

QUALITY OF EXPERIENCE:  
A DISCUSSION ON  
EXPERIENTIAL ACCESS TO OUTDOOR ENVIRONMENTS

by

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(ABSTRACT)

This study explores experiential access to outdoor environments. This qualitative thesis presents the results of open-ended interviews with four people who have severe visual impairment. The interviews gathered information about the participants leisure activities in outdoor settings.

The purpose of the study was to discover the factors in the environment that contribute to a positive recreation experience for people with visual impairment. Experiential qualities of the environment for both people who are sighted and those who are blind was compared through the analysis of eight contemporary authors writings related to environmental understanding and the transcripts of the four interviews. The overlap of experience in outdoor environments between these two user groups was explored.

Two areas of significant influence on the participants experience was discovered; (a) wayfinding and making sense, and (b) affective response. The specific factors in the environment that influenced the quality of experience for these participants, other than those that contribute to making sense, were found to include: (a) interaction with nature, (b) awareness of enclosure & openness of the setting, (c) intellectual and physical stimulation and challenge, and (d) direct physical interaction with the surrounding environment.

This study provides some of the specific benefits and advantages of incorporation of multi-sensory stimulation in design for people of all abilities.

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This thesis is available in Braille at the  
Virginia Department for Visually Handicapped,  
Roanoke, Virginia.

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## Chapter I: Introduction

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The purpose of this study is to gain a greater understanding of how to design outdoor places that are experientially accessible to a diverse population, and more specifically, to discover what factors contribute to a positive recreation experience for people with visual impairment. In order to design places for people, designers must first understand the diversity of human needs and abilities. The majority of theory, on which design is based, fails to comprehensively consider the diverse nature of people and how they experience their surroundings; the theory about environmental understanding is primarily based on the needs of a sighted world.

The Americans with Disabilities Act (ADA) now requires designers to address physical and programmatic access to the built environment, however, the quality of experiences afforded the person with a disability is not addressed. To design inclusive places, to meet the experiential needs of a diverse population, additional concerns need to be considered. To further explore these additional concerns the visually impaired population was selected for this study based on the fact that the majority of the literature focuses so heavily on the visual experience of the environment. This study will examine experiential qualities of the environment that are relevant to this user group and explore the overlap in experience based issues for sighted and non-sighted people in outdoor environments. Where is the common ground?

## **Approach:**

Two forms of evidence have been identified and considered for comparison in this study. First, contemporary theory of environmental understanding is reviewed. Then the experience of people who perceive their environment without the use of sight is documented. This is accomplished through case studies using open-ended interviews of people with visual impairment.

In many cases, landscape architecture depends on the research of other fields when addressing issues in the environment. Environmental cognition theories are an area of research frequently drawn upon to understand human interaction and understanding of the environment. The theories reviewed address a range of issues from how innate human needs influence people's interactions with and understanding of their surroundings, to the process by which humans receive, store and recall information in everyday interactions with their environments. Landscape architects, as well as other designers of outdoors spaces, utilize this information to aid in the design of places that will be both understandable and meaningful to the people who will use them.

This study will analyze well-established theories regarding human experience of the natural environment, as one component of environmental cognition, and compare these concepts with data gathered through interviews with people who have severe visual impairments who will be asked about their leisure experience in the outdoor environment.

It is the contention of this author that the environmental understanding theory has been based on information received predominately from studies focused on visual perceptions and has not reflected aspects of non-visual experience that may benefit persons having varying degrees of visual acuity. The results of this study, with regard to interviewed participants and the literature reviewed, will indicate either that the terms and concepts found in the literature do not reflect the experiences of persons with visual impairments; or will show that the visual experience reflected in the literature, and the experience of these persons with visual impairment, are similar, indicating that the theories found in the literature adequately reflect the needs of both groups.

The results of this comparison and the identification of similarities and differences between these two different kinds of experiences will be used to suggest guidelines that may be used to assist designers in creating places that will be experientially accessible to a more diverse population.

## Chapter II: Literature Review

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### **Introduction:**

This portion of the document will present summaries of the literature reviewed on environmental understanding. It is divided into five sections. The first four sections are grouped by categories of ways of understanding the environment, which reflect both influences on the process and the processes themselves. Following the four sections, a summary of the categories will be provided as section five.

Section one concerns information processing and presents information about the quality of the stimuli in the perception. Section two concerns issues of evolution and the innate needs of humans. This section presents information about those aspects of perception and environmental understanding that are believed to be innate and developed through evolutionary needs. Section three deals with affect, or emotional response, and presents information about experiential quality. Section four discusses the cultural influences on understanding the environment and the theories related to meaning in the landscape. This section further presents information about the quality of human interaction, the influences of society on behavior, and how it effects the understanding of the environment.

The final section of the literature review will present a summary of the theories reviewed and an introduction to the methodology chapter which follows. Throughout the literature review, as well as the remaining chapters, italics are used within the text to

indicate and highlight key words and concepts that are used as a part of the analysis and conclusions of this thesis.

### **Section 1: *Information Processing***

This section presents information about the quality of the stimuli in the perception process. It includes concepts related to perception and the processes by which humans receive information about their surroundings.

In order to better understand how objects are identified and distinguished, it is important to first look at the different qualities of the various senses; their strengths and limitations. The senses are divided into two groups according to the type and quality of information available to the sense. There are proximal senses and distal senses. These terms refer to the distance between the source of the information and the receiver. For instance, the sense of sight is distal. Although this sense receives information precisely, the information is most often received from a distance. This distance creates a less intimate contact between the object and the receiver. Sight is considered a cool sense, one that is less emotional (Tuan, 1982). The proximal senses of touch, hearing, and smell are said to be warmer and more closely related to emotion, as they are physically closer and more intimately relate information to the receiver.

## The Senses

The olfactory, auditory, tactile or haptic, and visual senses either collectively or separately, provide the bulk of information necessary for most people to understand their surroundings. These four senses are the focus of this review. There are other senses, such as equilibrium and ESP, that provide information but do so to a lesser degree and will not be reviewed in this study.

### Smell:

Each sense, whether proximal or distal, has its own unique characteristics. Smell, the olfactory sense, can suggest mass and volume and contributes to the understanding of space (Tuan, 1977). As a proximal sense, smell tends to envelop the receiver. For example, the pleasure of food is authenticated with the sense of smell. Smells surround people every day. While some smells are nonspecific or transient, they provide stimulation to an overall sense of well being.

Odor and what we consider to be natural (real or authentic) are somehow associated in the mind. A reason for this is that nearly all natural substances, including rock, have a distinctive fragrance. Many artifacts, on the other hand, are odorless (Tuan, 1982).

Although, the sense of smell certainly contributes to the information gathered about a place, it is limited to providing qualitative information. The qualitative nature of this sense is an attribute, and provides a unique contribution to how one relates and understands the environment, as it stirs the emotions (Tuan, 1982).

### Hearing:

Although the auditory sense does not deliver the precise kind of information that vision relates, hearing is often taken-for-granted as a source of information about the specifics of size and distance (Tuan, 1982). The auditory sense receives information passively but has the dynamic ability to surround the listener. Sound provides proximal information, it is most effective at middle distances, but assists in the estimation of spatial relationships at all distances. This is best illustrated by the Doppler effect, a phenomenon which explains why sounds seem to increase in volume and pitch as their source approaches the listener, enabling the listener to make such judgments about the source, as distance, movement and speed. As a design consideration hearing, and its unique affective qualities, is a somewhat taken-for-granted sense as a source of information.

### Touch:

The tactile or haptic sense of touch is the most fundamental of all the senses (Tuan, 1982). The skin is the largest human organ, providing constant contact with the world. Although it is a proximal sense, limited in its range, and emotionally laden, it is the ultimate test of reality” (Tuan, 1982). Its strength lays in the ability to provide precise, very detailed information about external surroundings.

### Sight:

Sight, the visual sense, is by far the most precise method of information reception. This accuracy has made humans dependent on vision, as it is the greatest

source of information about objects and their arrangement. Vision is the dominant human sense (Kaplan & Kaplan, 1982; Posner, 1978; Posner & Rothbart, 1980; Rock & Harris, 1967; and Tuan, 1982). Due to the complex nature of the eyes, it is able to provide large amounts of spatially ordered information. In addition, the quantity of the information received simultaneously usually allows for instantaneous understanding of the relationships among the objects perceived. Despite all of the benefits of specificity, sight does have limits. One of its limitations is that it is a distal sense, and therefore the information received is always going to be removed from the receiver.

Sight is the coolest of the senses; it stirs our emotions the least. The visual field does not enwrap; we can see only what is in front. We stand at the margin of the visual field. All objects in it, no matter how close, still seem out there. We cannot wholly possess what we only see; there remains both a physical and psychological distance between the onlooker and that which she looks at (Tuan, 1982).

The majority of research in environmental understanding focuses on information received visually, therefore, most of the concepts reviewed here in will refer to the visual information process.

### Cognitive Mapping

Having detailed the different methods of gathering information, the focus of this review will now shift to the components of the process of interpreting the information received. The process of interpreting information is complex having evolved along with the increasingly complex human societies. Among the many writings about this area of cognition, the theory of cognitive mapping is a common theme. The premise of the cognitive map is that there are images stored from past experiences in the human mind.

The images are not exact replicas of the experience, but instead are simplified summaries or internal models. These models of the world allow functioning at a normal pace, without hesitation and constant evaluation of every object in view.

One need not pay as close attention, one need not be as sensitive to feedback because one knows it is there, knows what to expect. Decisions can be made without waiting, without careful testing (Kaplan & Kaplan, 1982).

This enormous reference library of information, based on experience and repetition, provides a sense of familiarity, even in a new place. In unfamiliar surroundings, familiar objects are recalled from the cognitive map and understood.

A cognitive map is a model of a general representation of reality. The Kaplans contended that no person knows the world in every detail, but each knows it as a model of essential parts. Humans refer to these models every day, and instantly recall images stored in a cognitive map.

A cognitive map is a compact, orderly collection of knowledge. It contains more information than one can generally perceive at one time, thus permitting one to anticipate, to react, to consider possible next events (Kaplan & Kaplan, 1983).

### Spatial Relationships:

In addition to recalling past experiences, the ability to *distinguish* objects from their backgrounds, and also from each other, is important in understanding the environment. A key concept in the framework of object identification is *space* and *spatial relationships*. Not only is there a need to be able to *identify* objects, but it is

important to understand where they are in space and where they are in relation to each other.

As previously mentioned, the largest source of information about objects and their arrangement is vision. However, other senses can relate information about space and spatial relationships. When used in combination with vision, the other senses provide a richer quality of information, and in many cases provide information critical for a fuller understanding of the situation or object (Kaplan & Kaplan, 1983).

#### Object Identification:

Visually collected information has some unique qualities which make humans capable of locating and recognizing objects very efficiently. The eye uses systems of *location* and *contour*. According to the Kaplans (1982), the location system is a general system that provides information about the object and its surroundings and reveals the nature of the objects through *texture* and *size* information. The contour system is more precise and detailed, offering information in terms of *lines*, which define *edges*. In addition, information about the *orientation* of the object is another important tool in identification. When combined these two systems when combined, offer necessary informational cues about the environment (Kaplan & Kaplan, 1982).

#### Building the Map:

Cognitive maps are created from specific kinds of defining information used in the location systems just described. When these non-discreet components, or cues, are combined they allow information to flow between experiences. The fluid nature of the

information stored in cognitive maps allows one to be able to *anticipate* and *predict* future events. This flow is characterized by a lack of uncertainty and hesitation; much less thought or attention is required for every object encountered. Therefore, cognitive maps provide a sense of security as they base assumptions about the future on past experiences.

Cognitive maps also provide information about spatial *structure*. Some of this structure is physical. Some is more abstract and relates to *sequence*, that is, how things should be in a place, and the order of things.

Cognitive maps code proximity and distance, order and sequence. There are paths between some things and not others. There are regions and levels, allowing one to deal with the same domain at different scales. In other words, cognitive maps have a set of relational spatial properties that constitute what we call structure (Kaplan & Kaplan, 1982).

Wayfinding is a term used to refer to the process of sorting and applying information about structure and content as one moves through an environment. The cues, referred to earlier, are essential signals that assist in wayfinding. They give information about what to do and where to go. Most of this information comes from the cognitive map based on past experience. It is summoned through cues in the environment. The effectiveness of cognitive map application, however, depends on the structure of the place, that is, how it is ordered or how it *makes sense*. The structure of a place and its spatial order form patterns of information which creates a language that presents information for interpretation. For example, when the spatial and built languages are clear and well ordered, little directional signage is necessary as one relies

on her/his cognitive map. The Kaplans (1982) noted that the use of signs is, for the most part, a corrective action and “much of the built environment appears to depend on signs to correct pre-existing illegibility.”

Evidence of spatial importance can be found in human built environments and is prolific in human language. Examples of spatial imagery were noted by Kaplans (1982) included: to be up front; to be behind in work; to be beside oneself. The use of spatial language helps to describe the image or simple picture in the mind. Concepts such as *proximity, separation, enclosure* and *order*, are concepts found in the spatial languages drawn upon to recall an image of a place.

Thus far, the components of perception and cognition discussed have included: (a) ability to distinguish objects from their background; (b) location, space, and relationship; (c) movement and size of objects; (d) texture; and (e) lines and edges. These are all important components of cognitive maps.

The concept of cognitive maps was first introduced in 1948 by E. C. Tolman in Psychological Review. However, cognitive mapping did not receive any significant attention until 1960 when Kevin Lynch published The Image of the City. Lynch proposed that not only was there a network of points and connections in the cognitive map, which the Kaplans (1983) later subscribed to, but there was a hierarchy among them.

### Information Stored in the Map:

Understanding cognitive maps requires an understanding of the structure and quality of the kind of information stored. Why is some information imprinted in a cognitive map while other information is not? Lynch (1960) identified the components of nodes, landmarks, edges, districts and paths as structuring elements of the cognitive map. There are similarities between the structuring components of both the Kaplans (1982) and Lynch (1960). The Kaplans pointed out that both nodes and landmarks are points in the landscape that have acquired *meaning* and are important tools in wayfinding. Meaning is attached to objects individually and as a result of many different influences.

The likelihood of a place or object being coded in one's mental map is a function of a great range of attributes that would seem to cut across this distinction (Kaplan & Kaplan, 1982).

D. Appleyard (1969) discussed the qualities of a landmark by remarking that a building must have striking sensory qualities in order to become and then be known as a landmark. Appleyard (1969) described landmarks as "imageable points in the landscapes and points of decision. There are many ways of creating distinctions, some methods are sensory and generalizable; others are idiosyncratic, internalized processes. All methods are important to imprinting information contained in a cognitive map. The structuring elements presented by the Kaplans (1982), Lynch (1960), and Appleyard (1969) are the

foundations for the elements of *coherence*, *continuity*, and *legibility* or *imageability* that allow humans to process information about the environment and understand it.

Along with the concept of space and *spatial relationships* is spatial learning. This type of understanding is not only linked with the meaning, placement, and distinction of objects but is influenced by *familiarity* with the space and the objects encountered. The ability to recall information is based on a level of familiarity, that is, whether something or someplace is familiar. This recalled information is not only a concept, but it is an image. Familiarity and *continuity* in the environment are basic to the issues of safety and security, and therefore important for *comfort* and *confidence*.

Having a more concrete conception of future possibilities tends to simplify one's cognitive processing, and to contribute substantially to one's confidence (Kaplan & Kaplan, 1982).

Continuity in the environment contributes to the likelihood of being able to *anticipate* the future. This ability to anticipate lessens the likelihood of hesitation and the amount of concentration and attention required for even simple movement. In addition legibility, or ease of understanding the surroundings, contributes to both the level of comfort and the ability to move smoothly through the environment.

#### *The Quality of Information:*

The modes of information processing and the structural components of the processed information were presented in this section. The next component to examine is the quality of the information. The quality of information, its structure, and its presentation, are important issues when examining the content of information. J. F.

Wohwill (1976) defined some categories of information quality. He defined *incongruity*, as a mismatch between different aspects or portions of a stimulus, or between a stimulus and its context. *Surprisingness* is the temporal equivalent of incongruity, based on a mismatch between some expected event and the event actually encountered by the individual. Wohwill (1976) identified *novelty*, as a discrepancy between the range of stimuli previously encountered by the individual and the particular characteristics of the stimulus presently confronted. Lastly, he identified *complexity*.

The parent concept of uncertainty, in the informational sense, is more pertinent; indeed, for artificially constructed stimuli it is frequently possible to define complexity operationally in terms of some measure of structural information, i. e., uncertainty. By extension, uncertainty may generate conflict; i. e., the greater the information content of a stimulus, the greater the conflict among alternative ways of identifying, classifying, or organizing it (Wohwill, 1976).

This aspect of information quality is one that is also identified as significant by the Kaplans (1982), Tinsley and Tinsley (1986), and Ulrich (1984).

Wohwill's (1976) work is based mostly on the work of Berlyne (1963, 1974), who believed that all of these attributes of human cognition directly relate to the amount of interaction an individual will engage in within an environment.

The tendency of the individual to engage in voluntary active exploration of a stimulus is proportional to the amount of uncertainty or conflict it engenders; it [the tendency] is thus highest for stimuli relatively rich in diversity, structural complexity, novelty, incongruity, or Surprisingness (Wohwill, 1976).

Berlyne's (1963, 1974) discussion of the quality of stimuli related to the level of interaction a person might engage in as a direct result of the stimuli. He wrote in terms

of kinds of cognitive exploration, as they relate to types of motivation. Berlyne distinguished between *diverse exploration* and *specific exploration*. The purpose of diverse exploration is to encounter stimuli that “act as a relief from some low base-line generally designated as boredom”. The intent is to increase the level of arousal. The second type of exploration is specific exploration, which usually occurs during conflict or uncertainty. It is directed at lowering levels of arousal.

Stimulus characteristics, as well as motivation, are important components to understanding the framework of the human/environment interaction. They can be an indication of both preference and aesthetic values. Berlyne’s (1963, 1974) research showed that a positive aesthetic response should result from an initial high level of curiosity which is immediately followed by a medium hedonic-type (beauty or pleasure) stimuli. The level of the initial stimuli should be related to the level of complexity, ambiguity, and surprisingness (curiosity). These two extremes will balance out and produce an aesthetic appreciation. Although this review is not focused on aesthetic value it is introduced here because of its close relationship to motivation and preference. Motivation is a complex and highly relative subject when discussing the nature of human interaction with the environment. However, here it is used as an introduction to environmental preference and recognized as significant. Motivation will not be addressed in detail as it is a thesis unto itself (Berlyne 1963, 1974).

## Environmental Preference

Although not a type of information processing, environmental preference studies are helpful tools in understanding how people group or categorize their surroundings.

Preference judgments are based on perceptions. The research on preference thus tries to determine not only what people do and do not like but also what some of the categories are that constitute the basic patterns of daily experience (Kaplan & Kaplan, 1989).

