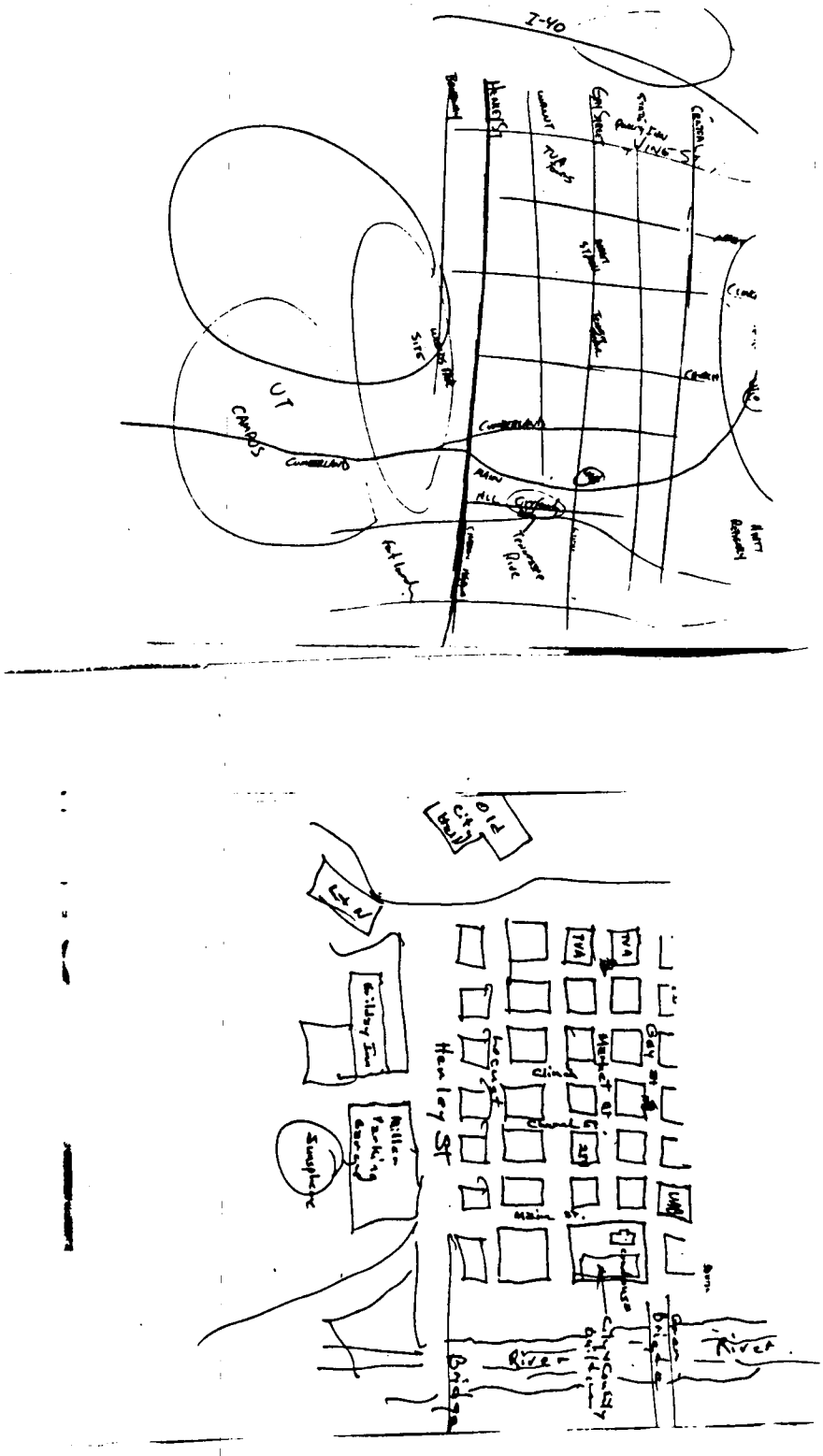


FIGURE C.9

THE TRIANGLE BETWEEN HENLEY, MAIN, AND CUMBERLAND APPEARED IN A NUMBER OF EARLY RESPONSES, BUT DISAPPEARED AFTER IT WAS PAVED AND FENCED OFF.