The empirical data that has emerged from the Kaplans' work on environmental perception shows two distinct categories of common themes among preferred scenes. They are: (a) content of the scene and (b) the spatial configuration of the scene. The term "scene" refers to the scene of a photograph. The Kaplans' preference studies utilize photographs and the results of their studies relate to the confines of the photographs and the limited type of information available in a photographic plane. Despite these limitations, some common themes emerge from the data and identify categories of content and spatial configuration from the preferred scenes.

The content-based categories have as their theme or common characteristic that they deal with specific objects or elements. The spatial configuration categories are based on the way the elements are arranged in the implied space of the scene (Kaplan & Kaplan, 1989).

One common theme interpreted by the Kaplans as a preferred element in the selected scenes is the element of "nature." This common element appeared in categories of scenes ranging from urban to wilderness. The information concerning spatial

configurations is more complex than that of the content category, and based on “the opportunities and constraints afforded by the space.”(Kaplan & Kaplan, 1982)

### Summary

Environmental cognition is a complex and vast field. This section only touches on the nature of information processing and presents some of the components considered to be most influential on that process which humans undertake when interpreting the environment. This section presented a discussion of sensory pathways, cognitive mapping, their structures and interpretation, and some of the components that influence the quality of information.

### **Section 2:** *Evolution of human needs relative to environmental understanding*

Just as it is important for humans to understand and make sense of the environment, it is human nature to want to understand our beginnings. There are many theories which explain how and why we exist, based on beliefs ranging from evolution first postulated in the 1800s (Darwin, 1859; Lamarck, 1809; Wallace, 1859) to a variety of religious paradigms. This study will examine the theories related to evolutionary theory, as it is a theory cited in the writings related to behavior and environmental psychology.

## Functionalism

William James (1892) discussed behaviors in terms of the function they serve. This viewpoint is termed “functionalism”. In many ways the current work of researchers, like the Kaplans, is related to this approach to behavioral study. Functionalism is based on the Darwinian notion that behavior is directly related to survival of the species. This approach to behavior does not proclaim that behavior is inherited but instead that structure is inherited (Kaplan & Kaplan, 1982). Experience affects behavior; and if, in the future, the brain has the ability to recall information, then past experience must in some way affect the structure of the brain. Functionalism states that the structure of the brain is inherited, and provides an explanation for the evolutionary changes in behavior.

... prior experience could not influence current behavior unless it had some effect upon the structure of the brain. We know that the structure of the brain is in some measure inherited, just as we know that it must in some measure be influenced by experience. (Kaplan & Kaplan, 1982)

In trying to understand the function of human behavior from an evolutionary perspective, the Kaplans (1982) have used the following premises:

1. Humans emerged under conditions of danger and uncertainty. Under these difficult circumstances, the capacity to anticipate events, with all that entails, was probably central to their survival.
2. Humans are closely tied to the physical environment. Their concerns, their capacities, their hostilities, and their ways of identifying themselves all reflect this bond.
3. Given the requirements of their evolutionary backgrounds, humans are inherently difficult - and potentially dangerous - animals. They are not lamb-like; nor should we expect them to be, in even an optimal human environment. If our hopes for the human future are overly pastoral, we shall surely be disappointed and probably disillusioned as well.

Some of these behavioral premises are based on the specific changes which took place in the physical ability of humans. The evolution of humans from arboreal to savannah life, brought with it many changes in both physical and behavioral capacity (Berrill, 1955). These changes greatly influence human abilities to understand and interpret their surroundings today. The specific skills of the human eye and hand had much influence on the species survival and advancement of species status in the food chain. The physical changes of evolving humans included: an increase in body size, bipedal movement, big toes, and opposing thumbs, increased balance and equilibrium, color vision, and specialized vision.

...eyes are more accurately aligned to the front, are movable, and their movements exactly coordinated; binocular vision has become more stereoscopic, with the visual cortex of the brain enormously increased. (Berrill, 1955)

The combination of the skills of the eyes and hands allowed humans to absorb vast numbers of details about the environment. Areas of the brain developed to store information gained about the encounters with the environment.

The brain evolved great storage places for the past, of solid things with color and texture. Eyes do more than look at an object. With imperceptible movements they caress the outlines in three dimension and make a record of solid shapes. (Berrill, 1955)

Information is also gathered in a similar manner with the hand, and combined with the visual information to create detailed memories. The ability to integrate information from different senses and to distinguish objects from their surroundings is somewhat unique to humans.

Object recognition is a highly active, interpretive process far beyond the simple sensation of a pattern of light on the retinas. The interpretive process relies heavily on the past, upon information gathered at previous times. (Kaplan & Kaplan, 1982)

This kind of evidence is the link between evolutionary need and the ability to create and utilize cognitive maps.

### Role of Vision

The Kaplan's, in their 1982 book Humanscape: Environments for People, discussed the evolution of human sensory perception and the significance of the change from a dominance of olfactory stimuli to the dominance of vision as the primary source of information. Most early primates use of vision functioned as a way of identifying static food objects. Carnivores used their olfactory senses to track their food. Humans were one of the first land creatures to hunt their moving prey by sight.

When man began to hunt, his perception evolved accordingly. Using his prime sense, vision, man evolved the ability to identify objects on the move without reference to their relationship to the fixed part of the environment; he saw them as totally separate from their environment. Here was a fundamental improvement in perception and something novel among land animals: a carnivore that hunted by sight. (Campbell, 1966)

This ability to *distinguish* objects from their surroundings, and understand their *relationship* to one another, gave humans the ability to identify the object, its movement, direction, speed, and size. Once an object was understood, the crucial information about that object or that situation was committed to a cognitive map, so that in the future similar objects and situations could be recognized and dealt with more swiftly. In the hostile environment of the time, there were not many opportunities to make the same

mistake twice, so the ability to *anticipate* or *predict* the future based on past experience was valuable.

Although the process of information gathering was evolving, the kind of information gathered was simple and basic, primarily motivated by hunger and safety issues. The ability to gather more sophisticated information evolved much later, as cognitive and physical abilities evolved and motivations changed.

### Environmental Preference

One component of cognition that evolved as a result of survival needs, (or in relation to modern and generally less dangerous environments--innate needs), was the capacity to prefer one environment over another. Preference for particular environments grew out of memories of positive and negative experiences stored in the cognitive map, and is believed by some contemporary theorists to be initially related to survivability.

A well-prepared human is one with a good supply of cognitive maps and a highly developed capacity to utilize them swiftly when necessary.  
(Kaplan & Kaplan, 1982)

Humans have a basic need to make sense of and be involved with their surroundings. This need profoundly influences human preference for patterns of information. Lines, edges, texture, and various other components, make up these patterns, which make up places--places that are preferred or not preferred based on this basic information. The basic information is comprised of the structure, depth, and content of a place's make up, what Roger Ulrich (1984) calls, preferenda. This is not to

say that all humans prefer the same place, but that there are similarities in the kinds of places humans prefer. The Kaplans have done extensive studies on this subject, but have received criticism about the use of slides or pictures of places as a way of testing for similar responses among different people. Another limitation to these studies is the use of only one sense as a source of data, visual preference, and does not actively test other forms of perception.

In addition to the kinds of places that humans prefer, there are preferred ways of knowing the environments that commonly meet innate human needs. One is the need to be familiar with a place or object. This need, as with others mentioned earlier, is based on survival needs. The advantages of being familiar with a place or object, is the ability to deal with a situation swiftly, as the mind rapidly refers back to the cognitive map referencing similar situations. The ability to make sense of a situation in a timely manner, particularly when dealing with danger, is an important factor.

People prefer what they know, what they are familiar with. In the same vein, the fear of the unknown and the cautious reaction to the stranger are understandable. Familiarity increases one's confidence, one's facility; it provides opportunities to use the cognitive maps that have already been developed. We propose that the concern to make sense out of the environment is one of the most pervasive of human needs. (Kaplan & Kaplan, 1981)

The Kaplans (1981) argued that familiarity becomes monotonous to humans so there is a need for balance between "the excitement of the new and the comfort of the known".

This balance between safety, comfort and the need to be challenged, drives humans to be involved with the environments.

The opportunity to make sense of the environment seems not to be enough. People also prefer circumstances that require them to expand their horizons or at least circumstances where such enrichment is a possibility. (Kaplan & Kaplan, 1981)

There is a balance required here as well, for success. Too much information at once might bring about confusion, and too little involvement may result in boredom or even danger.

Although people do not prefer to be overloaded or overwhelmed, they are usually at their best (and Happiest) when the challenges they face fall just short of that. It must be in other words, that it is inherent for people to seek and cherish involvement. (Kaplan & Kaplan, 1981)

Preferences, although not as urgent as needs, are directly linked to the ability to meet human's motivations and abilities to meet their needs. Based on this information about the innate nature of preferences, a preferred place or situation is likely to be in the best interest of the person at the time and provide the greatest opportunity for success in the future. (Kaplan & Kaplan, 1982)

### Summary

Functionalism, the role of vision , and environmental preference are all significant areas of concern when trying to understand the relationship of humans to their environment. Functionalism present some basis for the evolutionary relationship between need and behavior. The discussion of vision explains the dominance of visual stimuli in contemporary human landscapes. Finally, the exploration into preference presents some of the common components that are believed to assist in the interpretation and understanding of the environment.

### **Section 3:** *Emotional responses to the environment and the affects on environmental understanding*

Emotional responses to the environment are influenced by a range of factors relating to past experience, such as innate knowledge, cultural interpretations and behaviors, and other factors. Some of these are discussed in other sections of this thesis. These influences on emotional response greatly affect human behavior and interaction with and understanding of the environment. This section will present a discussion of some of the specific affective components in the landscape, as well as some of the resulting responses.

#### **Affect**

Affect or emotional response are used interchangeably in this section. These terms are described by Izard as innate, cross-cultural phenomena, each having characteristic experiential, facial, and neurophysiological components (Ulrich, 1984). Affect is further defined as a feeling or emotion as distinguished from cognition, thought, or action; a strong feeling having active consequences (American Heritage Dictionary, 1985) Affect, for many, is a major motivation influencing behavior because “virtually no meaningful thoughts, actions, or environmental encounters occur without affect” (Ulrich, 1984). In terms of leisure experiences in the outdoors, many experts feel that the emotional experiences of recreation are the most important benefits realized (Rossman & Ulehla, 1977; Shafer & Mietz, 1969). Affective response is also used as an indicator of the level of interaction with the environment (Lazarus, Kanner, & Folkman, 1980; Ulrich,

1984). That is, how people feel about a place directly relates to how much interaction they have had with their surroundings. It is difficult to study how people feel, but it is possible to study behavior, observe actions, and infer emotion. Csikszentmihalyi (1982) believes that these observable actions are a more reliable measure of how one is feeling, rather than information gained through asking someone how they feel. Overall emotional responses are worthy of investigation when trying to understand human/environment interaction.

Although the vast majority of the empirical work done in the area of affect and aesthetic response to the landscape has been limited to responses to information gathered visually, they contribute to the understanding of one aspect of human response to the environment. Little work has been done to study affective and aesthetic responses to auditory and olfactory components of natural environments. Ulrich (1984) classified the stimuli and features in the environment that elicit affect as Natural Environment Preferenda. They are identified as structure, depth, texture, content, threat/tension, and deflected vistas. Many of these components of the landscape are identified as significant by others in the field who use similar terminology.

#### Components of the Landscape that Influence Affective Response

The term *structure* refers to the properties within a landscape that help organize it; often including a focal-area and patterns. *Depth* in a landscape usually refers to a sense of openness. This component is linked with the ability to infer distance and relates

to the three dimensional aspect of a space. The lack of depth, or a visually impenetrable immediate foreground, can elicit an affective response of dislike or uncertainty. This response is due to the possibility of hidden dangers and/or restricted escape options (Ulrich, 1977).

*Texture* is an important tool in understanding depth. This component could help one to understand not only distance but could also relate information in an organized manner so it is more easily understandable.

The presence of uniform, even-length ground textures, as opposed to rough, uneven surfaces will aid in a more rapid and accurate cognitive appraisal, due to the sense of a continuous surface (Gibson, 1958).

The *content* of a landscape, or what is in it, can elicit many affected responses. For example, Zube (1975), and others (Anderson, 1975; Pitt, 1975), have shown considerable evidence to support the theory that water can elicit positive responses to a landscape. Ulrich (1984) indicated this response may be biologically based. Despite the controversy of the source of the response, ( i.e., biological, informational characteristics, or learned associations), the positive response is similar in many people.

*Threat/tension* is another common response to some situations. While involving issues of personal well being, little work has been done to identify the specific types of settings that elicit the threat/tension response. Studies have shown that slides containing calm water surfaces elicited the lowest tension levels (Ulrich & Zucherman, 1981).

The last component of the natural environmental preferenda identified by Ulrich (1984) is the *deflected vista*. This concept is similar the Kaplans concept of *mystery*

The term *deflected vista* was first used by Appleton in 1975, and refers to the line of sight in a natural or urban setting that is deflected or curved. This deflection signals that new landscape information is just beyond the visual bounds, defined by the observer's position. This, too, has been shown to elicit a positive response, and is linked with the concept of *curiosity*. Ulrich (1984) stated his concern about the unstable equilibrium between curiosity and fear. He also pointed out that this preference for landscapes which incorporate mystery will only be attained if the observer can experience them at a low risk.

Preference in the landscape has been shown to be strongly tied to the ability of the *observer* to understand it. People prefer what they understand (Kaplan & Kaplan, 1982). The components discussed in this section show the concrete nature of the factors in the landscape which can affect the *observer*. Affective responses to stimuli and features in the environment greatly influence understanding of the surrounding and possibilities of future interaction with it. The ideal landscape (one that is preferred), according to Ulrich, (1984) would incorporate the following: (a) a moderate to high level of complexity; (b) structural properties that establish a focal point, while other order or patterning is also present; (c) a moderate to high level of depth that can be perceived unambiguously; (d) the ground surface texture tends to be homogeneous and even and can be appraised as conducive to movement; (e) a deflected vista is present; and (f) appraised threat is negligible or absent.

With the identification of 'ideal components', the setting must then be examined. There have been extensive studies that show that there is a human preference for 'natural settings' (Kaplan & Kaplan, 1982; Ulrich, 1984). However, positive affective responses have been shown to result from a variety of settings (Kaplan & Kaplan, 1972). Some may interpret the term natural setting to refer to wilderness, however, Ulrich (1984) believed a wider range of settings should be included in the term 'natural'. The identified components, and the ideal combination just described could apply to a range of settings.

The term natural should encompass man-made settings such as wheat field, wooded parks, and golf courses. Americans appear to respond to a scene as natural if (1) it contains extensive vegetation or water, and (2) if buildings, cars, and other built features are absent or not prominent. (Ulrich, 1984)

Affective response is one aspect of understanding how humans respond to, interact with, and understand their environments. Specific components of the landscape can be either enhanced or eliminated to affect these responses. The *optimal experience*, according to Csikszentmihalyi (1982), occurs when the right amount of information is received in an orderly fashion.

The optimal experience equals the right kind of information, received in an orderly fashion, by a person whose skill level allows them to understanding the information, while remaining complex enough to challenge the receiver and holds their attention. (Csikszentmihalyi, 1982)

Csikszentmihalyi's reference to optimal experience is presented with regard to leisure events, however, the principle of providing appropriate information in a manner that

makes sense could be applied to landscape perception. The ability to understand information presented is important in any case.

Increased knowledge about circumstances and settings that encourage *optimal experiences* would benefit the individual as well as assist designers in creating *optimal environments* for the individuals experiencing the environments. While there are idiosyncratic differences among individuals, there are predictable human affective responses that have been identified. These predictable responses can be used to assist in the creation of environments which are more likely to be understood and preferred by many.

#### **Section 4:** *Social and cultural influences on placemaking relative to environmental understanding*

It would be a difficult, if not an impossible task, to create a place that would accommodate the needs of all persons, all of the time. However, there is empirical evidence, as indicated in earlier sections, that identifies commonalities among people's environmental understanding. These common threads can be used to gain a greater understanding of the larger complex issues and relationships which must be dealt with when analyzing place.

#### **Place and Placemaking**

Place and placemaking are terms first used by E. Relph (1976) and later popularized by Rapoport (1988). They used these terms to describe specific

environments to which people have attached meaning. In order for an environment to attain meaning, it first must be understood by the people it is meant to serve. According to Rapoport, there are two groups of influences on environmental understanding; (a) perceptual aspects, and (b) associational aspects.

Designers creating spaces may affect both of these aspects. The perceptual aspects of the environment are those which are identified through the senses. Perceptual aspects are factual and informational in nature. The associational aspects of the environment are much more closely linked with interpretations of a place. Associational aspects are also heavily influenced by pre-existing conditions, such as, expectation, personal history, and cultural influences (Rapoport, 1988).

The first of these environmental aspects, perceptual, is by far the more susceptible to manipulation, as these are physical objects in the landscape. Associational aspects are not physical objects. These cognitive associations are more complex and can only be influenced secondarily through the appropriate manipulation, either supported or inhibited, acting as catalyst to “communicate, guide and structure significance” (Rapoport, 1988).

Rapoport noted that the same space can become a different place at different times. Likewise, the same space may have different meanings and uses, according to the diverse nature of the users. However, meanings and uses can be generalized if commonalities among users are identified.

They [designers] cannot directly manipulate users’ associations but if there is high group agreement there may be adequate predictability at the group level, particularly if *redundancy* [italics added] is sufficiently high, cultural rules are

known and employed, and there is consistency of use. The cues then define the situation with which a particular place may be identified (Rapoport, 1988).

The redundancy that Rapoport referred to is key to the concept of generalization of common needs and meaning assigned by people to spaces. The multidimensional nature of place can be analyzed as a model of redundancy. Rapoport has created such a model. The model breaks down the aspects of a setting into six different components, each representing the influences toward associational meaning assigned during the process of placemaking.

The more attributes coincide, the greater the redundancy, the stronger the 'sense of place' and the more likely it is that a given setting will lead to high levels of agreement about it being a place (Rapoport, 1988).

Rapoport's model addresses many influences on placemaking, several of which have already been presented. In addition, there are social and cultural influences on placemaking. To discuss these influences on environmental understanding in more detail this thesis will refer to the work of Tuan.

### Evolution of Society

Tuan (1982) explored the development of societies, their social structures and subsequent influences on their physical structures, as these changes paralleled the evolution of self-awareness. Through this historic journey of societal evolution and the structures that support it, Tuan presented physical evidence that described the affects that

cultural and social history have had upon contemporary human environmental understanding, needs, and preferences in the built environment.

Tuan wrote of the human need to create distinction. As the world becomes more complex this need increases to promote human's understanding of their surroundings. One example Tuan provided related to humans making objects, and the necessity of understanding the parts in order to reconstitute the parts into a new object. This cognitive ability has allowed humans to survive in a world that is complex and "richly fragmented." In order to understand this fragmented, complex world, humans have created environments that are ordered and layered with rules that help in comprehending their surroundings. As society becomes more complex, so do its spaces. Spaces become segmented and hierarchical with discrete areas. Primitive, or nonliterate, peoples are much more likely to organize their spaces as larger wholes with less delineation (Tuan, 1982). This difference is found in the complexity of the society and the position of a world sense rather than a world view. This is a distinct difference and affects many aspects of both pre-modern and modern daily life.

A society with a world sense, according to Tuan, is one of harmony and oneness with nature. A society with a world view generally views itself as separate from nature, a distant position looking in. Historically, this view of self is evident in the segmenting of spaces found. For example, examination of ruins from early Greek culture reveals the importance of differentiated space in all aspects of the built environment.

The Renaissance was a significant period in the development of self and a

movement toward self-awareness. This is evident in...

the increasing importance of autobiographical components in literature; the proliferation of family and self-portraits; the growing popularity of mirrors; the concern with child as a stage in the blossoming of human personality; the use of chairs rather than benches; the multiplication of private and specialized rooms in the house; the inward turn in drama and literature; and psychoanalysis (Tuan, 1982).

As humans became more individualistic and capable of withdrawal, both physically and psychologically, an awareness of vulnerability developed. This vulnerability was particularly apparent during activities such as sleeping, eating, defecating, and copulating. This self-consciousness brought about a need for privacy, and was evident in the built environments of the day. Tuan indicated that modern human self-consciousness has gone too far.

Consciousness, and with it an intensifying awareness of self, has become excessively isolating and painful. We wish at times that we had not eaten the fruit from the Tree of Knowledge, that we could be back in Eden, sufficiently aware to name objects in the world but not so aware as to be able to name also ourselves (Tuan, 1982).

This evidence of self-consciousness is directly tied to evolution of the more complex modern societies. Societies less complex display little interest in the idea of the unique or isolated self (Tuan, 1982). The modern world view is also evident in such “terms and concepts as scenery, prospects, perspective, point of view, interpretation, and, in our time, construct and paradigm. The way the world looks depends on where you stand.” (Tuan, 1982)

## Evolution of Structure

Contemporary designers often depend on historical structures as references of past and current human needs. The evolution of structure has paralleled the changes in the complexity of the societies they supported.

Along with the increasing complexities of society, so grew the complexities of structure. As human need and behavior began to be influenced by feelings of vulnerability, the need for privacy, and self-consciousness the styles and arrangements of spaces changed. This is evident not only on city streets but can be found in the confines of houses and household structures, as “an enclosed space contains, concentrates, and focuses the human psyche.” (Tuan, 1982)

Houses provide an opportunity for an individual to withdraw from the complexities of the world and find solitude to reconnect with the unique nature of oneself. Following the progress of architecture through history, Tuan (1982) traced the evolution of space from a round semi-pit dwelling to the modern structure of a partitioned rectangle. This is yet another example of the paralleled progress toward segmentation of space and self.

The house is an architectural embodiment of social structure and values (Tuan, 1982).

With the evolution of structures, there has been a parallel perceptual shift. The shift to vision as the dominant sense has evolved to accommodate the changes in human societal structures and view of the world. Tuan (1982) used the modern office

environment to illustrate the shift to visual dominance and the neglect or underfeeding of the other senses, affecting interaction with the environment.

The place has neither odor nor sound other than the muted noises of office work or of soft canned music; and it discourages touch ... it has a limited sensory ambiance . . . . it maintains a distance: people in it feel somewhat detached and isolated (Tuan, 1982).

He contrasted this experience with that of a Gothic cathedral, where all the senses are engaged and envelop the visitor.

All of one's senses come to life under the impress of soaring stone pillars, of organ music that reverberates across the cavernous space, of odors from moist stone, incense, and melting candle wax, and of the feel of hard ground underfoot (Tuan, 1982).

### Evolution of Sensory Experience

The perceptual shift is historically evident as described from the evolution of society's complexity and its infrastructure. These changes are also evident in the changes in sensory perceptions. The pre-modern sensory experience was more "complex, full of competing and conflicting sights, odors, and sounds." (Tuan, 1982) Today's experience are in a larger world, dominated by visual stimulation and tend to be separate and distinct from one another.

The result of this change is that, whereas the size of the perceived world expands, its inchoate richness declines. Another result is the fostering of a heightened sense of a self detached from its milieu. Emphasis on seeing, and particularly on seeing with the mind's eye, has had the effect of isolating the individual and of promoting an awareness of the self as the lone framer of knowledge (Tuan, 1982).

Experiencing the world by sight alone, with its resulting aesthetic distance, has been found to be inadequate if the intent is to merge oneself with the world. The dominance of vision is modern, and particularly the notion of views or scenery.

The view or scenery is a specialized way of structuring visual impressions; objects out there are arranged by the eye and the mind's eye so as to constitute a pleasing picture - and pleasing because of a perceived order in the objects that the picture arbitrarily frames (Tuan, 1982).

People of the Medieval period, unlike modern people, had a tendency to focus on the objects rather than how they were arranged.

Perhaps they felt no compulsion to seek assurance in a large visual order because, at an intellectual level the world's coherence was something that medieval people could take for granted; moreover, sounds, odors, and bright colors provided a sensuous and reassuring cocoon in which life could unself-consciously proceed (Tuan, 1982).

### *Need for Privacy:*

The vast complexities of modern humans drive many to search for solitude. The stresses of everyday life, particularly in crowded urban settings, encourage this search for solitude and reconnection with nature, the whole.

Individualism, self, and self-consciousness - these and other related concepts are supremely the products of Western culture. In the West, the self has grown apart from others in prideful and nervous sufficiency. We are islands, each a world of its own (Tuan, 1982).

The Renaissance was a landmark period for the surge toward individualism.

Privacy was of increasing importance and was evident in the structures of the day.

Seclusion was sought in the privacy of segregated spaces within the houses as well as

walled courtyards. New found choice and mobility of the day, both socially and physically, gave the Renaissance person a sense of power.

The level of complexity in modern society, Tuan believed, has encouraged people to withdraw.

The problem is how to withdraw without withdrawing from life; how to nurture a sense of self without losing touch with other people altogether; how to escape from the world and yet still be in the world ... a world over which one has some control (Tuan, 1982).

Tuan found that for many a common solution to this problem is to seek or create a setting closer to nature. Traditionally, the city has represented chaos and stress, whereas the countryside has represented order and tranquillity. However, nature can be found or created even in the city, the courtyard, or the suburban yard. This yearning for nature and reconstitution of the whole can be found in the modern day movement toward a utopian-like community. This notion of Eden has been a theme throughout modern history. There have been many different approaches, but they all have similar characteristics, such as, "egalitarianism, geographical isolation, and the richness of the natural environment" (Tuan, 1982).

Finally, there is a need for the balance of community and freedom, where interactions are a result of the need for survival of the whole, and there is a freedom from constraints within the greater needs of the community. Tuan's concern, with regard to utopia, is that he felt that given the freedom to explore self and world, few people would pursue it without the motivating stresses of everyday life, resulting in melancholy or boredom. Having needs, he wrote, gives ease to life.

Meaning is manifest in things, people, and activities; it is not a point of view or the result of a personal investment of energy (Tuan, 1982).

### **Section 5:** *Literature Review Summary*

The literature reviewed has been select, and based on the prominence of the authors and the frequency of concepts found in this very directed literature search. The broader topic is environmental cognition, however, the breadth of that literature is far too wide for the purposes of this thesis. Therefore, the selection was limited to the area of environmental understanding, which encompasses only a small portion of the greater body of literature. The focus within this subset of the literature was limited to an exploration of four major influences on understanding the environment.

The review resulted in the creation of a comparative matrix of terms and concepts found in the different levels of influence on environmental understanding addressed in Sections 1- 4. This matrix was designed as a tool to facilitate the comparison not only of terms and concepts among the authors, but also between the literature and the responses gathered through interviews of visually impaired participants (Appendix B, C). This comparison will result in the identification of the commonalties between the visually based literature and the experiences of the visually impaired participants.

Many questions have been raised through the review of this literature. The primary focus of this review was upon the visual nature of the theories presented on environmental understanding and preferences, and has reveled some of the many influences on the evolution of environmental understanding. The literature presented

reveals the inherent process of human evolution, movement toward domination of vision and the evolution of human society whose stresses forced greater sensory differentiation and social segmentation.

Some evidence was presented within the work of the Kaplans regarding the physical changes humans made during the transition from arboreal life to the Savannah. There were adaptive reasons for those physical changes related to survival. Later, during the Renaissance period there was another shift, referred to by Tuan (1982). This change was linked to social and cultural influences and paralleled a shift in world view (man-nature relationship). How did the shift in world view relate to the shift in visual preference for information gathering? Tuan briefly referred to the shift, but offered little causative evidence. However, there is physical evidence to show that human brains have adapted to the shift to dominant vision; the portion of the brain which is responsible for visual perception has physically increased, and now represents 40% of human perceptual capability (Dulbecco, 1991).

What is the correlation between how humans see themselves in the world (man-nature relationship), and the shift in visual dominance? Has the decrease in multi-sensory dependence affected how humans relate to their surroundings? Do people who relate to and understand their surroundings non-visually have a different world *view*? Do people with severe visually impairment understand their surroundings differently than those who perceive it visually?

Many of these questions are far too complex to address in the context of this thesis, and furthermore can not be addressed until a more basic understanding of the issues have been presented. However, this thesis will address some of the basic concepts about environmental understanding that have been presented in this literature review, as a base from which to explore some of these more complex issues concerning the far reaching implications of the questions posed.

The following chapters will begin that exploration, as a comparative analysis will be presented between the conceptual constructs identified in the literature and the conceptual constructs identified in the interviews with the participants with visual impairment. From this comparison a base understanding of the commonalties and differences between visually and non-visually based understanding of the environment will be established.

## Chapter III: Methodology

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### **Introduction:**

The primary purpose of this study is to gain a greater understanding of how to design outdoor places that are experientially accessible to a diverse population. A qualitative approach was chosen for this study, as this type of inquiry enables the researcher to understand the subject from their perspective.

A background on the subject of environmental understanding was obtained through a literature review of contemporary writings on the subject. The literature review revealed that the majority of research on the subject relied on data received through the primary sense of vision. It was the primary concern of this researcher that this perspective may not reflect the needs or experiences of those who did not perceive the environment visually. This concern led to a secondary focus for the research.

The second goal of this study was to discover the common factors that exist in the environment that aid in, or inhibit, the understanding of places for a diverse group of users. This approach to Universal Design is qualitative, with the focus on the quality of the experience rather than the specifics of structural barriers that might be addressed in a more quantitative study.

Upon completion of the literature review, it became evident that the sense of vision was the dominant source of data, paralleled by the absence of the other senses as

contributing factors to the quality of experience. Based on the absence of this type of information in the literature, which would reflect perception through multi-sensory stimulation and exploration, this study will address the experiential quality and the nature of environmental understanding of those who perceive their environments through senses other than sight.

### **The Participants:**

The study participants were four volunteers from the surrounding communities. The criteria used to select the participants were: (a) must have severe visual impairment, be considered legally blind, having lost their sight in early life, and (b) be willing to participate. It was the hope of this researcher to locate willing participants that were totally congenitally blind, however, only one of the four participants met this initial criteria. This limited pool of potential participants led the study to focus on a small case study approach rather than a sampling method. The case study approach has limits and does not allow for generalization of the findings. However, this approach does allow the researcher to have a greater understanding of the responses of the individuals chosen. Using four case studies allowed the researcher to interact with the participant on a one-to-one basis, encouraging a more comfortable dialogue. This level of interaction elicited the details and types of responses required for the qualitative nature of this study.

The purpose of this thesis is comparative and requires an exploration of the concepts revealed by an open-ended interview process. The results of which are to be compared to the contemporary theories on environmental understanding.

### Participant Profiles:

Participant #1 is a 59 year old, male, university professor, who is currently totally blind. This participant never had normal vision, but did have slight light perception with color perception 30 years ago. He has had less than one year of orientation and mobility training, and considers himself an independent cane traveler.

Participant #2 is a 32 year old, male, graduate student who is congenitally totally, blind. He has had extensive orientation and mobility training, but considers himself only an average traveler. He describes himself as a route traveler.

Participant #3 is a 27 year old, female, graduate student, who has been legally blind from birth. She does have slight light perception with some color perception, if the object is within two inches of her eye. This condition worsened three years ago and now is considerably worse. She has had approximately five years of orientation and mobility training, and considers herself an average cane traveler.

Participant #4 is a 37 year old, male, rehabilitation teacher. He has slightly better than light perception vision and has had this condition since birth. He has had many years of orientation and mobility training, and considers himself a fairly independent cane traveler.

### **Interviews:**

The interviews were conducted in the participants homes for their convenience. A list of six questions were prepared to guide the interviews. The six primary questions were as follows:

1. Do you enjoy outdoor recreation activities?
2. What kind of activity do you enjoy?
3. Do you have a favorite place to do this activity?
4. Can you please describe this place to me?
5. How many times have you been to this place?
6. Do you usually visit this place with others?

From this series of questions, more specific probes were used to elicit responses related to affect and specific techniques of perception and understanding. For example, How do you feel about...? What do you think makes this place your favorite?

All participants were asked the six primary questions, however, the secondary probes varied according to the participant and their responses so as to allow the individual experience of each participant to lead the focus of the interview (Appendix A).

### **Summary:**

The purpose of this study is to explore the participants experiences of their outdoor activities. Secondly, to describe those experiences in terms of conceptual themes, and thirdly, to compare those found themes to those of the literature. The open-ended interview process was an effective tool in eliciting the kinds of responses that would be necessary to answer the questions posed in this study.

## Chapter IV: Analysis

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### **Introduction:**

There are three sections in this chapter. The first is the presentation of the experiences of four visually impaired people as they describe their outdoor recreation activities. This is accomplished through the use of the verbatim transcripts taken from the participants. The interview segments are used within the text of the chapter to assist the reader in understanding the outdoor recreation experiences from the perspective of the participant. The analysis in this section compares the experiences of the participants to one another

The second section presents the analysis of the interviews in terms of the specific factors in the environment that were felt to contribute to the quality of the experience of the participants.

The third section of this chapter compares the experiences of the participants to the constructs found in the literature to determine the level to which the literature reflects the experiences of these participants with visually impairment.

### ***Section One:***

#### **The Interviews:**

The interviews revealed more than twenty themes (Appendix D).

Those themes will be presented as evidence related to two questions, and are italicized within the text for ease in identification. The two questions are: (a) What factors contribute to the understanding of the participants environment?, and (b) What affects the quality of the participants experience when participating in outdoor activities?

### *Contributing Factors to Understanding:*

The analysis of the interviews showed that among the contributing factors there were two steps in the process of understanding for the participants. They were, (a) gathering the information, and (b) making sense of it.

### *Gathering the Information:*

There were both physical and cognitive techniques of gathering information about the environment surrounding the participants. The physical techniques included the use of the senses, caning, and the use of the Doppler Effect.

#### *Physical Techniques: The Senses*

Two of the participants have slight light perception and used their limited visual capacity whenever possible to help locate and identify objects.

**Participant #3:** [determining location] There were no trees over us, no shadows and stuff there....and light on black. There was no trees right over us where if we were on the edge of the lake, there were trees all around the lake, so it would be darker.

The most commonly mentioned sense in the interviews was the sense of hearing. Many of the participants depended on this sense heavily for gathering information.

**Participant #1:** ...starting in mid-to late-February...a few of the robins are going to begin to sing their spring song. That's one of the early, early signs of spring and then, suddenly, one day the grackles are going to be back... you know, you just kind of watch the birds that do fly south return....then I see the slowing down of their songs in July as a precursor to the end of summer, particularly the robins. Its a very, very strong indicator of what the season is.

**Participant #4:** I keep coming back to the hearing but, you know, for me, hearing is just so ...I depend on it so much...I really do depend on hearing to get a lot of things out of the environment. I just pay attention to everything, especially if I'm by myself, I listen. I pay attention to everything around me by listening cause that's the only way I know what's going on.

The sense of touch was also an important tool in informing the participants. In some cases, the touch was passive and felt as an overall body sensation. In other cases, the information was gathered in a more active deliberate way, usually through the use of the hands.

**Participant #4:** ....you can feel the changing of the air...

**Participant #2:** ...you can smell the air difference. When you're up a little bit, the air feels colder. There's a lot more wind up there.

**Participant #2:** One of the things I like about hiking...is you can touch everything and its...I mean, you can see, but I can get something out of it through touching the rocks.

**Participant #3:** He [camp counselor] would pass everything [leaves and branches] around...he would pass it around so people could touch it...He would pull things off the trees and show them to us, raise our hands up to touch the stuff.

The sense of smell was not the dominant sense mentioned but was significant and contributed to the multisensory experience of the participants.

**Participant #4:** ...you can smell the fresh air...

**Participant #3:** You could kind of tell if you've got pine trees...different trees and different things smell different and that's kind of neat. It sort of gives you more of an idea. Cause people don't walk along with you and tell you everything that is going on. Probably drive you crazy if they did.

**Participant #3:** They [camp counselors] would stop and go, what's that? Smell that? Do you know what that is? And tell us about that one, too because that was the first thing that you would notice about it ...was not the flowers on it or something like that but the fact that it had this strong smell to it ...just kind of hit you.

#### Physical Techniques: Caning

The next technique of physical information gathering was the use of a cane as an aid in traveling and informing the participant.

**Participant #1:** ...when I'm traveling alone like that, I carry a cane and catching, using that cane very systematically so that as I move and you swing that cane back and forth so that the tip of that cane strikes the ground, floor, pavement. That you swing that cane to the right as you advance with your left foot so that the cane strikes the ground at just about the point where the right foot is gonna be with the next stride.

#### Physical Techniques: The Doppler Effect

The Doppler Effect, as mentioned in the literature review, is a technique used by many people with visual impairment. It is a highly specialized use of the sense of hearing to gather information about objects, a technique that is mastered only with practice.

**Participant #1:** [assistance with orientation] Oh yeah, landmarks, you see because as you walk, you can hear the various landmarks when you pass them, the sound pattern changes, you see, as you pass a telephone pole, you pass a tree, you pass a fence. That character of the sound, the echoes, they change so that very often you can even have some idea of what kind of phenomenon, what kind of structure, what kind of thing causes that soundtrack.

When asked about detecting the closeness of objects the participant responded,

**Participant #1:** Sure, by the characteristics of the sound, you can tell whether something is close to the feet, six feet, ten feet away, you can tell when there's an abrupt change.

The techniques just described were all physical types of information gathering.

The second type of gathering is cognitive.

Cognitive Techniques:

Cognitive techniques mentioned in the interviews were described as ways in which the participants conceptualized their surroundings. Those who had experienced sight in early life, no matter how limited, relied on visual memory.

**Participant #1:** ...I sort of see the rough outlines of those trees. I see that neighbors house though it may not look anything the way it is, but I've got a notion there's a house there so I construct a picture that I will pass the neighbors driveway, I visualize something there that's a little bit lighter than the grass around it...though I don't see it...there is no visual sensation at all now, but I have that much in my memory...

**Participant #2:** We have another student ...he's got a really good map of the campus in his head because he could see at one time, not while he was here, but he can just, kind of conceptualize what the campus looks like...

Participants who had never experienced sight relied on creative imagination and speculation.