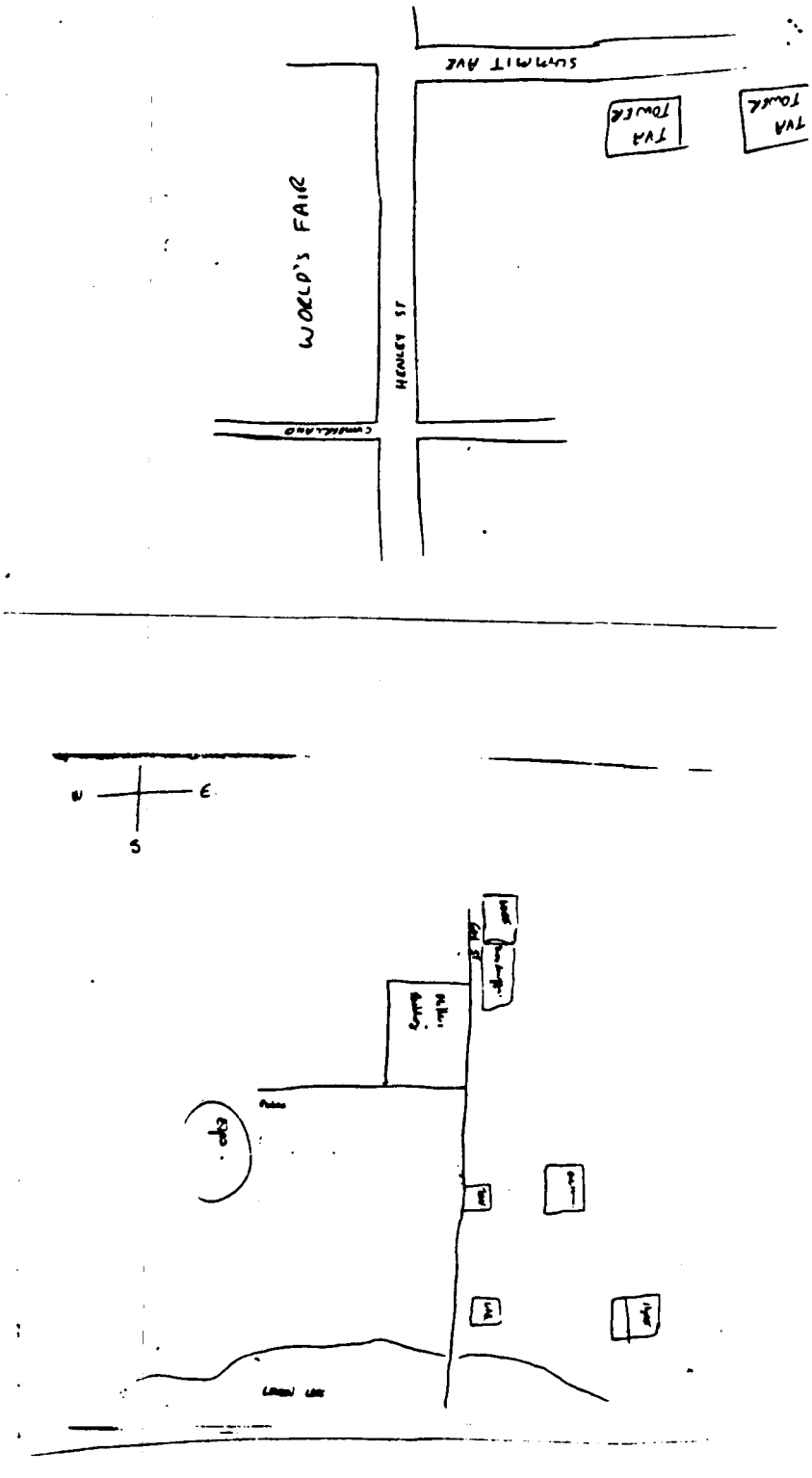
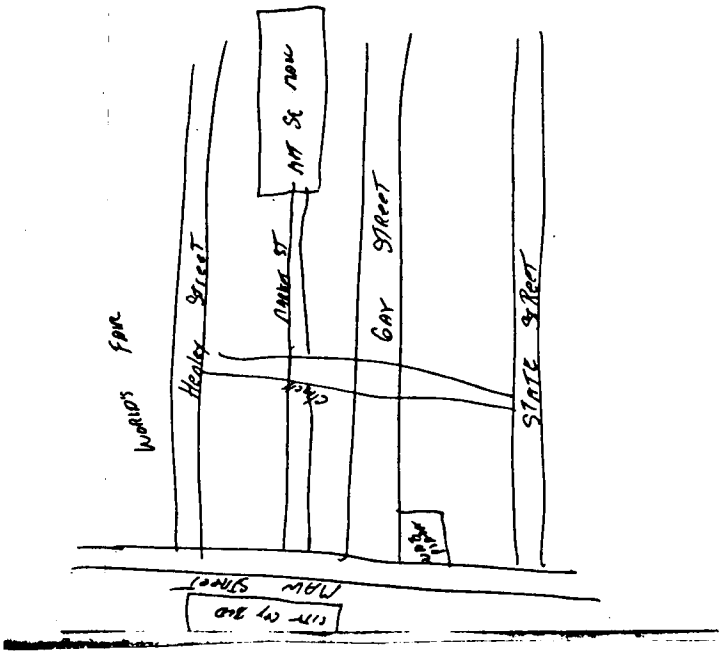


FIGURE C.10

EARLY IN THE SURVEY THE WORLD'S FAIR SITE WAS INDISTINCT.



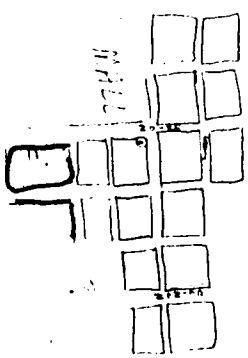


FIGURE C.11

BOUNDARIES TEND TO DRIFT OFF THE EDGES, ESPECIALLY IN THE GROUP 1 RESPONSES SUCH AS THE BOTTOM RESPONSE ABOVE.