**Participant #4:** If somebody loses their sight and you describe a person to them, they can visualize it. But I can't really visualize, for example, what you would look like as compared to somebody else...what your face, you know the features...the details. Because I can make up something in my mind but really there's no way of knowing cause I've never seen it...when I was single and interested in girls, I would go a whole lot by their voice. That's the only way I had of determining in my own mind whether they were really nice looking or not. And sometimes that didn't have anything to do with it at all.

In addition, a comparative technique was utilized to aid in conceptualization, where objects, either speculated or experienced, were *contrasted*.

**Participant #3:** You can kind of tell if you've got pine trees...different trees and different things smell different and that's kind of neat. It sort of gives you more of an idea.

**Participant #2:** [When describing pretty or beautiful...] ...a sighted person will tell you its pretty outside but I might be able to feel maybe there's a difference in the air and the terrain and if you look around you and touch all the stuff, you see its different and there's not a lot of man there. You know man hasn't really contaminated it yet.

*Memory* plays an important role in everyday functions. This is true whether the memory is stored visually or non-visually.

**Participant #3:** [how to get around campus]...a lot of memory, just practice. I go up the street and there's a wall there and that wall goes all the way up around the corner, And then there's a pole...I've had a couple of run-ins with it...I've gone far enough, I'll be crashing into the pole soon. Bang. Yep, there's the pole.

Conceptualization and memory are aided by the use of maps that make sense, tactile maps.

**Participant #2:** ...but I don't have a mental image about Radford campus because there's never been a raised map.

**Participant #2:** [visualized maps vs. tactile maps] That doesn't work very well for me because I'm congenitally blind. And so that doesn't work out well. But, pictures are a way of ...having, like, a mental image of how something is shaped, or like seeing how the whole campus is laid out is really helpful. But a lot of time, its just not realistic because not many places have maps, you know, we can read.

Each individual learns to adapt to their environment given their own unique situation and history, however, the techniques discussed here are believed to be generalizable to the larger population. Some of the physical techniques have specialized

application to those with visual impairment, however, the guiding concepts are very similar to the way in which all people gather information. More specifically, the cognitive methods of conceptualizing are very similar to the techniques used by the greater population. People who are sighted have become accustomed to the convenience and power of the visual sense and first rely on it to gather information, however, the same techniques are used with the other senses for those who do not primarily rely on sight.

### Making Sense of It:

The techniques of comparative conceptualization and contrast are a very important tools in the understanding of the larger context of the environment, but also aid in the understanding of the specifics of the immediate surroundings. Many of the participants applied these techniques to the changes in climatic conditions.

**Participant #2:** You can smell the air difference. When you're up a little bit, the air feels colder. There's a lot more wind up there.

**Participant #3:** There's a fire hydrant on one of the corners, pretty good indication of, yep, this is really the sidewalk. Its not just a blip in the road.

Others used sensory information gathered from objects and activities in nature to inform them and aid them in making sense of their surroundings as well as affect the quality of the experience.

**Participant #4:** ...like birds singing, of course, to me is beautiful. So any kind of music I hear is beautiful to me. But, just sounds of animals, to me, is kind of neat. But I would think that's the same as it would be for you, isn't it?

A second source identified in the interviews to help make sense of the environment was that of *physical cues*. As mentioned in discussion of Alexander's work patterns, order, and organizing tools are essential for the understanding of the environment.

**Participant #2:** ...one thing that Radford, at least is bad, is there are so many different sidewalks and they all go different ways and they're not square...they're all like curling in diagonal directions and that gets real confusing.

**Participant #3:** [when describing summer camp] We slept in a little building at the bottom of the hill, and the dining hall was at the top of the hill. And everything was pretty close together, it was a good setup because it was just right in there together...just stay on that road and you were gonna be O. K. cause it didn't turn or anything. It was straight.

Making sense of a place requires *legibility*. The Kaplans pointed out the necessity for legibility and appropriate levels of complexity as essential elements of making sense of the environment. These concepts are found to be important to those who experience the world without sight as well.

**Participant #3:** [when describing what was confusing about the trail] There were too many of them and they went in every single direction and no direction at all...We gotta go home. Somebody's gonna get killed up here. There didn't seem to be any rhyme or reason...

The interviews also revealed the importance of *predictability* and *expectation*.

**Participant #1:** Well, given the time of the year, you expect to find certain kinds of birds, you know, because starting in mid-to late-February, a few of the robins are going to begin to sing their spring song.

**Participant #3:** ...there was some distance to cover, but you pretty much would get on this gravel path and just keep going and you were gonna get to one end or the other, and you could count on it.

As an aid to the memory related techniques of conceptualization, the concepts of *familiarity* and *novelty* proved, by repeated appearance in the text, to be contributing factors to the making sense process.

**Participant #4:** I use landmarks as much as I can to travel...and a mobility person can help me, you know, cause they can tell me, in a route, what I need to kind of look for. And then once I kind of get familiar with it of course that makes a big difference. When I moved...the mobility instructor...just basically familiarized me with the area...you have to have somebody show you...unless of course you can ask people as you go but you've got to learn your route to work or whatever. You've got to have somebody familiarize you with it.

**Participant #4:** ...walking along unfamiliar areas, if I ever got lost, naturally, I'd just have to ask directions, you know like anybody else would have to do.

The concern for over stimulation from the senses was addressed in the literature review of this thesis (Kaplan & Kaplan, 1983), and was determined to be associated with confusion. This concern is valid here as well. As with the possibility of visual over stimulation, there is the possibility of over stimulation of other senses. This is true for those sighted and for those who are not. For example, one participant found traffic noise distracting and a nuisance, and another participant depended heavily on the sounds of traffic for orientation and location information.

**Participant #1:** I like the trail because its quiet...you don't have the distractions of the traffic so I like those kinds of situations for walking...you can relax more on the Huckleberry Trail because you don't have the vehicular traffic...

**Participant #2:** ...I'm a lot better in the city because in the city there's traffic. So, for me the traffic really helps me because you have the obvious source...

In addition, when the participant received inappropriate amounts of stimuli the response was either fear or boredom.

**Participant #2:** I don't mind going walking outside in the woods or something like that for a little while, but its not real visually stimulating, And so, I mean I can't see, and so its all right but it s not...I don't spend a lot of time doing it...

**Participant #3:** There were too many of them and they went in every single direction and no direction at all...and it was terrible...I didn't like that at all.

The appropriate amount of stimulation is necessary to balance these affective responses. This is true among diverse populations and among all senses. The information gathered through different senses greatly affects the level of interaction a person may have with the environment. This information also greatly affect the quality of the experience.

### *Affects on the Quality of Experience:*

The factors that contributed to the understanding of the environment for these participants have been identified. Next a look at the factors that affect the quality of that experience will be discussed.

The affects on the quality of experience identified in the interviews will be presented in two categories: positive and negative. These categories are defined for convenience, as some of the constructs identified are not as black and white as the categories may indicate. The affectual constructs are identified in the following text with italics and are not presented in order of importance, as all are important to the participants in different ways at different times.

## Positive Responses:

Eight affectual themes were identified in the interviews. The first of which is ritual. *Ritual*, as defined here, is an activity or event that contributes to the meaning and quality of the participant's life. The pattern is cyclical and in many cases is annual. In the case of one participant, the cycles of the season were identified to him by the migratory patterns of birds. The quality of his outdoor experience was positively affected by the identification and enjoyment of "bird-watching".

**Participant #1:** ...starting in mid-to late-February...a few of the robins are going to begin to sing their spring song. That's one of the early, early signs of spring and then, suddenly, one day the grackles are going to be back... you know, you just kind of watch the birds that do fly south return....then I see the slowing down of their songs in July as a precursor to the end of summer, particularly the robins. Its a very, very strong indicator of what the season is.

*Challenge with success*, was another theme identified. Challenge is an important part of the quality of human life (Csikszentmihalyi, 1982). Some of the participants expressed the importance of both the need for challenge as well as the motivational reward that success provided them. This theme was strongly tied to responses of *pride*, and *self-esteem*.

**Participant #2:** [describing a trail group they were asked to lead] I think the thing that really made it cool was being asked to kind of lead the group[ of blind people]...then when we did it,...some of the blind people said thank you very much and it was really cool and you guys really know what you're doing. And that made me feel really good about myself.

**Participant #4:** ...there were so many rocks, mud and loose gravel and obstacles, there were some things that were very difficult to negotiate...and knowing that I could actually, well I didn't know if I could, when I thought back about doing it, you know, just kind of neat to know that I could do it.

*Exploration and discovery* were themes that were identified as desired factors of a quality experience.

**Participant #4:** ...on top of that mountain was about two inches of snow. It was kind of neat watching... you know, going from the elevation...I mean that was kind of a neat experience...just climbing the mountain and feeling the air get colder. It was just different, you know? Something new.

*Choice and freedom* was another prevalent theme in the activities discussed by the participants. In some cases these terms had multiple meanings. For instance, freedom to one participant meant escape from fear. A freeing experience was one that was safe.

**Participant #1:** You can relax more on the Huckleberry Trail because you don't have the vehicular traffic, you don't have the obstacles on these narrow sidewalks in Blacksburg. Its a freedom there.

Freedom from obstacles and dangerous traffic gave this participant choices.

**Participant #1:** I talked about being able to walk fast, you walk fast because you don't have to be concerned about some of those same obstacles that you have to be concerned about when you're just walking on the sidewalk, or in this neighborhood.

Choice and freedom were closely related to the theme of control. *Control* was identified as a contributing factor in the majority of the activities discussed in the interviews. It is one that strongly influenced both the quality of the experience as well as the positive or negative feelings about the activity or place. Several positive reactions were identified as related to control. This theme was strongly tied to the constructs of *dependence* and *independence*.

**Participant #2:** ...if you tell me I have to go to this building, I'm gonna go the way that I know even though there's a shorter way and I know there's a shorter

way unless I'm with somebody. And then if I'm with that person, I'll let them take me.

**Participant #2:** I go the same route every time. Whereas ya'll [sighted] can just walk and just go wherever you want.

Activities that could be done with little or no supervision, in a safe environment, with choice were preferred and gave the participants a sense of self-control and independence.

**Participant #2:** There was nobody on the trail. So, we went to this one place that we both really like, it had lots of rocks. And I like to touch rocks and see what they feel like, but our favorite thing to do with the rocks was throw them in the water. Both of us loved to throw rocks. So, what we'd often do was try to throw rocks, hit other rocks and then make all the rocks fall into the water...we had a great time that day.

The themes related to interaction with other people were motivational factors for the participants. They included *social interaction* and *escape/retreat*. *Social interaction* with other people was not necessarily related to socializing but sometimes was related to *safety* and *relaxation*.

**Participant #1:** ...the camping that we did when the children were still living at home...in those situations I was always with somebody and that makes a difference because when you're with somebody you don't look for the same things. You know, when you're walking, because you're not worried about the landmarks, where I need to make the turn, you know. So, you can concentrate on other things, whatever they might be or maybe just relax a little bit because you don't have to be quite as alert.

*Escape and retreat* were themes that were associated with reactions such as "getting away", "peace and quiet", and "freedom".

**Participant #2:** The fun part about that was getting away from everything...

**Participant #4:** ...just like it would be for you. Just to getaway from your job pressure and, just being outside in the nice clear air...

The themes discussed here are, as with the other constructs identified, very similar to those identified in the literature. Some, like control, may have greater importance for a less independent person with visual impairment. However, in general, again the similarities among both the sighted experience as described in the literature and the visually impaired experience described here have many more similarities than differences.

### Negative Responses:

The negative themes identified are less in number. This may be due to the fact that most responses were made to the question, “What is your favorite place to do this activity?” This probe was primarily designed to solicit positive responses, however, some negative responses were given.

The notion of challenge in activities of everyday life as well as planned activities can elicit both positive and negative reactions. The responses are usually *success* or *failure*. Csikszentmihalyi wrote of the importance of the balance between these two responses. These too are relevant to the activities of people with visual impairment.

*Challenge with Failure* is a theme that was prevalent in the discussion of activities that were associated with discouragement and frustration. A balance was important between success and failure. Too much failure and the participant was discouraged and resulted in diminished self-esteem. In many cases, a “favorite” activity was primarily described as easy .

**Participant #2:** ...it was a real easy trail...There was no brush...there was a path all the way to the top...no big rocks and there was not really much chance of falling off the edge and things like that.

Some responses were centered around frustration with themselves and some were frustrated with the lack of opportunity.

**Participant #2:** I like some sports, like I like volleyball. I mean I can serve and things like that. I like that. One thing that I think is really also frustrating for me is, you know because I'm blind, the outdoors and sports have always been kind of limited and it always really frustrated me because I've never...I'm not much...I mean, I don't dislike sports but I was never all that good.

**Participant #4:** I think especially children that are congenitally blind or almost like I am, you know a lot of the now are going to public schools and I don't think they let them participate in physical education like they should and they don't get the exercise. I think physical activity is probably even more important than if you can see.

In addition, failure was identified in terms of social interaction, and the level of acceptance by peers.

**Participant #2:** When you're ten years old, sports are everything. I mean, all your friends are into sports, you're into sports, they're into sports. One reason it was so painful was my brother played little league baseball and my friends play, too, but I couldn't play.

Finally, there were some negative responses to physical cues. As mentioned earlier sound, for example, has many purposes and affects. It is a useful tool for some, a pleasurable activity for some, and for others in some situations, sound can be a negative contributing factor to the experience.

**Participant #1:** Anytime you walk on a public street, you've got to watch for the traffic but on the Huckleberry, all you have are bicycles and the riders are very good about telling, you know, 'passing on your right, passing your left', so that if you pay attention, you don't have the distractions of the traffic so I like those kinds of situations for walking.

## **Summary:**

The interviews were rich with information about the experiences of the participants. Their experiences were all different and yet the themes cited persisted. The similarities between the four participants was identified through the analysis of the context of the interviews. The interviews revealed the common experiential themes between the participant's experiences and ways in which they understood their surroundings. Many of the factors identified as influential were pragmatic in nature and begin to reveal the importance of wayfinding issues in the experiential aspects of the leisure activities of these participants.

## ***Section Two:***

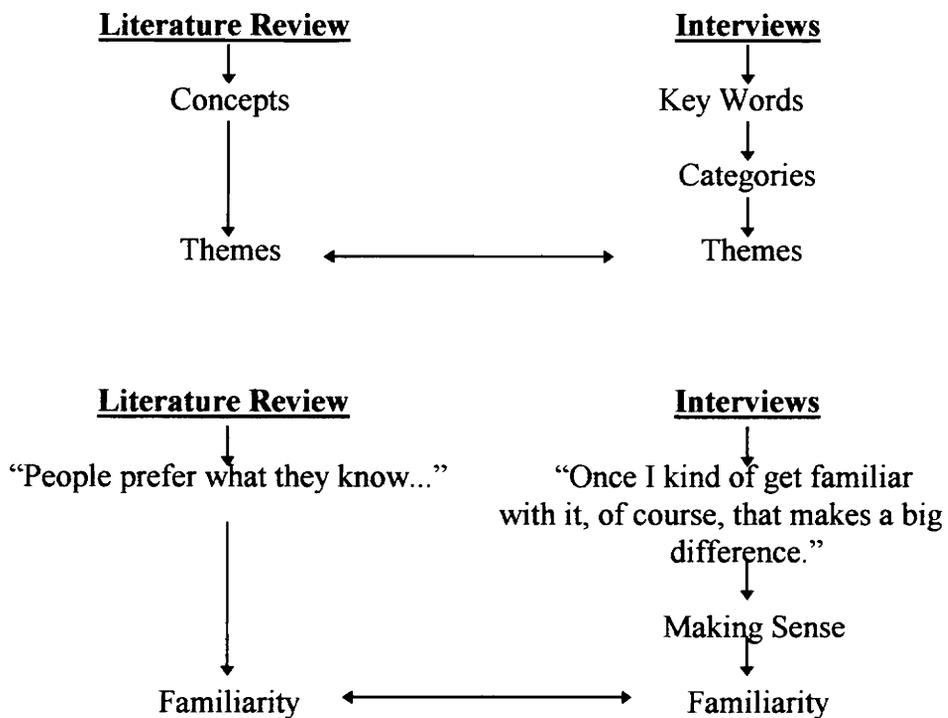
### **Literature Review Concepts:**

The literature review focused on the selected works of eight contemporary authors of environmental understanding theory. Each work was reviewed for significant terms or concepts that were used to structure the theories they supported. Each authors concepts were then compared, and consolidated into a list of similar terms and concepts to show the relationship between the concepts of each work (Appendix B). This tool was used to help the researcher determine which concepts were novel and which were repeated. The concepts that are identical are only listed once. The groups listed have similar meanings or have related themes.

## Interview Concepts:

The interviews revealed 117 different key words that were used by the participants to describe their experience. Further, these key words were used to describe the understanding of their surroundings and/or how the quality of their experience was affected. (Appendix C) The key words were then grouped into 24 categories according to their similarities in meaning. The 24 categories were then assigned to 18 themes, which describe the overall nature of the concepts within the group. (Appendix D) This method of analysis was very similar to that used in the analysis of the literature in the attempt to create like data for comparison.

For example:



Not all themes found in the literature related directly to the themes identified in the transcripts. Some themes were shown to be very similar and others unique to the populations they represent.

### **The Interviews & The Literature: Similarities & Contrasts:**

Each of the two data sources were unique, and presented information specific to the nature of the source. However, through the analysis process the two dissimilar sources were systematically manipulated to create themes which could be compared.

The major themes identified in the transcripts were as follows: (a) Activity, (b) Control, (c) Release, (d) Climatic Elements, (e) Ritual/Patterns, (f) Negative Affect, (g) Challenge, (h) Structures, (i) Visual Cues, (j) Contrast, (k) Self-esteem, (l) Exploration, (m) Positive Affect, (n) Social Interaction, (o) Sensory Information, (p) Cues, (q) Techniques, (r) Making Sense, (s) Nature, (t) Enclosure/openness, (u) Intellectual stimulation, and (v) Direct interaction.

Activity: Activity was identified as a theme because so much of what the participants described was directly related to the activity they were engaged in. This was partially due to the nature of the questions asked, but was also felt to reflect the impact of the activity on both the initial motivation of the involvement of the participant and also the impact of the activity on the experience. This theme did not directly correlate to a theme identified in the literature.

Release: The theme of release was found to be related to the literature themes of *restoration* and *escape*. The focus of these related themes was primarily associated with getting away and restorative types of activities. However, release for the participants was related to frustration and, in some cases, build up of aggression. The source of much of this frustration was related to both the inability to make sense of their surroundings, and/or the lack of opportunity to participate in activities.

Climatic Elements: Climate and weather related elements in the transcripts were associated with the literature theme of content. The literature presented *Content* primarily as a source of information about a scene or place. The participants used elements as sources of contrasting information, but more information was gained as the elements were used for comparative purposes. This contrasting method gave specific information about orientation, as a place is understood by the change in temperature, or wind direction, or the quality of the air. This aspect of the elements then relates to the theme of *distinction*. Distinction in the literature is related to visual factors such as outline and edges, whereas the participants with visual impairment find the distinction of objects through other senses. For the participants, as well as sighted people, the elements can not only be sources of information but may impact experience by providing ephemeral qualities to an environment.

Ritual/Pattern: Ritual/Pattern was a theme identified in the transcripts and is related to the literature themes of *familiarity*, *predictability*, *redundancy* and *novelty*. Both data sources use these themes as ways of understanding the environment. Both

refer to the use of these themes to build the cognitive maps of a places. For the participant who enjoyed bird watching, the patterns and the seasonal ritual of the migratory birds and his activity not only helped him to understand nature but added to the quality of his life, as he was able to interact with nature in a way that made sense to him. Pattern was also important in travel, as the participants depended on the patterns of streets, sidewalks, and sound to both orient themselves and understand their surroundings.

Negative Affect: This theme was identified with the key words that were used to describe the negative experiences of the participants. The key words and concepts were similar in the literature, and were related to *Threat/Tension/Anxiety*. The source of the negative affect for the participants was primarily related to the inability to understand or make sense of their surroundings. In addition, there was a strong correlation to safety and security issues which would elicit the same type of responses from both sighted and people with visually impairment.

Challenge: Challenge was broken into two areas of concern in the transcripts. They were (a) *challenge with success*, and (b) *challenge with failure*. Challenge in both cases is related to the literature review themes of *attention, interest, arousal, boredom*, as well as affectual responses of *enjoyment and pleasure*. Challenge for both people with visual impairment and for those who are sighted, has great impact on the emotional response of the person engaged in the activity. The work of Csikszentmihalyi reports on the fine balance of success and failure, and the resulting levels of either boredom or

anxiety. This is true for the sighted as well as for those with visual impairment. The obstacles for people with visual impairment are many times structural. The challenging obstacles that challenge sighted people are generally more directly related to individual physical limitations, as opposed to sensory limitations, and levels of ability as related to the , activity. Both groups however have in common the challenge of understanding. The success or failure of both groups depends on the ability to understand and make sense of their surroundings.

Structure: Structure was a theme identified in the transcripts to describe not only the physical structure of the environment but the structure of the activities the participants were engaged in. The physical structure was related to the themes of *content, node, landmarks, path, edge, spatial relationships, regions, districts, and distinction, and distinctiveness*. The attributes of structure that were identified as significant to the participants were described in terms of orientation, such as, right angles, straight, diagonals, and curves. The ability to understand the way the environment was structured highly affected the participants ability to interact with their surroundings. Physical features, such as waterfalls, within the landscape were also important structural elements for the participants as they added to the quality of the experience. This was found to be true in the literature as well.

Structure in terms of activity was used in the transcripts when describing both the levels of supervision as well as the level of independence the participant had when

engaged in an activity. Structure in this case, not only provided information but also provided a sense of security to the participant in new or uncertain situations.

Visual Cues: Visual cues are the primary source of information for those who are sighted. People with visual impairment have learned to understand the environment through other sense, however, whenever possible it was found that if the participant had any residual sight it was used and depended upon as a source of information. This supports the theory of the power and evolved dependence of sight as a primary sense.

Self-esteem: This theme was related to many other themes within the transcripts, however, the most prevalent concepts were related to issues of *independence* and *dependence*. The participants enjoyed situations that enabled them to engage in activities that allowed them to interact with their surrounding independently. This gave them a sense of freedom. *Freedom of choice*, as identified in the literature review as well as the interviews, can positively affect the quality of experience for both sighted and people with visual impairment.

Exploration: Exploration was a theme in some of the activities described by the participants. As indicated in the literature review, *discovery* and *curiosity* are desired components found in the experiences of sighted people, as well as when interacting with their environments. However, when exploring in an environment that primarily communicates information visually, people with visual impairment are often tentative and guarded about exploring unfamiliar places because of safety issues.

Positive Affect: Positive emotional responses are strongly tied to motivation and affect the quality of experience. Key words such as *enjoy*, *peaceful*, *preference*, and *fun* were used to describe favorite places and preferred activities. These responses are universally available, but as with negative affect, the understanding and ability to make sense of the surroundings can either enhance or diminish the opportunities for positive emotional responses.

Social Interaction: This theme incorporates all degrees of human interaction described in the interviews, ranging from isolation to group interaction. There was no significant difference found in the two groups with regard to this theme, as both enjoyed periods of quiet solitude as well as having the need to interact with others. However, there were cases with some participants where the level of social interaction affected their level of independence. This relationship between independence and dependence also affected the participants level of security, which in turn reduced stress and need for concentration.

Sensory Information: Multisensory information, as established in the literature, is useful to everyone. The use of multiple senses at one time is regarded as optimal in some cases, however, there is a fine line between optimal levels of multisensory stimulation and confusion. As with sighted individuals, people with visual impairment have different reactions to different senses, such as the reaction to traffic noise. One participant felt traffic was noise pollution and another found it a primary source of orientation information.

Many people have different primary senses. The establishment of this primary sense allows for the majority of information to be gathered in a manner that makes the most sense to that person, given their abilities. For the majority of humans that sense is sight, for others it is hearing or touch, and for even fewer, the sense of smell. Humans call on secondary senses as confirmation of the first source when gathering information. However, all senses can be used to enhance the quality of the experience once the object, scene, or place has been identified.

Cues: Cues for people who are sighted and visually impaired are informational in nature. It is the process by which the information is gathered that is different. Most cues in the landscape are physical structures and can be generalized to Lynch's organizational elements of landmarks, nodes, paths, edges, districts and regions, however, for most people those cues are experienced visually. People who use other senses as their primary source could use many of the same cues, provided they were presented in a manner that made sense to them.

Technique: Technique is used here to describe the methods of assistance used to aid a person in gathering information. There are many differences in this theme between the two groups due to different methods of information processing with different primary senses. Just as sighted people have developed aids, such as directional signs, to aid in understanding so too have people with visual impairment. The use of canes, Braille, the utilization of the Doppler Effect, and the specialized use of contrast are learned techniques used to help make sense of a world that is primarily built for the sighted. The

dependence on memory was another technique identified in the interviews. Just as with the recall of images stored in a cognitive map for the sighted, the ability to recall information about a place, a route, a persons voice, the sounds of a place, were all important aspects of understanding a situation for the participants.

Contrast: Contrast is a comparative technique used by all people to gain a better understanding of their surroundings. The literature refers to this type of information processing as *distinction* and *distinctiveness*. Both people with visual impairment and those who are sighted, depend on the memory of previously experienced objects, circumstances, or settings to recall and compare the current situation to. This ability to recall, then contrast and compare is important for people with visual impairment as well.

Control: Control was a theme that was identified as somewhat unique, as it did not appear as a strong theme in the literature reviewed. Although control in a situation may be desirable to many, these participants indicated that it was an important aspect of their experience and therefore note worthy. People with severe visual impairment are often times required to depend on others for assistance and information. Control in these circumstances is equated with independence and contributes to the quality of their experience.

Making Sense: Making sense was by far the most prevalent theme. It relates to the majority of the other themes as it is the overall goal of understanding in general. It is identified here as a theme to specifically address the larger components of understanding not yet identified in the other themes.

Nature: Nature was an important element in several of the experiences described in the interviews. This theme represents a range of elements in nature including wildlife, plants, water, and ephemeral qualities like climate.

Enclosure/Openness: The degree of enclosure of the activity settings was both noticed an influential factor in the quality of the participants experience.

Intellectual Stimulation/Physical Challenge: This theme differs from the earlier theme of *challenge*, in that it reflects the more sought after experience. The theme of *challenge* describes the challenges of the structure of the setting and the degree to which the participant was able to overcome the barriers. This category describes the contribution that stimulation, both physical and cognitive, provides in a quality recreation experience.

Direct Interaction: Physical interaction with the immediate surroundings in a recreation experience was found to significantly contribute to the quality of that experience.

The similarities between the two groups with regard to making sense was significant. Both groups depend on many of the same making-sense-concepts. They include *patterns, order, organization, predictability, and legibility*. The difference between the literature and the participants was the format of the presentation of the information. The presentation of information using visual cues exclusively limits the level of understanding of those who perceive visually and limits the number of people

that can perceive it . Both of these factors affect the ability of everyone to make sense of the object, scene, or place.

### *Section Three:*

#### **Contributing Factors to the Experience:**

The first section of this chapter presented the analysis of the interviews and the important themes revealed, and the second section discussed how those themes compared to the literature. The third section of this chapter will present those factors in the environment that contributed to the experiences described by the participants.

Many of the themes discussed thus far have been strongly linked with the primary issues of wayfinding. The experiences of these participants go beyond those pragmatic factors of moving through a place. The positive experiences described by the participants were characterized by factors of those places and situations that affected their enjoyment of the experience. For many it was the interaction with nature.

**Participant #1:** My wife and I have a route that we do...it is fairly heavily wooded. Very nice, its just makes very nice walking. I like to check on the bird-life.

Here the participant describes the contribution that his interaction with birds makes on his selection of walking paths. This passage also is reveals the contribution of the enclosed feeling of a heavily wooded path.

Many people enjoy the experience of the changing of the seasons. This is evident in the Fall, as thousands of people flock to the mountains to witness the ‘Fall Color’.

People with visual impairment are no different in that respect and enjoy the ritual of the seasons.

**Participant #1:** I would have to say they [birds] identify the seasons and, I prefer the spring. I can tell people, I guess, May is my favorite month and June is my second favorite month because of the bird-life and the walking is good before the heavy heat of the summer, so that's part of it [enjoyment], the season change.

This participant experiences the change of seasons through his interaction with the bird-life, and has an understanding and appreciation for the seasons as a result of this interaction.

Nature is interpreted differently by many people. For one participant, the absence of noise was an indication of nature.

**Participant #1:** ...I think you prefer nature, at least I do, those natural scenes like that without the noise pollution, if you will, you know so that you can concentrate on the bird cataloging.

Enclosure, as reported in the literature, is a contributing factor to the experience of a place. This was found to be true in the interviews as well. Enclosure was a factor in many of the preferred places for walking and contributed to a positive experience through comfort both psychologically as well as temperature control.

**Participant #1:** [the trail] is heavily wooded...it just makes very nice walking. Enclosure is perceived through the change in temperature from sun to shadow, as well as through sound.

**Participant #3:** [How could you tell you were in the middle of the lake?] There were no trees over us, no shadows...

**Participant # 1:** [How do you perceive the difference in openness and enclosure?] It's the sound again, when the trees are not close, the sound, the whole pattern gets different...its reverberation...that helps you tell whether its open or wooded.

Some participants at times enjoyed activities that took place in open areas.

**Participant #4:** I like to go deep sea fishing. Just go out on the boat ...just be out in the middle of the water ....enjoying the fresh air. Just a relaxing kind of thing.

Another common factor mentioned by the participants was the motivation of mental stimulation. Without stimulation boredom sets in and a positive recreational experience is not likely.

**Participant #2:** As a child I didn't mind going outside in the woods or something like that for a little while, but it's not visually stimulating. I mean I can't see, so I don't spend a lot of time doing it...

**Participant #1:** So many of the hikes that we have found ourselves doing in some of the state and national parks, there are marked trails with placards posted at intervals along the trail...there's an intellectual activity there.

**Participant #3:** One of my favorite things was to go out with this one guy who knew plants. He could pick up a leaf and say, this is from a whatever tree, big ole Latin words, and tell you all about it ... he was really cool to go on a hike with.

Along with mental challenge, that participants enjoyed activities and places that physically challenged them as well.

**Participant #4:** ...the best part of it was the actual experience of it and the exercise...it just helps you clear your mind, just the exercise of it [hiking] and knowing that I could actually .... I didn't know if I could, when I thought back about doing it, you know, just kind of neat to know that I could do it.

Multisensory stimulation offers information about a persons surroundings but was also found to be a contributing factor to a positive recreation experience. In many cases,

the participants enjoyed activities which allowed them to directly interact with their physical surroundings.

**Participant #2:** We went to this one place that we both really like - it had lots of rocks, and I like to touch rocks and see what they feel like, but our favorite things to do with the rocks was throw them in the water. Both of us love to throw rocks.

**Participant #3:** ... different trees and different things smell different and that kind of neat. It sort of gives you more of an idea. As your walking along and you kind of breathe ... the first thing that you'd notice was not the flower...but the fact that it had this strong smell to it. Just kind of hit you.

**Participant #4:** ...you can smell the fresh air or you can feel the changing of air. or, if you are fishing, you know, just feeling that fish hit the hook...winding it in...or hear that rod sing...

**Participant #4:** ...on top of that mountain was about two inches of snow. It was kind of neat watching ...you know, going from one elevation ... that was positive, I mean that was kind of neat experience, just climbing the mountain and feeling the air get colder.

The ability to escape or get away from it all is a common experience sought after during a recreation experience. This was true for these participants as well.

**Participant #2:** The fun part about that was getting away from everything...

**Participant #4:** ...just like it would be for you. Just to get ways from your job pressure and just being outside in the nice clear air ...

In most cases, safety is a influential factor when dealing with experiences related to human/environment interactions. For these participants, safety was also a contributing factor. As with sighted recreationist, a setting that one day might be preferred can on another day elicit negative feelings if associated with fear or other negative experiences related to danger.

**Participant #3:** [Describing a place earlier referred to as a favorite place] I Fell once. Scared me half to death. I almost went down in the lake.

## **Summary:**

The interviews of the participants with visual impairment revealed that the majority of their needs and concerns are similar to those identified in the literature. The exceptions to this statement are the needs of (a) control, (b) independence/dependence, (c) and some specific safety issues which contributed to experiences ranging from fear to comfort. The needs identified in the theory are basic to both groups and most significantly the need to be able to make sense of the surroundings is common. These are fundamental issues of wayfinding for both groups but were found to be significant to the participants with visual impairment.

The two significant overall findings of this comparison were found to be (a) a difference in the methods of information processing, which significantly affect the level of understanding and (b) mutual benefits of moderate levels of multisensory stimulation. These findings, as well as their implications to design will be discussed in the next chapter of this thesis. These two areas of concern were first identified in the literature and were addressed in the information processing section. These similarities will be discussed in the next chapter of this thesis.

## Chapter V: Conclusions

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### **Introduction:**

The primary goal of this study was to gain a greater understanding of how to design outdoor places that were experientially accessible to a diverse population. In order to accomplish this, a literature review was conducted of some of the contemporary theories of environmental cognition which addressed the issues that influence understanding of the environment. The focus areas were (a) information processing, (b) evolution and human need, (c) affect, and finally some of the writings on (d) social and cultural influences on the understanding process.

The secondary goal of this study was to discover the factors that contribute to a positive recreation experience for people with visual impairment. For this portion of the study, open-ended interviews were conducted with four participants with visual impairment, and were directed at their outdoor experiences. The questions which guided the interviews were designed to draw out responses related to the quality of the experiences of the participants, however, the vast majority of the responses were related to wayfinding issues. Wayfinding and information processing, as first mentioned in the introduction, were not the primary focuses of this study but the persistence of this theme has lead to conclusions of significance.

Despite the initial intent of this study, due to the overwhelming response, both wayfinding and quality of experience issues will be addressed. An analysis of the

interviews, as well as the literature review, was completed and are summarized in the analysis chapter of this study. The comparison of the two results will be presented here in two sections. The two sections represent the two main areas of significant findings and are described as (a) affective response and the quality of experience, and (b) information processing and making sense of the environment.

### **Section 1: *Affective Response and the Quality of Experience***

The quality of experience has been shown to be influenced by many things, such as past experience, social and cultural experiences, and how information about the environment is perceived. This section will present a discussion of how the participants felt about their outdoor leisure experiences, and what influences these affective responses had on the quality of that experience.

The following are quotes from the interviews, many of which were used as examples of wayfinding issues in the analysis chapter of this thesis. These examples are cited again here to show the duality of the responses to emphasize the equal relevance to experiential quality issues.

The ability to perceive information has been shown to be an integral part of the understanding process and allows a person to move through a space. This same information can affect the quality of the experience. The sounds of nature relay location information, for example, but also positively affect the quality of experience.

**Participant #4:** ...like birds singing, of course, to me is beautiful. So any kind of music I hear is beautiful to me. But, just sounds of animals, to me, is kind of neat.

Sounds in the environment can inform a person about proximity but also have the potential to affect the level of relaxation, which in turn affects the quality of experience.

**Participant #1:** I like the trail because it's quiet ... you don't have the distractions of the traffic so I like those kinds of situation for walking...you can relax more on the Huckleberry Trail because you don't have the vehicular traffic...

Levels of complexity, which have been presented earlier as influential factors in the ability of a person to gather information about a place, can also affect emotional response.

**Participant #3:** There were too many of them [trails] and they went in every single direction and no direction at all...and it was terrible.. I didn't like that at all.

Obstacles and levels of difficulty in a trail, for example, not only affect the ability of one to travel through a space, but can positively or negatively affect the quality of experience.

Success in a leisure activity can result in affective response of pride and enjoyment.

**Participant #2:** [describing a trail group they were asked to lead] I think the thing that really made it cool was being asked to kind of lead the group [of blind people]...then when we did it,...some of the blind people said thank you very much and it was really cool and you guys really know what you're doing. And that made me feel really good about myself.

Obstacles and challenge also have the ability to enhance or inhibit opportunity.

opportunities must be made available if success or failure is to occur.

**Participant #2:** ...and knowing that I could actually, well I didn't know if I could, when I thought back about doing it, you know, just kind of neat to know that I could do it.

Identifying sensory information that enhances the quality of experience can increase perceptual opportunities for a more broadly used and understood environment.

**Participant #4:** ...on top of that mountain was about two inches of snow. It was kind of neat watching... you know, going from the elevation...I mean that was kind of a neat experience...just climbing the mountain and feeling the air get colder. It was just different, you know? Something new.

Freedom is a response that was given in the interview when a place was understood, safe, and free of obstacles. It is an example of a positive affectual response to a wayfinding issue.

**Participant #1:** You can relax more on the Huckleberry Trail because you don't have the vehicular traffic, you don't have the obstacles on these narrow sidewalks in Blacksburg. Its a freedom there.

**Participant #1:** I talked about being able to walk fast, you walk fast because you don't have to be concerned about some of those same obstacles that you have to be concerned about when you're just walking on the sidewalk, or in this neighborhood.

These examples of opportunity, choice, and freedom are all constructs that were identified in the literature. They have been shown here to be relevant issues to the experience of these participants with severe visual impairment. The responses in this category from the interviews seemed to be related to issues of independence, as well as control.

**Participant #2:** ...if you tell me I have to go to this building, I'm gonna go the way that I know even though there's a shorter way and I know there's a shorter way unless I'm with somebody. And then if I'm with that person, I'll let them take me.

**Participant #2:** There was nobody on the trail. So, we went to this one place that we both really like, it had lots of rocks. And I like to touch rocks and see what they feel like, but our favorite thing to do with the rocks was throw them in the water. Both of us loved to throw rocks. So, what we'd often do was try to

throw rocks, hit other rocks and then make all the rocks fall into the water...we had a great time that day.