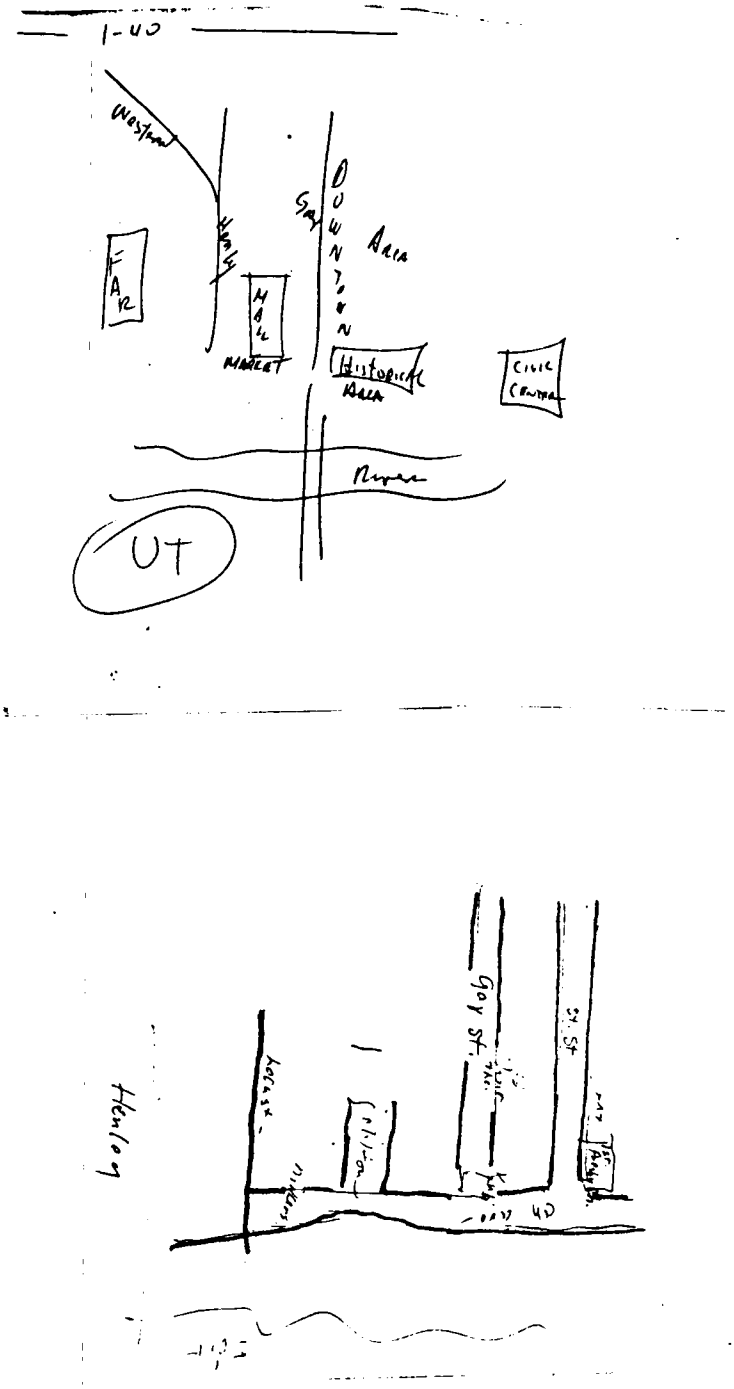


FIGURE C.12

THE INDIVIDUAL CONTRIBUTES A PART TO THE RESPONSES WHICH IS NOT SHARED BY THE OVERALL GROUP. THE TOP MAP SHOWS GAY STREET LABELED AS DOWNTOWN. THE BOTTOM MAP WAS DRAWN BY A MEMBER OF FIRST PRESBYTERIAN CHURCH. IT CLEARLY SHOWS STATE STREET.