**Participant #1:** ...the camping that we did when the children were still living at home...in those situations I was always with somebody and that makes a difference because when you're with somebody you don't look for the same things. You know, when you're walking, because you're not worried about the landmarks, where I need to make the turn, you know. So, you can concentrate on other things, whatever they might be or maybe just relax a little bit because you don't have to be quite as alert.

These issues of control and independence are important to some extent to all people.

However, for these participants these issues are of greater concern because of the lack of opportunity to participate in some activities as well as the need for many to depend on the sighted for information about the environment.

There are similarities between the sighted and visually impaired in their requirements, needs, and preferences for quality outdoor leisure experience. Everyone needs to relax; everyone needs the opportunity to have fun and to get away.

**Participant #2:** The fun part about that was getting away from everything...

**Participant #4:** ...just like it would be for you. Just to getaway from your job pressure and, just being outside in the nice clear air...

## **Section 2: *Information Processing and Making Sense of the Environment***

This area of environmental understanding was identified as a common theme in the responses from the participants about their outdoor experiences and was found to

influence the quality of their experience. Therefore, this area was regarded as significant and will be discussed in this section.

The analysis of the interviews has revealed patterns of understanding similar to the patterns discussed in the literature review. The four interviews conducted for this thesis contained a series of elements that when put together begin to describe a place that makes sense. In order to have a basis for understanding the type of patterns that would make sense to the largest number of users, it is essential that the commonalities between different groups of people are understood. The task is to design competent landscapes. That is, places that are responsible to the needs of the users, that make sense, and finally are cohesive and comprehensible.

Coherence, in our perspective, helps in providing a sense of order and in directing attention. A coherent scene is orderly; it hangs together. Coherence is enhanced by anything that helps organize the patterns....a legible space is one that is easy to understand and to remember. It is a well-structured space with distinctive elements, so that it is easy both to find one's way within the scene and to find one's way back to the starting point (Kaplan & Kaplan, 1989)

Both the literature and the interviews indicate a strong preference for pattern and structuring elements in the landscape in order to be able to understand it.

Considerable research has shown that perception in both humans and animals is characterized by a strong orientation to information that is structured or patterned (Ulrich, 1984)

The literature, in some cases, indicated the importance of non-visual factors in this understanding process.

Visual distinctiveness is not the only important factor. In some environments there is little that is distinctive, but people must nonetheless find means to remember their way (Kaplan & Kaplan, 1981)

Buildings at decision points tended to be remembered, even if they were not otherwise striking (Appleyard, 1969).

The principle of structuring elements and patterns are clear in both the review of the literature and interviews with the visually impaired participants. The elements are not necessarily physical structures, but the concepts identified have implications for the design of both structure and landscapes that have meaning to a diverse group of users. These implications will be discussed in the conclusion chapter of this thesis.

Both the Kaplans work and the foundation of this thesis rely on the assumption of a fundamental world view as “whole”. That is that the world is seen as one community with similar evolutionary histories. There are differences among people and societies, but more importantly, there are similarities among all humans on which to build the foundation of a common language.

Due to the unique qualities of patterns of understanding among people, a qualitative approach was taken to explore the experiences of the participants with visual impairment. Though each interview was unique, the shared patterns of understanding became apparent.

...there might be a way of creating a *whole* pattern, a pattern that would only gradually be sensed and developed; by sequential experiences, reversed and interrupted as they might be. Although felt as a whole, it would not need to be a highly unified pattern with a single center or an isolating boundary. The principal quality would be sequential continuity in which each part flows from the next--a sense of interconnectedness at any level or in any direction (Lynch, 1960)

There were many similarities found between the patterns identified as important to the participants, and the patterns identified in the literature on environmental

understanding. The experiences were far more similar than they were different, as the theories and concepts found in the literature could be identified as a part of everyday life of the participants.

The underlying issue here is in general wayfinding, however, the significance is the influence that understanding, or the inability to understand, has on the emotional well-being and quality of experience for these individuals.

### **Summary:**

The issue of wayfinding is fundamental to accessible environments, however, access is more far reaching than moving from one place to another. The components of environmental understanding that deal with information processing address wayfinding and information gathering techniques. Gathering information is an essential tool to wayfinding but it is also an essential component to experiential access to the environment. To be able to understand the environment allows one to move through it, but it also allows one the opportunity to enjoy it; to like it or dislike it. Wayfinding is a prerequisite to a 'good' recreational experience.

The significance of the information gathering process to the participants, as well as the impact of their ability to understand and make sense of an environment, have been discussed. As a result, two areas of impact have been identified. They are (a) wayfinding, and (b) affective response and the quality of experience.

The factors, other than those that contribute to making sense, that influence the quality of experience for these participants were found to include: (a) interaction with nature, (b) enclosure & openness, (c) intellectual and physical challenge, and (d) direct interaction with the surrounding physical environment.

This author initially believed that the literature did not reflect the experience of people with visual impairment. Through this study it is now believed that the literature does not exclude the experience of those with visual impairment. Most people seek the same kinds of 'good' recreation experiences, and most people understand their surroundings similarly, and most people enjoy the same kind of settings -- if the information is presented in a manner that most people can perceive it.

The majority of the literature reviewed deals with ways of understanding the environment. It is presented primarily in terms of visual stimuli. This is believed to be in part due to the perspective of the authors as well as the dominance of visual perception among most people. However, many of the principles are equally valid when applied to other modes of perception. The inclusion of other forms of perception in the discussion of environmental understanding would be helpful to designers in their understanding of the diversity of perception. This broader discussion should also present the contributions that a multi-sensory experience have to a 'good' recreation experience. Most importantly, the literature as a body of work about understanding, highlights the fact that the most significant aspect of understanding is -- cognition rather than perception. This

fact is shared between both people who are sighted and those who are not, and acts as the bases for common ground.

### **Implications:**

Landscape Architecture often relies on the research of other disciplines to guide and influence design of outdoor spaces. Environmental cognition theory is one of those areas relied upon for information about how people perceive and understand the landscapes around them. To rely exclusively on the theories of contemporary environmental understanding would not be complete because it does not currently fully represent the spectrum of experience. The literature presents most of its information from a visual perspective, which fails to include information about the impact, implications, and preferences of sound, touch, and smell as primary senses. This thesis presented several case studies that begin to describe the experiences of those who perceive their surroundings with primary senses other than visual. This kind of information about multi-sensory perception should be incorporated into the body of literature that designers depend on for a greater understanding of how people in general interact with and understand their surroundings.

Designing landscapes that consider and incorporate the needs and preferences of a diverse population, of which some use sound, smell, and touch as their primary senses, may not be as difficult as first thought. The primary design consideration is to create competent landscapes; places that can be perceived and understood by everyone. This approach to design takes additional thought and time. However, it is easiest to design a

place from one's own experience, and for most that is for a sighted world. It is assumed that if the designer understands the place then others will as well. Although, as Alexander pointed out, each person has their own language (1977), not all people are exactly alike.

It would be an impossible task to create a place that met all of the needs of all people; however, it is not an impossible task to create places that incorporate elements that allow all people to perceive and understand their surroundings.

It has been established that making sense, or wayfinding, is a prerequisite to the enjoyment of a recreation experience. Therefore, it is important to understand how to increase the likelihood of understanding or legibility. The tools of making sense for not only people with visual impairment but for all people, are **patterns** and **presentation**. The use of patterns does not suggest the use of a "cookie-cutter" approach to design, but instead suggests the use of organizing themes, order, spatial relationships, contrast and the like, as building blocks of place making. Order in design can be a universal aid in understanding, and does not exclude most people with sensory disabilities.

The second tool, presentation, refers to the way in which information is disseminated. A place that is organized and filled with making-sense-patterns and yet is presented in a limited way, diminishes its power of competency. In order for a place to make sense and to be understood, it must first be perceived. Presentation of information that reaches several different senses allows more people to understand it and increases

the quality of the experience for others, thereby increasing the place's power of competency.

If this prerequisite of understanding can be accomplished, then the next task would be the incorporation of those factors identified in the interviews that contributed to a positive recreation experience. Specific application of the following suggestions should be left up to the individual designers, and can be implemented along with the consideration of the suggested making-sense-tools. Some examples of this application are as follows:

1. The use of micro-climates to create contrast and added interest.
2. The use of water in the landscapes presents information through sound, sight, and touch.
3. Diverse surface texturing presents information both visually and tactually, while adding interest and character to a place.
4. Incorporating fragrant plant material into the planting plan provides multisensory interest.
5. Presentation of written information in raised letters and/or the use of contrasting colors provides opportunity for those with visual impairment to receive the information, while not impeding the opportunity for others to receive the information.
6. Increasing wildlife habitat provides opportunity to interact with the multisensory nature of ephemeral landscapes and wildlife.
7. Incorporation of several levels of physical challenge.
8. Incorporation of objects that reflect and make sound to indicate edges.

The incorporation of these suggestions, as well as other design elements that present information in a multi-sensory fashion, will enhance the competency of a place. This competency will allow for greater ease in mobility, independence and self-control, and therefore increase the quality of experience for a more diverse population.

The inclusion of opportunities to: (a) interact with nature in a multi-sensory fashion, (b) to experience spatial relationships of enclosure and openness, (c) to be intellectually and physically challenged, and (d) to have direct physical interaction with the environment will contribute to the quality of experience for people with visual impairment as well as those who are sighted.

The contributing factors to a quality experience identified in the interviews are limited to this study, however, they should be used to guide designers to a better understanding of the diversity of perception as it relates to the quality of experience. Finally, the identification of the similarities in both cognitive and perceptual processes establishes that there is no justification for the design of specialized trails or segregated recreation facilities. They have been shown here to be unnecessary.

### **Further Research:**

This study has focused on experiential access to the environment. It has been determined that many people with different sensory abilities can benefit from the similar types of information if presented in a manner they can perceive. Specific components of a quality experience have been identified as well as some suggestions for their incorporation into the landscape. However, it has not been determined from this study if there are specific setting preferences of people who perceive the environment with senses other than visual. Many preference studies have been conducted about the landscape but most have been centered on visual preference. To determine whether or not there are

specific types of settings and activities preferred by different primary senses, further research and preference studies will need to be conducted with larger groups of people with different disabilities.

In addition, there is a need for specific studies to be conducted to determine preferences and levels of effectiveness for sensory stimulation. If landscape architects are to be informed and more prepared to design places for a diverse population then specific information about the implementation of sensory stimuli will need to be identified. For instance, it is known now that there are different materials that absorb and reflect sound differently. Knowledge of this nature can aid in the implementation of designs that are competent and therefore experientially accessible.

## Appendix A

### *Unabridged Interview Transcripts*

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#### **Interview #1:**

Interviewer: I wanted to just introduce this study to you briefly and let you know that the interview is being conducted as part of a collection data process for my Master's of Landscape Architecture thesis, and I'm interested in finding out what is important to you in your outdoor recreation experiences. Your responses will be anonymous, the tape recordings of this interview will be used solely for the purpose of this study, and the identities of the respondents will not be revealed at any time in the study. The results of the study will be made available to you, upon request. Do you have any questions about this?

**Participant #1:** No, no problem.

Interviewer: O.K. Well, I guess the first thing I'd like to know is do you enjoy outdoor recreation activities?

**Participant #1:** Yes.

Interviewer: What kind of activity do you enjoy?

**Participant #1:** Well, you know, it's mostly walking these days. We've not done much hiking since the children. We used to would do that.

Interviewer: Do you have a favorite place that you like to walk?

**Participant #1:** Yes. When I lived on the other side of town, I used to love the bike trail there over near Draper Road ...

Interviewer: The Huckleberry?

**Participant #1:** Yes.

Interviewer: Can you describe the Huckleberry Trail to me as you were walking on it?

**Participant #1:** Well, of course it's a mile long trail and, yeah, it's just a good place in town to watch nature. I'm a bird fancier, you know. I just like to see what's out there and that's a good place because on the north end of it, you know, there are lots of trees and so

you get the tree-type birds (the cardinals and what-not). On the south end, there after it curves as you out toward Airport Road, it's more open and the bird-life is locked out.

Interviewer: How often, how many times do you go into that place? Do you go there a lot?

**Participant #1:** No, not much anymore because when I was on that side of town, that was my favorite regular walking place. My wife and I have a route that we do in this neighborhood which is just about a half-mile circle, I guess, that goes out through the neighborhood to just east of here, fairly heavy wooded. Very nice, it just makes very nice walking. Again, I like to check on bird-life.

Interviewer: Do you usually visit the trail or do your walking activity by yourself or do you usually go walking with other people?

**Participant #1:** The bike trail I usually did myself. The one in this neighborhood I usually do with her.

Interviewer: You mentioned the bird-watching. That seems to be an important part of the activity to you. Can you describe anything more detailed about that experience?

**Participant #1:** Well, you know, given the time of the year, you expect to find certain kinds of birds, you know, because starting in mid- to late-February, just a matter of, say, two weeks from now, a few of the robins are going to begin to sing their spring song. That's one of the early, early signs of spring and then, suddenly, one day the grackles are going to be back ...you know, you just kind of watch the birds that do fly south return. You know, the grackles fly south and I don't know what else does. The robins are here all year, so they're just not doing their spring song until mid-February and then I see the slowing down of their songs in July as a precursor to the end of summer, particularly the robins. It's a very, very strong indicator of what the season is.

Interviewer: So you feel like...you're talking about the sound of the birds?

**Participant #1:** Strictly, strictly. Sometimes my wife will, you know, spy a bird and we'll talk about it, you know, but sometimes it takes the song for us to figure out what it is.

Interviewer: That's the thing most people identify birds with...their song.

**Participant #1:** Yeah.

Interviewer: And you seem to be connecting it a lot to the change of seasons and ...

**Participant #1:** Yes.

Interviewer: ..how do you feel about that? What part does that play in your experience of watching the seasonal change in connection to the birds and the song?

**Participant #1:** I'd have to say they identify the seasons and, you know, I prefer the spring. I can tell people, I guess, May is my favorite month and June is my second favorite month because of the bird-life and the walking is good before the heavy heat of the summer, so that part of it, the season change. But, you know, what is amazing this time of year, crows are still there, the song sparrows are always here, the cardinals are always here the Carolina winds are always here, the robins are here (they're really not singing, they give flight calls but they don't sing this time of year). The song sparrows will sing a little bit. The winds and the cardinals...the cardinals sing a fair amount this time of year.

Interviewer: That's interesting. You walked about the directional ends of each of the trail and the curves and things like that. Can you talk a little bit more about those parts of the trail, the experience of actually walking through there?

**Participant #1:** I'm not sure, exactly, where to start. As I say, I have liked the trail because it's quiet and it's fairly easy to walk alone. Anytime you walk on a public street, you've got to watch for the traffic but on the Huckleberry, all you have are bicycles and the riders are very good about telling you, you know, passing on your right, passing on your left, so that if you pay attention, you don't have the distractions of the traffic so I like those kinds of situations for walking.

Interviewer: So you've mentioned quiet and no distractions. How do those kinds of qualities of the trail make you feel and why are those important to you?

**Participant #1:** Well, it's...think you prefer nature, at least I do, those natural scenes like that without the noise pollution, if you will, you know that you can concentrate on that and the bird cataloging. In the spring, even, when I walk to work, it's 1.1 miles from here to William's Hall where I work and in the mornings, you know, in the spring...April, May...I will play games to see how many different bird songs I can identify during that, roughly, 30 minute walk.

Interviewer: That's interesting. You also mentioned that it was easy to walk on the trail and sort of talked about the fact that it's different than being on the street.

**Participant #1:** O.K., it's the noise and, then a trail, it's well marked because you've got a nice, unbroken asphalt track to walk on and, you know, say it's a mile and you can, you can get on that trail and you can walk for that full mile and when I was living over there I could walk it in about 17 or 18 minutes, you see, from end to the other. Now, that's

moving. But, you know, if you're trying to use your walking really as a form of exercise, you can walk that full mile and hardly break stride. Well, you see, I walk that same 1.1 miles from here to work...it's the same distance but you don't get nearly the workout that you would get on that trail because you have to stop for traffic lights, you at least slow down every time you pass an intersection, you know. There are just too many things to slow you down...it's not that kind of intense workout.

Interviewer: So you feel like the surface maybe has something to do with it...the experience of the...

**Participant #1:** Yeah, that's it...the fact that it's an asphalt surface, say as opposed to a gravel surface, I think it's a little easier to follow as you walk.

Interviewer: And you said you've gone to this place a lot. How do you think that the fact that you've been there so many times influences your experience there now, let's say comparing your experience there at the beginning and now, now that you've been there so many times. Do you feel it's different?

**Participant #1:** Very little, you know. As you learn a place, you know, you know where some of the birds are likely to be, to be nesting, you know...you know where you come close to human habitation ' cause, you know, there's one place, there's one place kind of near the end of it where the houses back up, you know, back up right on the trail, whereas, the north end, really after you pass Southgate Drive, you're pretty well isolated.

Interviewer: Right. I'm finding it interesting that you talk about distance a lot and I'm curious to know how you...is that something you're perceiving or is that just something ...

**Participant #1:** Well, you know, we've been talking about this trail, you know, that is a mile long. We talk about distances there, you know. They're quantities that I know, number one, and number two, distances help one orient oneself. For one thing, walking to work, I like to know how far it is because at least if you're looking at an exercise regimen, you know how far you walk in a day if you walk that round trip. You have 2.2 miles of fairly brisk walking and on the return trip, you climbed a couple of fairly good hills that's gonna' cause the heart to pick up.

Interviewer: You referred to distances . maybe something that helps you orient yourself. Are there other characteristics of the trail, or similar experiences, that help you with that orientation?

**Participant #1:** Oh, yeah, landmarks, you see because as you walk, you can hear the various landmarks when you pass them, you know, the sound pattern changes, you see, as you pass a telephone pole, you pass a tree, you pass a fence. You see, that character of

the sound, the echoes, you see, they change so that very often you can even have some idea of what kind of phenomenon, what kind of structure, what kind of thing (I'm groping for words, you see) causes that soundtrack.

Interviewer: And you perceive that to be the sound?

**Participant #1:** Yes.

Interviewer: Can you describe that to me? I'm not familiar with that experience.

**Participant #1:** I'm not sure that I can, you know, it's one of these abstract sorts of things and, you know, you have not trained yourself to hear those sorts of things because you don't need them. But, you see, I can get up and I can walk toward that hall right there and I can hear where the opening is. It's a phenomenon some psychologists have called facial vision. At one time, there was a theory that it was air pressure, you know, because it does have that illusion almost as if you feel this on your face. But very careful study has shown that it actually is the sense of hearing. There were a bunch of studies in the '50's that pretty well concluded that that's what it was and it makes sense because those kinds of cues, you see, are almost completely erased on a windy day. You know, you try to walk in heavy rain, you see, that's all gone, you see, which would make me believe that absolutely that the primary sensor is the hearing and not any kind of air pressure on your face.

Interviewer: Were you talking about identifying landmarks on your trip...

**Participant #1:** Anywhere. Not, not just ... anywhere, sure.

Interviewer: And how do you identify or, or what makes something a landmark? I know you talked about hearing. How do you decide what's a landmark?

**Participant #1:** Uh, well I guess a question I could ask you - how do you decide if something's a landmark. You know, I think it's a matter as you get more used to a route, you know, that you, that you learn when you bring your pass this clump of trees, and I'm thinking now about on Turner Street at that cross street just where (?????????), there are some pines on the left as you're coming this way that are fairly close to the road. Of course, they're over your head and you can hear those, you can tell they're up there, you see...well, I don't know whether they're actually, I might say over your head, they're right at you, actually, sometimes they will actually brush against you, you see. They get cut and trimmed back so that's not the case right now but, you know, the owner lets that go and they can get out over the street. And, see, you pass that landmark...O.K., well, you know I'm about midway up the walk, you know, or the house on the corner, the side of that house is very, very up close to the street. So, again, you can hear when you come close to that house.

Interviewer: So, these are differences, something that you're perceiving a change.

**Participant #1:** Sure, sure. By the characteristic of the sound, you can tell whether something is close to the feet, 6 feet, 10 feet away, you know, you can tell when there's an abrupt change.

Interviewer: And is the specific identification of the tree as a pine tree...

**Participant #1:** No, no, it's ...

Interviewer: ...how are you perceiving that?

**Participant #1:** Because before the guy cut his tree I knew where it was, so I know it's those pine trees. But maybe to clarify that, you know, I would probably know those are probably trees. You know, that's probably the conclusion I would have drawn ... those are probably trees, but I know they're pines because I've had my hands on the needles.

Interviewer: So you've actually touched them.

**Participant #1:** Yes, exactly. But if that had not happened, you know, I would, you know, that's the trees very close to the road, that's about all I could say.

Interviewer: You had mentioned, when you were talking about the trail, you talked about openness around the trail. How do you feel about that kind of quality during your walk or as a part of your activity there? Is that something you ... do you, how do you feel about that?

**Participant #1:** I'm not sure exactly what you're looking for, you know, I don't, I don't like one necessarily any more than the other, you know, it's just different.

Interviewer: And how do you perceive that difference in openness and closed?

**Participant #1:** It's, it's the sound again, you see, that when those trees are not close, the sound, the whole pattern gets stalled, whatever you want to call it, is different and, you know, again because we're dealing with a very, very personal kind of experience and probably, you know, very, very complex stimuli that the human brain is handling. You know, I can't find words to explain how it's different you know, except the fact you know it is and you know, you know that it is more open by the sounds that you hear. You know, part of it is I know it's just reverberation, you see, from the sounds around you whether you create them or whether it's the wind wherever it might be...you see, that reverberation, that helps you tell whether it's open or wooded.

Interviewer: I was just trying ... I'm going back to the patterns and the changing of patterns and landmarks and how you're orienting yourself between as you're traveling.

**Participant #1:** Yeah, now, but let's...we've left out part of the equation, it's probably my fault. But you know, when I'm traveling alone like that, I carry a cane and catching, using that cane very systematically so that as I move and you swing that cane back and forth so that the tip of that cane strikes the ground, floor, pavement. That you swing that cane to the right as you advance with your left foot so that that cane strikes the ground at just about the point where that right foot is gonna' be with the next stride. Now this is a technique that was developed by a rehab. counselor with the Veteran's Administration after World War II and the canes are long and you determine the length according to your height, you see, so that when you do walk that it will, that the tip of that cane will fall. So you're not going to have that, where the edge of the walk is, on the street the gutter's a little deeper or where there's no gutter at all. You catch curb cuts, you know, that where the edge of the pavement may change in a certain way and it doesn't make any difference out, how it changes, but there's some phenomenon, some characteristic at point A that you know that you're at point A and not back here at point C or D just by what you pick up with that cane. Now, it occurs to me that if, example, how you take those things and put them together that where I cross down here at Turner Street, down at ????? and come up to the house...the neighbor's driveway is down there and the son parks on the street, and I can usually tell whether that car is parked there before I actually hit it with the cane. So, there I can just walk forward and about 10 feet from the driveway, see the grove comes right down to the street and I can tell by listening that I'm pretty close to the driveway, you see. And then I can start slowing down so that I don't move too fast and miss it. So, you're really looking at a variety of stimuli to help you orient yourself.

Interviewer: As you're describing this, this journey to me, can you explain to me how you're recalling that information? Do you understand my question?

**Participant #1:** No, I don't. You know, how does the human brain recall anything, you know. I saw somewhere that, oh, it's well over half of the stimuli, more than that, that human beings use in a given days' activity that the chief stimuli are visual. So, you know, I gave you some landmarks about where the street turned and where the numbers were on the mailbox. You see, I gave you exclusively visual cues when I gave you directions. And you used those visual cues to find my house and I used these combination of auditory and tactile with the cane because you can tell where the curb is, where the neighbor's driveway is, where my driveway is, where a step is, you see, whereas to get here you depend exclusively on those visual cues, I depend on a combination of auditory and tactile cues to get me here. So, I would say it's essentially the same kind of process but the data comes from a different source. Does that get at it?

Interviewer: Uh, huh, I mean, I ...

**Participant #1:** Well, I know you're sort of feeling for things you should try to work out for the interview, sure...

Interviewer: But you're right...

TAPE CHANGED SIDES

**Participant #1:** So, I had that little bit so some of these mental, these cognitive maps that you're talking about, for me they're visual, you know, because I sort of see the rough outlines of those trees. I see that neighbor's house though it may not look anything the way it is, you know, but I've got a notion there's a house there so I construct a picture that I will pass the neighbor's driveway, I vision something there that's a little bit lighter than the grass around it. See? Though I don't see it because the only way I can tell whether that light on right there is on, you see, I cannot see it, you know...is the bulb hot, you know, there is no visual sensation at all now, but I have that much in my memory that the cognitive map is visual because I can sit here and I see that speaker though I've never laid eyes on it, and the one over here, and the grandfather clock, the light that's right above it, the table behind the clock there, the mirror that's over top of it, the curio cabinet here, the CD rack right there, a chair there. See? But suppose somebody moved that chair, suppose my wife had moved that chair for some reason and I didn't know she had moved it, and maybe it was stuck back in front of that window and I had not discovered it, I would still see that chair there even though I'd be wrong. Am I making sense?

Interviewer: I think so. You're still remembering, you're still remembering it spatially .

**Participant #1:** You're still remembering it spatially and I look at this, you know, I perceive this room spatially, you know, I've lived here for 5 and a half years. You know, I know where all the windows are and all of the doors and, in some cases, I know about the decorations on the wall, probably more in this room than other rooms in the house. You see, so that would make this kind of construction fairly simple. But then, you know, you can go into a place where you've never been before and you may sit there and you draw a picture and, you know, later on you discover it's just totally, completely off base, you see. It's speculation.

Interviewer: Are there any other, another kind of activity that you would want to tell me about or a favorite place or anything else about what we've been talking about?

**Participant #1:** We talked about the camping that we did when the children were still living at home, you know, but again, in those situations I was always with somebody and that makes a difference because when you're with somebody, you don't look for the same things. You know, when you're walking, because you're not worried about the landmarks, where I need to make the turn, you know. So, you can concentrate on other

things, whatever they might be or maybe just relax a little bit because you don't have to be quite as alert, you know, sort of a difference between driving and walking, you know, I suppose that you're, you don't have to give the walking the kind of undivided attention that you may have, or that you jolly well better give, when you're driving, you see. But, you see, my walking is much like that, you see, that you've got to give things your undivided attention because you're listening and you've got to hear everything for your own safety, you have to hear everything. So, you know, that part of walking alone can be a very tiring experience, you know, just as driving in heavy traffic can be a very tiring kind of experience. And I think for the same reasons. That you're using those mental powers and your attention has got to be so directed and unflaggingly focused that it tears you up.

Interviewer: In that regard, with attention and the focus and the concentration, how do you think that experience relates to your experience of walking on the Huckleberry Trail?

**Participant #1:** We've come full circle. You can relax more on the Huckleberry because you don't have the vehicular traffic, you don't have the obstacles on these narrow sidewalks in Blacksburg. It's a freedom there. You know I talked about being able to walk fast, you walk fast because you don't have to be concerned about some of those same obstacles that you have to be concerned about when you're just walking on the sidewalk, or in this neighborhood ... you know, you're walking in the street, you see, so you can relax more in a situation like that.

Interviewer: So there are characteristics about those two situations that help ease that ...

**Participant #1:** Right, right. It's just less tiring when you don't have to concentrate as much. You can enjoy the trail.

Interviewer: And, so it actually the characteristic of the trail or ... you talked about being able to enjoy it, that it's more relaxing.

**Participant #1:** The fact that there are no cars driving,. I don't think it's the structure of the trail, per se, you see, as opposed to the structure of the street because in that case they are fairly similar except there's no gutter. But I think the point is what makes that a more relaxing environment is the absence of the vehicular traffic, you can relax more, thereby enjoy the walk more.

Interviewer: Is there anything else you want to tell me about the camping.? That's not really ...that's a little bit different kind of experience than your walking.

**Participant #1:** Not really because most of those situations, if we're walking, I'm usually with somebody and, you know, if there's a rock formation or you walk a trail

and the other side points out a particular kind of plant, you know, that my wife was over here, you know, you can touch that and see that so in those kinds of situations, I'm usually with a sighted member of the family.

Interviewer: Even if you're with somebody on those kinds of hiking trails, are there particular aspects of that experience that you feel differently about or that you...

**Participant #1:** Differently from when, what?

Interviewer: Or that you enjoy more?

**Participant #1:** Not necessarily. At so many of the pikes that we have found ourselves doing in some of the state national parks, there are marked trails with placards posted at intervals along the trail. There's a stopping, there's an intellectual activity there that it's, I shouldn't say it's not a factor, it certainly is a very, very minor factor on the Huckleberry Trail or that kind of place that you remember. You're stopping, you're taking in information; whereas you're necessarily taking in information with a walk on the Huckleberry, you know, that you're not assimilating information, you're, I'm trying to distinguish between information and stimuli. See, what I'm saying? The abstract or what's on that placard or what somebody tells you about a scene that's in front of you as opposed from the stimulus of whether there's a tree here or the smell of a pine tree, or the?????????

Interviewer: Different motivation?

**Participant #1:** Yeah, yeah.

Interviewer: I think that's all I can think of to ask. I'm sure there might be other things that I can think of as I ...

**Participant #1:** Why don't you do this is you sort of refine your instrument. You know, maybe go after that information, a phone call might do it.

Interviewer: O.K. Just to get some demographic information...

**Participant #1:** O.K.

Interviewer: I'm gonna' just assign you a number here... and your name is \_\_\_\_\_ ?

**Participant #1:**

Interviewer: And your age, please?

**Participant #1:** The reason I'm hesitating , I'll be 60 years old in about three weeks, so I'm still 59.

Interviewer: And your occupation?

**Participant #1:** College professor.

Interviewer: Ad your level of vision?

**Participant #1:** Totally blind.

Interviewer: And how long have you had this current level of vision?

**Participant #1:** 25-30 years. I don't really remember, you know, well, it was gradually . I tell people suddenly I woke up one morning and couldn't see anything.

Interviewer: So as a child you had normal vision?

**Participant #1:** No, no, never normal vision. Always very, very little. You know, talking about seeing the open doorways, you know, that people talk about color. My understanding of color is intellectual, from information about it that I don't know what the difference is between....you know, now brightness I can understand ...as a dark color as opposed to a mid-way shade of gray, I guess the amount of light that it reflects but I can remember things that people said were red, things that people said were black, I could never make that kind of distinction.

Interviewer: You couldn't describe red?

**Participant #1:** No, I never perceived red or green.

Interviewer: Do you have any other sensory disabilities?

**Participant #1:** No.

Interviewer: And do you use any travel assistant devices...you use a cane?

**Participant #1:** Use a cane.

Interviewer: And have you had any mobility orientation training, specifically?

**Participant #1:** That's sort of a funny story because I have been traveling a lot in my life, but between the first and second year in graduate school, I had a traveling summer

job and I was interviewing blind in the professions and I interviewed a social worker at a Veteran's facility down in Hampton, I believe it was, eastern Virginia, one of those coastal cities, I want to say Hampton. And, you know, I was just using a short, white cane, a cane that was about the right length for me, and he just took me out on the grounds and we walked around for about 20 minutes. He said, "I bet you could learn this easily." So I've had about 20 minutes of formal, formal instruction but just the fact that I had always been fairly independent anyway, you know, that mobility instructor at the Virginia Department for Visually Handicapped office in Roanoke said something else, you know, "You do all right with what you've had," you know.

Interviewer: And you said it would be all right if I contacted you if I needed some further clarification?

**Participant #1:** Sure, absolutely.

Interviewer: O.K. That's it.

**Participant #1:** All righty.

## **Interview #2**

INTERVIEWER: O.K., I need to tell you at the beginning, just to make sure that you, like an introduction to the interview.

**Participant #2:** O.K.

INTERVIEWER: This interview is being conducted to collect data for a Master's of Landscape Architecture thesis. I'm interested in finding out what is important to you in your outdoor recreation experiences. Your responses will be anonymous. The tape recording of this interview will be used solely for the purpose of this study and the identities of the respondents will not be revealed at any time in the study. The results of the study will be made available to you, upon request. Do you have any questions about that?

**Participant #2:** No.

INTERVIEWER: O.K. Well, do you enjoy outdoor recreation activities?

**Participant #2:** I like some of 'em, but like, I think that the only thing...it's gotten better since I was as adult because when I was a child, you know, I didn't mind going walking outside in the woods or something like that for a little while, but it's not real

visually stimulating. And so, I mean I can't see, and so it's all right but it's not.. I don't spend a lot of time doing it because like if I go hiking, I've got to go with somebody in a car and then they've got to walk with me. My best friend, who I usually go with, doesn't live in this area so we don't go as often as I'd like. I do like to hike but I think of one of the problems for blind people in general is, like, until they get a little bit older, unless they're in Scouts or something, there really aren't that many opportunities for them to really get outdoors that much, I mean, it's kind of like there's not much for them to do out there. Like, when I was a little kid, this is probably something you've probably never heard before and I'm gonna' tell you this 'cause it'll probably help you a little bit...um, see I was like in the first generation of kids who went to the school for the blind for four years and then I came back to public school. And, so I came back when I was about 10. And, when you're 10 years old, sports are everything. I mean, all your friends are into sports, you're into sports, they're into sports. One reason it was so painful was my brother played little league baseball and my friends played, too, but I couldn't play. And so, I hated going to baseball games. I was usually all right after I got there but I hated watching my friends play and then watching him...I didn't mind watching my brother, but I didn't like watching my friends play. And then I couldn't play and then the worst thing is like when you're, when you were kind of, if you were with your parents and all your friends were on the field and you were sitting in the stands, and that was really hard for me. So then, you know, later, it was really pretty interesting.

INTERVIEWER: Well, do you...so do you do any hiking or ...?

**Participant #2:** I do a little hiking now, but it's not really something I can do all that often. I'd like to, but I don't really have that many friends around here who likes to do it, so ...

INTERVIEWER: Well, have you had any recent experiences that you could talk about, like maybe a favorite place that you have hiked?

**Participant #2:** Yeah, one of the places we went was on the Shenandoah Trail. We were like in...I'll tell you the most interesting experience I ever had. We were, my best friend and I were, we were going along, we were hiking and, um, we'd gotten out of our car and, ah, out of his car, and he and I were...he was an Eagle Scout and everything, so, um and we were like, we were gonna' hike up this trail and one of the rangers knew that we could do it. I mean, we did this year like kind of as a warm-up hike 'cause it's only like 2.5 miles, and it's no big deal and it's a pretty easy trail. So, one of the guys in the park was like, you know, "Are you just going up that trail?" And I went, "Yeah." And he said, "There's a group of black bullets going up that trail, too. Would you mind going with them," and, at first, neither one of us really wanted to go because we didn't really know who the people were and we didn't feel that would be appropriate, and 'cause we were white and we didn't want to be with them, you know. And, um,, so then, um, like we were coming, we were going up the trail and one of the volunteers who was

going to work with them got there early and, um, we were like flying up the trail and we came down and we were going pretty fast and he's like, you know, "I know, because I'm glad him and the two guys were up there, because you know that tells me, you know, it can be done." And so they're like, "Gee I want to go again and leave the group, kind of, 'cause if they've got a blind person up front, I think it will make people feel better." In other words, if they know that someone's blind who's doing it because you are older, you know, and they'd never done that before, I guess, and they were thinking about hiking up the trail and that was really ...you know, they weren't really scared but, you know, they just weren't all that into it. But it was pretty....and so we went back and we did it and, um, it was funny because one of the guys in the group I kind of knew already and he was, like, "Yeah, that was your big day to show off because, you know, it's quite obvious you were pretty good at it." One of the things I like about hiking, though, is like, it's all like, you can touch everything and it's...I mean, you can see, too, you can see. But I can get something out of it through, like, touching the rocks. And I act a little differently, like I do try to touch everything and I'm a lot lower to the ground ??? and sometimes I end up, especially going down hill, almost sitting down going down hill. Only not sitting down, but like if it's real rough terrain, I can't see where I am so I have to, like, walk kind of like a crab-walk kind of thing where I'm squatting down so I can touch the ground. And, um, that's it. You know, that's pretty...I like to swim, too, but that's not really an outdoor activity.

INTERVIEWER: You said that the trail was real interesting or that the experience was interesting. Are there aspects of the particular place that you were that made it interesting?

**Participant #2:** Well, it was a really easy trail to go up and yet there was a waterfall at the end of it. So we always try to go up there and that was like our first hike every year. We don't do it any more 'cause we both have moved and, you know, it's just not real convenient. My and I don't really hike because, I mean, she likes to hike and I like to hike but she likes to kind of go on really lumpy trails and if I'm going to go on really lumpy trails, I don't want to go.

INTERVIEWER: You described this trail as an easy trail?

**Participant #2:** It was an easy trail. I mean that's just not a thing she would go on. There was no brush, there was no, like, there was a path all the way up to the top, and things like that.

INTERVIEWER: So when you used the word easy to describe it...

**Participant #2:** There was no, like, there were some roots maybe but there were no big rocks and there was not really much chance of falling off the edge and things like that. We've never been repelling but we've been on some trails that were kind of difficult.

INTERVIEWER: So it wasn't the incline it was the texture of the path and that there weren't very many obstacles?

**Participant #2:** Yeah, there weren't many obstacles.

INTERVIEWER: O.K.

**Participant #2:** And it was interesting that we had found that trail by accident and other people had kind of looked for it

INTERVIEWER: Uh-huh. And how many times have you been to that trail?

**Participant #2:** I've been to that trail like four times. Um, one of the other really good places around here that you can go is Hungry Mother State Park in Marion. They have trails, too, and they're pretty nice about letting you hike. And there's also, like, um, a lot of...when I was at the school for the blind, one year we went to this place where they had everything labeled, like they have parks where they have all the exhibits labeled in Braille. And that's pretty interesting. It's expensive, but it's pretty interesting. And then, um, I don't know...I guess that's pretty much ... that's really all I can tell you.