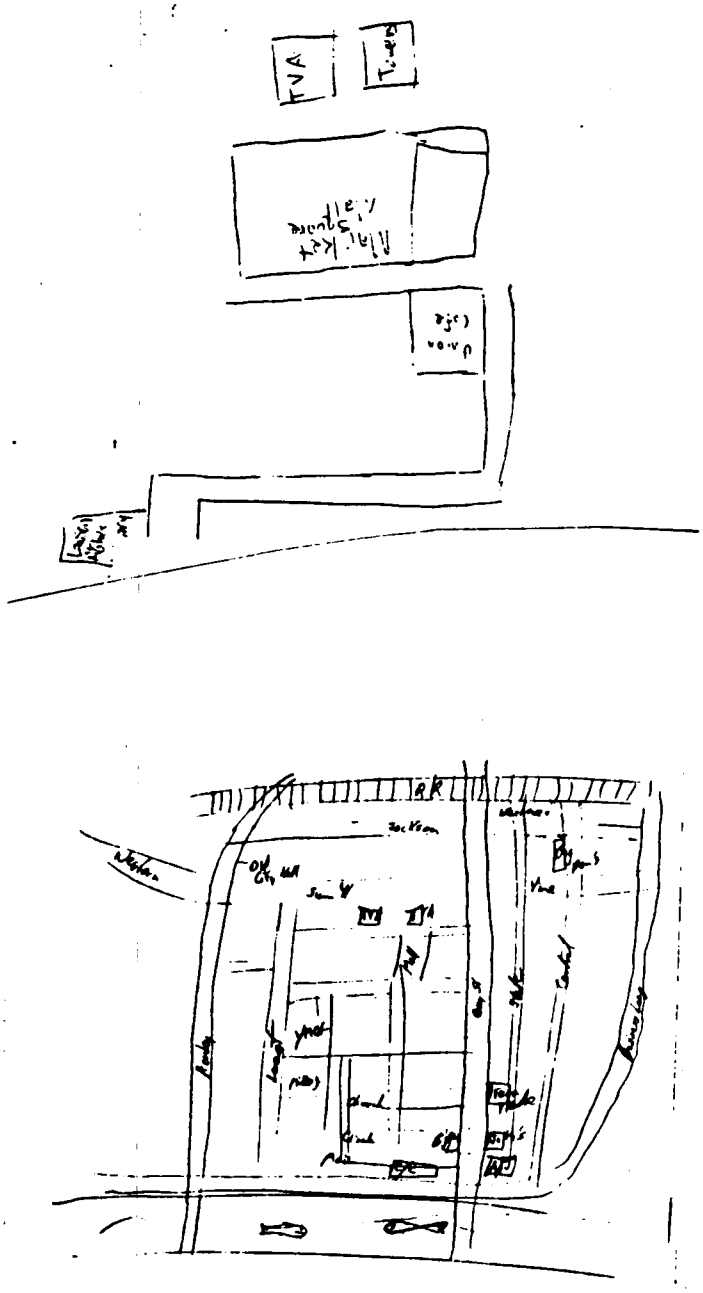


FIGURE C.13

LOCATION OF THE INTERVIEW HAS LITTLE EFFECT ON THE RESPONSE. BOTH THE ABOVE MAPS ARE FROM THE UNION AND GAY INTERVIEW LOCATION.

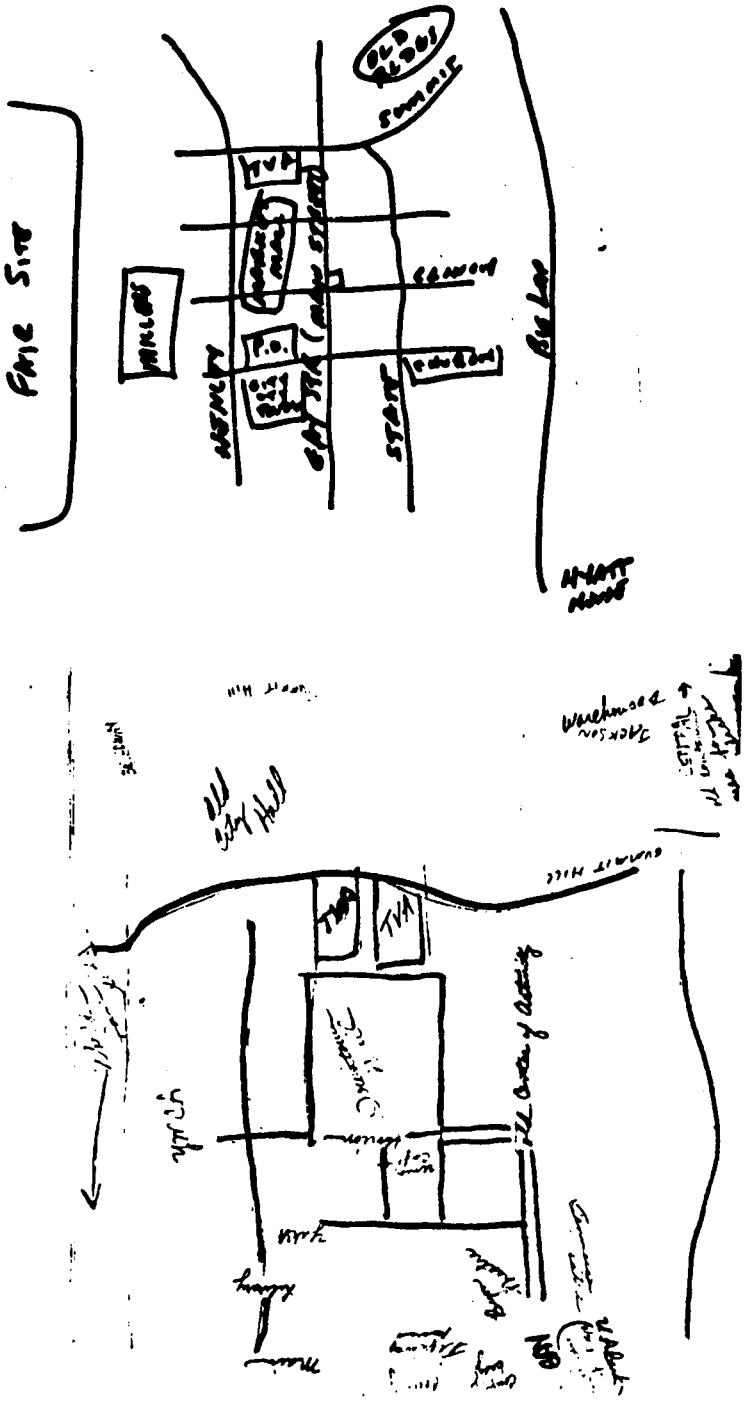


FIGURE C.14

THESE MAPS SHOW DIFFERENT TREATMENTS OF THE JACKSON AVENUE AREA.

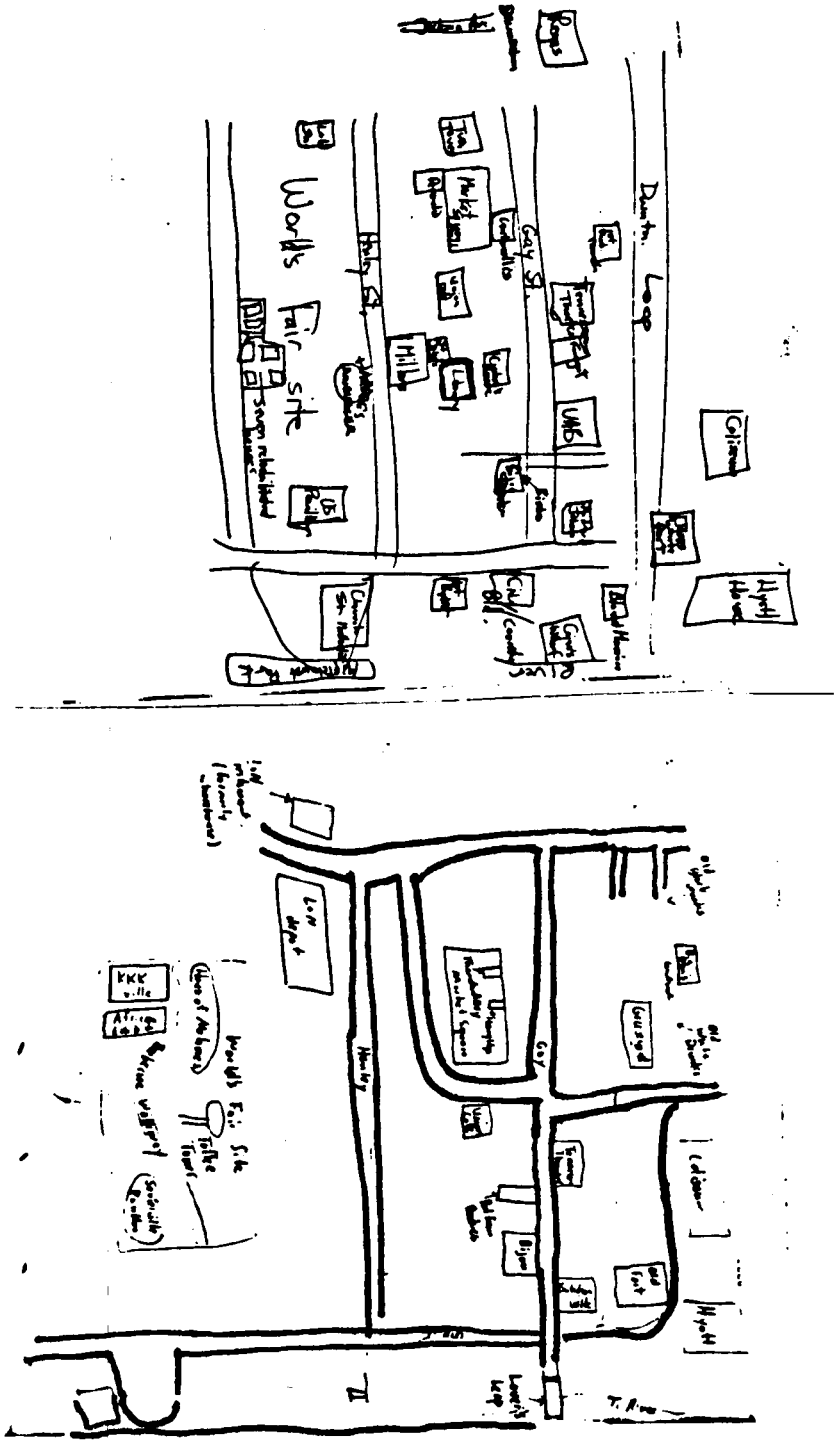


FIGURE C.15

AT THE END OF THE SURVEY, THE FAIR SITE BECAME MORE DISTINCT. LANDMARKS SUCH AS THE LAKE, THE L&N, AND THE SUNSPHERE BECAME COMMON FEATURES. THE ABOVE MAPS COMBINE THESE TRENDS WITH AN INTERESTING SORT OF HUMOR.

APPENDIX D

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS

The following is an overview of the statistics and reasoning behind individual choices for a particular analysis.

The Chi-Square Test for Two Independent Samples

An extension of the chi-square test for a single-sample case, the two-independent-sample version of the chi-square test is a goodness-of-fit statistic for the analysis of rX2 tabular distributions.

$$X^2 = \frac{(O_k - E_k)^2}{E_k} ,$$

where
O_k = observed cell frequency for the kth cell
E_k = expected cell frequency for the kth cell

Advantages and Disadvantages of the Chi-Square Test. Again, because of the sensitivity of the X^2 statistic to extremely small N's (i.e., less than 25) or extremely large N's (i.e., more than 250), applications of this test outside these recommended N ranges are not encouraged. If the researcher applies the chi-square test to extremely small samples or extremely large ones, a degree of distortion is introduced that amplifies the magnitude of the resulting X^2 value. This distortion tends to give the investigator a false sense of statistical significance associated with the observed table of frequencies.

When appropriately applied, the chi-square test is a rapid method of determining goodness of fit for categorical data. It is well known and widely used in the social science literature. There is an interpretive table with critical values of chi square that accompanies all hypothesis tests, thus making this technique increasingly attractive in research work. Of course, whenever the researcher is able to assume a higher level of measurement with the data being analyzed, more appropriate statistical tests would be desirable, which would use more of the information available. In some respects, the chi-square test is a "last resort" if other, more powerful, tests are ruled out as statistical alternatives.

Yates' Correction for Continuity

When sample size ranges from 25 to 75, a correction factor is recommended that is designed to reduce slightly the

magnitude of the resulting observed chi-square value. This is called Yates' correction for continuity. It consists simply of reducing the magnitude of difference between each observed and each expected cell frequency by .5. It is applied exclusively to 2 X 2 tables . . ., although the sample size in that table is well beyond the recommended range of application for this procedure. If we were to apply Yates' correction to the data in Table 9.7, we would move each expected cell frequency .5 closer to its observed cell frequency counterpart. For instance, the observed frequency for cell a was 29. The original expected cell frequency for cell a was 35.4. We will apply Yates' correction by moving 35.4 closer to the observed frequency by changing 35.4 to 34.9 (a difference of .5 points). Yates' correction applied to the data in Table 9.7 results in the modification for all cells shown in Table 9.9. The resulting chi-square observed value is now 4.422, a reduction from the original value (without Yates' correction applied) of 5.202. This is not a substantial reduction in observed chi-square values, and the 4.422 value continues to equal or exceed the original critical chi-square value of 3.841 for the .05 level of significance (two-tailed test). But the correction illustrates the general effect of Yates' procedure on the reduction of the overall magnitude of the observed chi-square value.

Yates' correction is recommended only for sample sizes ranging from 25 to 75. The correction applied to samples of size 200, for instance, would make the difference in the observed chi-square values (with or without the correction applied) negligible. This correction is a conservative step to offset the distorting impact of relatively small samples sizes. Reducing the size of the observed chi-square value makes it slightly more difficult to reject H_0's in hypothesis tests. Yates' correction for continuity should never be applied to tables larger than 2 X 2. (Champion, 1981:234-240)

The Z Test for Differences Between Proportions

The Z test for proportion differences examines two samples and the proportionate distribution of some nominal dichotomous characteristic between them

$$Z = \frac{P_1 - P_2}{S_{p_1 - p_2}},$$

where

P_1 and P_2 = proportion of "yes" responses for groups 1 and 2
$S_{p_1 - p_2}$ = standard error of the difference between the two proportions

Advantages and Disadvantages of the Z Test. The Z test for differences between proportions provides an approximation of a Z value that can be used in conjunction with the unit normal distribution. This does not mean that the Z test requires normality. The formula for the Z test merely provides an approximation of Z that can be interpreted according to the normal-curve table, Table A3. Because of our familiarity with Z values and their utility in statistical decision making, the Z approximation provided by this test is an attractive feature of it.

Another advantage is that the Z test can handle large numbers of elements. Many nonparametric statistical procedures are limited to relatively small sample size applications. There are no sample-size restrictions with the Z test. When $N_1 + N_2$ 30, the resulting Z value may be treated as a t value, with $N_1 + N_2 - 2$ degrees of freedom and interpreted accordingly. (Champion, 1981:227-280)

X^2 with Yates' correction/sequence analysis

The sequence analysis used the X^2 statistic to determine significance. It should be noted that there are problems encountered with small cell frequencies and small sample sizes which tend to overestimate the results. In consideration of this possible bias, the Z test was used to confirm the X^2 estimations. However, the Z test introduces problems associated with dichotomizing the variables. In the case of sequence the planners exhibited a highly consistent tendency which makes the application of non-parametrics difficult. Further, the sample breakdowns produced N's which fell in the gray range for the X^2 statistic. Because this is only one of a series of interrelated analyses, the difficulties encountered are not extreme. Their contribution is as one supporting piece of evidence and insofar as the result supports other related analyses, questions of overestimation and dichotomization are not overridingly crucial.

The cell frequencies and sample sizes associated with this nominal level investigation render the selection of an ideal statistic

impossible. X^2 with the Yates' correction factor in association with the Z test for proportional differences is the preferred statistic (Champion, 1981; Costner, 1965). However, there are alternatives which might have produced different results. In particular the extension of the Fisher Exact test beyond the 2 X 2 table advocated by Pierce (Pierce, 1970) would have allowed a more in-depth investigation along the lines of a variety of possible sequences. However, the permissible upper limit N values are not fully explored. The ALGOL model developed by Pierce can handle large sample sizes. Whether it is appropriate to do so is not covered in Pierce's text. As a very general rule Fisher's Exact test is limited to an N of less than 25 in the 2 X 2 format. Logically one would expect only a slightly larger permissible N for the expanded table format. However, the extension to Fisher's Exact test may present a valid analytic approach to the sequence analysis problem. The decision to proceed with the X^2 with Yates' correction in association with the Z test is evidence of a conservative approach to the data analysis process. A less conservative reserrcher might have pursued a different strategy in the choice of statistical tests with a valid logical basis (Costner, 1965; Champion, 1981; Pierce, 1970).

THE KOLMOGOROV-SMIRNOV TEST

> The Kolmogorov-Smirnov (K-S) test is a goodness-of-fit procedure in a sense. A distribution of frequencies is arranged throughout k ranked or gradated categories. This observed distribution of frequencies is compared with an hypothetical distribution that is presumed to be equally distributed throughout the k categories. The actual comparison is made between cumulative frequencies from one category to the next. If there is substantial variation between the two cumulative frequency distributions (i.e., between what is observed and what would be expected if the data were equally divided across

the k categories), the observed frequency distribution would be considered significantly different from what would be expected according to chance. (Champion, 1981:258)

Advantages and Disadvantages of the K-S Test. Compared with the Wald-Wolfowitz runs test, the K-S test is approximately 85 to 90 percent as powerful as the parametric t test for rejecting false null hypotheses. The greater power differential of the K-S test makes it a more desirable alternative compared with the runs test.

The K-S test deals with tied scores effectively. Any cell containing more than one frequency constitutes a tied-score situation. In Table 10.3, for instance, there are 42 tied scores in the first cell in row 1,

TABLE 10.5

	QPA				
	High	Mod.High	Mod.Low	Low	Totals
Prepaid	19	42	50	77	$N_1 = 188$
Fee-for-Service	90	53	47	36	$N_2 = 226$

77 tied scores in the second cell in row 1, 90 tied scores in the second cell in row 2, and so on. The researcher must create k categories into which the data for the two samples can be distributed. The raw scores cannot be dealt with directly as was the case with the runs test.

The K-S test is particularly useful for comparing two distributions of elements on some ordinal characteristic. The researcher simply identifies an attitudinal or behavioral variable, divides the variable logically into k graded subclasses or categories, and compares the resulting cumulative frequency distributions according to the proportionate differences between them.

A table is available (Table A11) for determining critical D values for hypothesis-test purposes. The K-S test is easy to compute and is subject to no sample-size restrictions. It has no restrictive distributional assumptions such as normality, and it is properly regarded as one of the better nonparametric two-sample tests at the ordinal level of measurement. There are no serious disadvantages associated with the K-S test. (Champion, 1981:270-71)

K-S Test/Organizational Styles

The choice of the Kolmogorov-Smirnov two sample test is a second choice. While the K-S test is 85-90 percent as powerful in

rejecting a null hypothesis as the parametric T test, it is not as powerful as the better known Mann-Whitney U test (Champion, 1981:270-71). A slightly different research approach could utilize the Mann-Whitney and so improve the data analysis process. However, in this case there are no raw scores upon which to base a ranking process. Further, Appleyard's templates are ordinal categories which when subjected to statistical analysis behave as tied scores. As one goal of the research project is to show the inter-supporting nature of the available analysis approaches, the situation which forced reliance on a secondary ordinal measure of significance was anticipated and the consequence judged acceptable in consideration of the research goals (Champion, 1981; Costner, 1965).

The t Test for Differences Between Means

> The t test for differences between means is an extension of the t test for a single sample. Therefore, almost all of the assumptions, advantages, and disadvantages associated with the application of the t test in the single-sample case also pertain to the two-sample case.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{\bar{x}_1 - \bar{x}_2}},$$

where

$\bar{X}_1$ = mean for the first sample

$\bar{X}_2$ = mean for the second sample

$S_{\bar{x}_1 - \bar{x}_2}$ = standard error of the difference between the two means

the standard error of the difference between the two means is determined as follows:

$$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}},$$

where

N_1 and N_2 = two sample sizes

S_1^2 and S_2^2 = two sample variances

Advantages and Disadvantages of the t Test for Mean Differences. The fact that two means are being analyzed rather than one makes the test slightly more cumbersome to apply than the single-sample version of it. The denominator term, $S_{\bar{x}_1 - \bar{x}_2}$, is more complex as well, inasmuch as two variances are combined or "pooled." Other than these minor differences, the same advantages and disadvantages associated with the single-sample t test also apply here.

Interval-Level Tests of Significance

The test is appropriate for data at the inverval level of measurement (sometimes a disadvantage where ordinal attitudinal scales are used). It is easy to apply and interpret with available tables of critical values, and it is the most powerful test for assessing mean differences between groups.

On the negative side, the stringent level of measurement and normality assumptions as well as the "equal variances" recommendation made by some researchers are significant constraints and limit the t test's utility in a large number of research projects. Again, when the assumptions are met, it is the best test to use to assess differences between two groups for a characteristic measured at the interval level. (Champion, 1981:171-180)

Eta, the Correlation Ratio,

If the researcher wants to determine the degree of association between one nominal and one interval variable, eta, the correlation ratio (η), may be used. Some instances of the utility of the correlation ratio might include examining the association between race and income, group membership and age, religious affiliation and church attendance, and occupational category and amount of leisure time.

One option available to the researcher is to reduce the interval-level variable to the ordinal measurement level and compute theta. This would result in some data loss, however. The correlation ratio will preserve the properties of the variable measured according to an interval scale. It will permit the researcher to compute the degree of association between k categories on a nominal variable and the selected interval variable.

$$= 1 - \frac{Y_T^2 - (N_1)(\bar{Y}_1)^2 - (N_2)(\bar{Y}_2)^2}{Y_T^2 - (N_1 + N_2)(\bar{Y}_T)^2},$$

where

N_1 and N_2 = two sample sizes
$\bar{Y}_T$ = grand mean for groups 1 and 2 combined
$\bar{Y}_1$ and $\bar{Y}_2$ = mean scores for groups 1 and 2
Y_T^2 = sum of squared scores across both samples

The Significance of Eta. The statistical significance of an observed eta value is tested by the following F formula:

$$F = \frac{^2(N - k)}{(1 - \ ^2)(k - 1)},$$

where

N = total number of persons in both samples
k = number of subclasses on the nominal variable

Advantages and Disadvantages of Eta. The correlation ratio is often suggested as an alternative measure of association to the Pearson r whenever the bivariate normal distribution or linearity assumptions are not met. The correlation ratio has no such distributional restrictions. In fact, this measure will reflect accurately an association between variables that is curvilinear. This is one of its major strengths contrasted with Pearson's r.

The correlation ratio has a PRE interpretation. It is one of the only measures available for measuring association between a qualitative (nominal) variable and a variable measured according to an interval scale. It is fairly easy to compute. In Table 11.14, the application of eta was illustrated for two groups only. This measure can be extended to any number of groups. (Champion, 1981:344-348)

Information Space/Eta, the Correlation Ratio (η)

Eta, the correlation ratio (η) is a nominal/interval measure of association. This approach preserves the interval nature of the information proxy. Based on the previous element frequency analysis,

one could develop a strong case for treatment of the subgroups as ordinal with group 2 as the first order, the planner group as the second order and group 1 as the third order. Jasper's M would be the preferred measure in the ordinal scenario. However, a conservative approach finds this ordinal treatment premature. Therefore, Eta is the statistic of choice because it preserves the nominal characteristics of the groups and the interval nature of the information proxy.

There are alternatives to the approach pursued in the investigation of the information space. Gould's alternative was not used due to the problems associated with the assignment of values to logically indistinguishable locations which were discussed in the introduction. A second problematic approach is Poisson's distribution in conjunction with an X^2 test. This alternative is appropriate and potentially represents a highly informative analysis. For example, the Poisson approach would allow not only an investigation of the differences between the groups but also could be used to explore the relationships between the response and a great variety of characteristics found in the physical CBD which could be categorized. Thus, the exploration between the images solicited and land use, traffic levels, architectural features, retail sales, or even changes in elevation could be measured in a precise manner. However, there are problems with this approach which involve the assumption underlying the Poisson distribution equation and the data generated during this research. These are associated with the low N values in conjunction with high p values. The Poisson approach represents an interesting approach. However, for the purpose of this research a more conservative data approach outlined

above was utilized (Champion, 1981; Pierce, 1970; Costner, 1965; Maxwell, 1961).

Guttman's Coefficient of Predictability, Lambda,

Perhaps the best and most flexible measure of association between two nominal variables is lambda, . Lambda may be applied to tables of any size and can achieve +1.00. There are other features of lambda that make it a desirable alternative as well.

The lambda formula is:

$$= \frac{r + c - (F_r + F_c)}{2N - (F_r - F_c)},$$

where

r = largest frequency occurring in a row
c = largest frequency occurring in a column
F_r = largest marginal frequency occurring among the rows
F_c = largest marginal frequency occurring among the columns
N = number of observations for the table

If the researcher is interested in determining which variable, type of union or level of participation, is the better predictor, an alternative formula for lambda must be used. This formula is asymmetrical and is designated lambda a or a. The asymmetrical formula for lambda is

$$a = \frac{i - F_d}{N - F_d},$$

where

i = largest frequency occurring within each subclass of the independent variable
F_d = largest frequency found within the dependent variable subtotals
N = total number of observations for the table

Advantages and Disadvantages of Lambda. The primary advantages of lambda are that it can yield a PRE interpretation that is both symmetric and asymmetric, and it can also reflect the degree or strength of association between variables. For any kind of directional statement to be made, an inspection of the distribution of cell frequencies is in order.

> Lambda requires no correction factor and can achieve +1.00. Lambda is applicable to tables of virtually any size, and lambda values from different table sizes may be compared directly.
>
> One disadvantage of lambda which occurs infrequently is that a lambda coefficient may equal 0 or indicate no association when association between variables actually exists. This is because of certain peculiar distributions of frequencies throughout the cells. Whem lambda is applied to a table where visual inspection reveals that an association likely exists, a lambda value of 0 should be viewed with skepticism. (Champion, 1981:318-321)

Subgroup Analysis/Lambda

Guttman's lambda, a nominal measure of association which is comparable to Pearson's and has an implied proportional reduction in error (PRE) interpretation, was used for the initial analysis. The statistical analysis system (SAS) implementation was used for all phases of the intra-group lambda examination (Champion, 1981; Helwig and Council, 1979). Sommer's d_{xy} was used in addition when lambda values of .00 and ordinal categories were involved. Given the inappropriateness of X^2 based measures, such as Crammer's V, Pearson's C, and Tschuprow's T, due to low cell frequencies and the restrictions of Phi, tetrachoric R, R_{tet}, and Davidoff and Gohesn R_{tet} estimation procedures due to table sizes, there was no backup statistic for .00 lambdas involving the nominal level. However, there were no observable relationships evident in the frequency charts for the nominal variables. Following Costner's suggested procedures, no backup was indicated in these cases (Costner, 1965; Champion, 1981).

Shared Images/Lambda

The statistic chosen for the analysis here is the statistic of choice with no close second choice. The two alternatives available

are Wilcoxon's Theta and Eta, the correlation ratio (η). Theta has no asymmetric interpretation. However, Theta, which is a nominal-ordinal measure, does fit the data better than Guttman's lambda. The other alternative, Eta, would force the treatment of overlap as an interval measure with only three observations. "There is a possibility that smaller sample sizes will contribute to a certain amount of distortion in the magnitude of Eta" (Champion, 1981:347). These are significant problems which rule out the alternative higher level analysis of association which might otherwise have been employed.

VITA

Homer Ernest Weeks was born on June 22, 1955, in Knoxville, Tennessee. He holds a B.A. in Urban Studies with a minor in Philosophy from The University of Tennessee, Knoxville. He received the Master of Science in Planning in 1982.

Ernie Weeks has been active in neighborhood organizations over the last 8 years. He served on the Board of Directors at Ft. Sanders Development Corporation, North Knoxville Fellowship for Community Service, Knoxville Housing Cooperative and Inner City Neighborhood Coalition. He served on a city wide anti-displacement task force, was elected vice-chairperson of the coalition, and elected treasurer of the cooperative. He was a Mayor's Appointment to the Community and Economic Development Advisory Board.