INTERVIEWER: You mentioned the waterfall at the ... I'll go ahead and stop. TAPE RESUMED

**Participant #2:** ... to know about, at least. And there's an architect that might help a little bit. Um, when...one of the things that really frustrated me about this area is that there's really only, like, a few places I could live that actually have a sidewalk. And for me, sidewalks are really important. And, as an architect, I think you can probably understand that. You know. And there's like, in Radford, and even somewhat in Blacksburg but more so in Radford and other places like that, there are not many sidewalks. Like, there, like where Kim lives, there are sidewalks, too. She lives on the same street. But we both kind of chose this area because of that.

INTERVIEWER: And do you walk back and forth to school?

**Participant #2:** Yeah.

INTERVIEWER: And how do you feel about the sidewalks, why are they important to you?

**Participant #2:** Well, they are important because it gives you something to walk on and it's real easy to feel and the cement...you can feel the cement beneath your feet. The one thing that is kind of a nightmare is snow and stuff...that's really...we don't like that. But,

um then we walk in the street. But it's really easier, um, it's always there, it's not going to go away. Like if you have a dirt path or something, it doesn't always work and, um, one of the things that Radford, at least is bad, is there are so many different sidewalks and they all go different ways and they're not squared...they're all like curling in diagonal directions and that gets real confusing.

INTERVIEWER: Curves in the shape of the sidewalk?

**Participant #2:** Not only in the shape but, like there's not really shape to them. They're not straight. They're shaped kind of like nothing goes at right angles or square or anything. It's all, well, this goes diagonally and that goes, um, nothing goes really straight and then there are lots of different sidewalks that lead to the same place and they cross each other at different places and all that. And that gets confusing.

INTERVIEWER: And how do you, how would straight sidewalks help you?

**Participant #2:** You can't be. Gosh. You've never had an experience with blindness, have you?

INTERVIEWER: No.

**Participant #2:** Um. OK., straight sidewalks would be easier because they're easier to follow because they give you a straight path to go down and you know where you're going. If you're going diagonally, you can't really...you don't know exactly where you're going to end up because, um, it's harder to try to figure out which direction you're going. Does that make sense?

INTERVIEWER: I think so.

**Participant #2:** Um, I'm surprised you didn't realize that. You just never thought of that? I mean, as an architect, you never really thought about...some of the, like, most beautiful buildings, and we have this one building at Radford that's really pretty, but it's a nightmare to get around it. Because it's not straight, nothing is logical. And then they have, like, eight-sided buildings and all that. Anything that's not sort of almost square is really kind of more difficult for us to get around in. Not always, but it just is different. Do you know what I'm saying?

INTERVIEWER: Uh-huh.

**Participant #2:** It's not as easy to have a picture of what you're doing and to understand what you're doing once you...um, the other thing that, um, is interesting is like at Virginia Tech, they have a map of campus, which I'm sure ??? but here at Radford, we don't have any map of campus for the blind students. There's one for the

partially sighted, but there's nothing for the blind students, so you're kind of, like, on your own totally.

INTERVIEWER: Well, you mentioned a picture. How do you know how to get around campus?

**Participant #2:** I have to, like, this guy came. His name is Wa Wong and he works for the Virginia Department for the Visually Handicapped, and he has to come and show us how to get around. He had to come and, you know, explain the campus to us and show us.

INTERVIEWER: Did he physically take you through it?

**Participant #2:** Yes. And we, like, have to learn the routes and stuff like that.

INTERVIEWER: And you said you had a picture of the campus? What do you mean by that?

**Participant #2:** No, what I mean is at Virginia Tech they have a map of campus.

INTERVIEWER: And you were talking about finding your way around campus and it's easier to have a picture of the campus.

**Participant #2:** Yeah.

INTERVIEWER: What do you mean by that?

**Participant #2:** Why do you use a map?

INTERVIEWER: Why do I use a map? So that I, so I know how to get around a place.

**Participant #2:** O.K. So, why would I use a map?

INTERVIEWER: So that you know how to get around a place.

**Participant #2:** Yeah.

INTERVIEWER: Do you...I'm just trying to find out what kind of, what your version, how your version of a map and my version of a map compare.

**Participant #2:** Well, mine is raised.

INTERVIEWER: I see. I thought you meant, when you said a picture, I didn't know if you meant you had a picture ...

**Participant #2:** No...

INTERVIEWER: ...was a way of remembering for you?

**Participant #2:** That doesn't work very well for me because I'm congenitally blind. And so that doesn't work out well. But, pictures are a way of ...having, like, a mental image of how something is shaped or, like, seeing how the whole campus is laid out is really helpful. Um, but, a lot of times, it's just not realistic because not many places have maps, you know, we can read.

INTERVIEWER: So you think...so you have a mental image based on the raised map?

**Participant #2:** Yeah, but I don't have a mental image about Radford because there's never been a raised map. ???a mental image but it's, I'm sure it's not correct of the whole campus because I don't go to the whole campus. I'm in grad school so I only really have to go to one building or two buildings.

INTERVIEWER: Can you describe your mental image of either Radford or....

**Participant #2:** Yeah, well, Radford is...it used to be pretty square but then they started adding on to it. And when they started adding on to it, um, they kind of did things because it would make them look good and they didn't really think about, um, you know, a lot of the sidewalks, have you been on the campus?

INTERVIEWER: Radford?

**Participant #2:** Yeah.

INTERVIEWER: Not very much.

**Participant #2:** Um, the campus is kind of, it's real pretty but it, um, it's not, it's not square. I mean, sidewalks go different directions. Like, I know what's at certain ends of campus and things like that and, um, but it is kind of confusing when it just, kind of, the sidewalks go different directions and I have to go...I feel sort of like a route traveler, which means I learn everything... I go somewhere, I go the same route every time. Whereas, ???, ya'll can just walk and just go wherever you want. But I can't do that. And I'm like of like a like a route traveler, which means that my ability is not bad but I don't really have the concept of how to, like, change my route to go somewhere very well. It's kind of like, if you tell me I have to go to this building, I'm gonna' go the way that I know even though there's a shorter way and I know there's a shorter way unless I'm

with somebody. And then if I'm with that person, I'll let them take me. But I, you know, if I'm gonna' go somewhere, I want to go the way that I learned and that's bad when you're on a college campus because, um, it's O.K., but, um...and it's O.K. for work because, like, I'm a lot better in the city because in the city there's traffic. We have another student, his name is Juwan, who, um, he's got a really good map of the campus in his head because he could see at one time, not while he was here, but he can just, kind of, conceptualize what the campus looks like and stuff. And he's good at explaining it to me, but, um, but he, like he won't go running around Norwood and Tyler and all that, you know, the street, and I'm just like, that's easy. So, for me the traffic really helps me. And, um, because you have the obvious source, there's an obvious source. Um, and this isn't really recreation but it is, kind of, travel-type things. But, I'm sorry. I just wanted to get back to your thing. I'm really sorry, I diverged a little bit but I felt it was important.

INTERVIEWER: No, that's good information about how, you talking about the cues and the environment that help you understand it, and that's important to me.

**Participant #2:** Yeah.

INTERVIEWER: Well, you did talk about sound in the city, maybe we could get back to. Does that sense help you in, let's say, your experience on the trail in the Shenandoah?

**Participant #2:** Well, it helps a little bit. You know, you see other people and you can tell which way they're coming from and, you know, whether they're going up or down. But one of the things I think that's really hard for me in the outdoors, I like the outdoors. I mean, I think it's beautiful, but I don't spend a lot of time out there because it's not, there's not a whole lot out there that really...and I think this is...like I don't like to garden and stuff. It does not interest me at all. I mean, I like to hike but, um, and I like to, um...I like to do some sports, like I like volleyball. I mean I can serve and things like that. I like that. And I like to do things in the outdoors like if somebody wants to have a party outside, hey, that's cool. You know. But I'm not like one of these people that will ever be considered a nature lover. I think you might find that a lot in my population

INTERVIEWER: Well, you talked about, you described your outdoor experiences in terms of being pretty and beautiful.

**Participant #2:** Yes.

INTERVIEWER: Can you explain that?

**Participant #2:** Well, like, everybody always tells you it's pretty and beautiful, but you don't really know. You can listen to the...some people who are blind actually take up bird-watching because they can listen to the birds and see what they are. But I just don't

have patience for that. And, um, the ?? will tell you it's pretty outside but...and you might be able to, like, feel maybe there's a difference in the air and the terrain and if you look around you and touch all the stuff, you see it's different and there's not a lot of man there, you know. You know, man hasn't really contaminated it yet. But, that's really about all there is to it, you know. Being in Radford, I'm from Washington...I mean, I came from Washington, D.C., and being here has been really hard for me because, um, I've had kind of a hard time adjusting to a smaller town.

INTERVIEWER: I see.

**Participant #2:** I mean I like to be in larger cities for obvious reasons, there's more to do and then, on top of that, there are buses and kinds like that there, too, that there aren't here.

INTERVIEWER: Uh-huh. You mentioned that...the difference in the air. How...

**Participant #2:** Well, you can smell the air difference. When you're up a little bit, the air feels colder. There's a lot more wind up there. Or there's a lot...maybe there isn't that much more wind but there are a lot less things to stop wind from blowing up there.

INTERVIEWER: You mentioned the waterfall at the trail?

**Participant #2:** You can hear it. And, you know that New Age music where they really get into that? They play a lot of the natural sounds and it's pretty interesting.

INTERVIEWER: Does it make you feel any different?

**Participant #2:** Well, for religious reasons, I don't really listen to it very much. Um, 'cause we're kind of born-again Christian thing. A lot of that stuff is...

INTERVIEWER: Well, I mean the natural...the waterfall...

**Participant #2:** Oh, the waterfall? Um, we like...I mean, I enjoy it. It's very peaceful. It's nice to get up there every once in a while but I don't really...I'm not one of those...like, my wife goes...she, like, you know, she can see that she likes more, um, she's one to like visual things and she likes to go to, like, different things from different time periods. And unless they have, like a lecture, I don't want to go, unless somebody talks and guides the tour. I don't really want to go because I don't learn that much 'cause here's, you can't touch the stuff. And sometimes you can but you don't want to 'cause you can break it or, it's a priceless heirloom and you really don't want to be responsible for that.

INTERVIEWER: You talked about touching the rocks and when you're going down the trail, you're touching the rocks. What kind of, how are you getting information from that?

**Participant #2:** Well, I like to know, like, if it's a real bad trail and there are lots of rocks, um, then, I've got to find a foothold in the next rock.

INTERVIEWER: I see. So you're talking about pretty steep...

**Participant #2:** Yeah, pretty steep. And if it's not, I don't know why, but my best friend and I enjoy this...it's just one trail that's pretty steep. And, like, when we used to live closer to each other, we were always going in the spring, or, what was really great, the best time that we ever had was...it was like today was supposed to be. It was, like, in the winter but it was really warm and, um, both of us...it was on a weekend. And the two of us were like, "Well, why not go hiking?" So we decided to go hiking. There was nobody on the trail. So, um, we went to this one place that we both really like - it had lots of rocks. And I like to touch rocks and see what they feel like, but our favorite things to do with the rocks was throw them in the water. Both of us loved to throw rocks. And, um, and so what we'd often do was try to throw rocks, hit other rocks and then make all the rocks fall into the water. Have kind of like a landslide but not really a rock-slide, just a little one. And, um, we had a great time that day. But we got in a little trouble because...we got in a little trouble because we weren't supposed to be throwing, we were doing a little too much of it. A big boulder started and, you know. Um, we were up there for four hours doing it, so...but we had a great time. And, ...

INTERVIEWER: And what is it about...the throwing of the rocks?

**Participant #2:** It's like....it's a real tension release, you know, if you're real tense, it releases your tension. And then, um, it also feels good because a lot of times, like, um, sometimes, like, a lot of the, um...like we could wrestle, you know, we could be wrestlers or whatever. But that's really the only sport, you know, that we can really do. The other sports, like, I had a good friend that did track for a while who was blind but, um, that isn't real aggressive. A lot of sports are real aggressive like soccer and football...they're very aggressive sports. And, um, for blind people, you know, we just don't have that outlet.

INTERVIEWER: Right.

**Participant #2:** And, um, there's judo and things like that but that's not really outdoor recreation.

INTERVIEWER: So you feel, you feel that it's in that setting that that's a good place to do that?

**Participant #2:** Yeah, and one of the things that I think is really also frustrating for me is, you know, because I'm blind, the outdoors and sports have always been kind of limited and it always really frustrated me because I've never...I'm not much...I mean, I don't dislike like but I was never all that good. It was always kind of uncoordinated and always kind of, even when I was at the school for the blind, I was not one of the better people at it. And then, um, and I was younger than a lot of people in my class, too, and that makes a big difference when you're dealing with athletics. And, um, I was just never very, like, into it...I was never, um, you know, I like the outdoors sort of, but, um, unless they had playground equipment, you know, I wasn't going to bother with it. And, um, it was always...amusement parks, I like them, but they're not really natural outdoorsy places.

INTERVIEWER: Well, that's O.K. Just talking about outdoor kind of things.

**Participant #2:** But there have been instances where blind people are not allowed to ride rides in amusement parks. I've never had any problems but I've read about people who have.

INTERVIEWER: Huh. Well, just a couple of other questions.

**Participant #2:** Sure

INTERVIEWER: If you could describe your favorite thing or the best part of that Shenandoah Trail.

**Participant #2:** Well, probably the best part was the time when we went to throw rocks was in the Shenandoah, too, and that was really fun. The fun part about that was getting away from everything, it was in winter and we weren't supposed to be up there but we were. And, um, we were totally by ourselves and we could do anything we wanted up there. And, um, that was really cool. But in the Shenandoah trip, I think the thing that really made it cool was being asked to kind of lead the group and we really didn't know anybody in the group. We felt, you know, kind of, at first we were like, "No way." And then, you know, um, then, when we did it, they said... some of the blind people said, you know, "Thank you very much and it was really cool and you guys really know what you're doing." And that made me feel really good about myself. And they used to call me, like, every year after that...they called and they'd let us do it again. But now we both moved away so we can't do it.

INTERVIEWER: So that was rewarding?

**Participant #2:** That was rewarding. And people, for some reason, people that like, are, into outdoor stuff sometimes tend to, um, will help people who exhibit blindness a little more, you know. They, like, um, when I was at James Madison as an undergrad, um, a

lot...some of my friends were in, like, a caving club and they always used to ask me if I wanted to go with them. And I would have liked to have gone caving but I kind of didn't want to go with that group because they were too into drugs.

INTERVIEWER: Oh, it wasn't the activity, it was...

**Participant #2:** It wasn't the...I mean, they did the activities but I just kind of felt that I didn't want to be involved with the drugs. And they, I'm still friends with some of them, but, you know, I mean I was still friends with some of them even though I kind of told them I didn't want to be involved.

INTERVIEWER: Yeah. Well, this has been really helpful and I, you know, appreciate you talking about all these experiences.

**Participant #2:** No problem at all.

INTERVIEWER: I can ask you, if I could, just a few demographic questions.

**Participant #2:** Sure.

INTERVIEWER: Your name is

**Participant #2:** Yep.

INTERVIEWER: And your age, please?

**Participant #2:** 32.

INTERVIEWER: And you're a graduate student?

**Participant #2:** Yes.

INTERVIEWER: And your level of vision?

**Participant #2:** Zero.

INTERVIEWER: And how long have you had this current level?

**Participant #2:** All my life.

INTERVIEWER: And, do you have any other sensory disabilities?

**Participant #2:** No

INTERVIEWER: And, do you use any travel assistive devices?

**Participant #2:** A cane. Um, I'm thinking about a guide dog but it won't be for a while, 'til I graduate because that's another whole story. That's a real...I mean there on college campuses it's really difficult because people, um,...but now, people have their dogs, you know, animals, and they leave 'em loose, they let 'em go loose and the dogs bark at my dog and things like that. And I have a friend who has a dog on campus and she's not congenitally blind...that's why I didn't give you her name, but she was talking about it today and she said, "You know, I don't really want to be involved in that...you know, I don't want to be messing around with that any more."

INTERVIEWER: Right.

**Participant #2:** You know, she told me that it would be really hard for me because I didn't have any way of really keeping the dogs away from my dog.

INTERVIEWER: Right.

**Participant #2:** And, a lot of the people that are very into, like, nature and that kind of thing really bother me because they don't think about, like, there's a law that says that if you're blind and, you know, you're...if the other dogs are distracting your dog...well, for one thing, the dogs aren't supposed to be on campus without a leash.

INTERVIEWER: Right.

**Participant #2:** But nobody will enforce it. Is it that way at Tech, too?

INTERVIEWER: I think so. I've noticed that there's some dogs running around and I know there's at least one student who uses a dog, but I don't know if she has any difficulty with, you know, stray dogs or loose dogs.

**Participant #2:** And, um, so, you know, Carol kind of told me to wait until after I got into an apartment that was a little more controlled.

INTERVIEWER: Right.

**Participant #2:** You know, that, you know, 'cause, you know, in college people do things that are kind of stupid.

INTERVIEWER: Yeah. Have you had any mobility and orientation training?

**Participant #2:** Yeah.

INTERVIEWER: You have? And how many years was that?

**Participant #2:** Oh, gosh, I don't know. I don't know.

INTERVIEWER: Lots?

**Participant #2:** Lots and they don't really...the thing about mobility and orientation of mobility is mine is not real bad but it's not real great. It's not real, real, real bad. But it's like I'm kind of an average blind traveler, I'm not like anything that's gonna' make any headlines for being a great traveler or anything. And that's one of the areas I'd like to be better in but it's something that's really hard because I've never really had...I've had it, you know, had lots of training in it but it's always been real sporadic, like, I don't need it now so I don't have it. And, then, I've never really learned, like, some of the skills maybe I should have. Like now, I'm a good city traveler but when, like, I first came here, I was not a really good cane traveler. And here...because there were too many trees and there was too much stuff...now I've gotten better at it and even my mobility instructor says I've gotten better. But, it just took a while.

INTERVIEWER: Do you think that there are cues in your surroundings, or things that you remember along a path that help you?

**Participant #2:** Yes. You know, like, where Kim lives, there's a big stone wall out there and if you run into it, aaaahhhh...it kind of hurts and so you know where you are. Um, and then you can, have to know where street crossings are you have and whereas on a college campus it's not quite as easy 'cause sidewalks go different directions and you don't have a real constant sound source and it's just kind of warm...it's more difficult for me.

INTERVIEWER: And the constant sound source...you mean, when you talk about the cars?

**Participant #2:** Yeah, the cars.

INTERVIEWER: O.K.

**Participant #2:** And, so, um, it's just more difficult but I know I'm not the only person who's had that problem.

INTERVIEWER: Well, can I contact you if I need any further clarification on any of your responses?

**Participant #2:** Sure.

INTERVIEWER: O.K. That will be great. O.K., well, that's it.

**Participant #2:** That was it.

### **Interview #3:**

**Interviewer:** O.K. I appreciate your taking time to do this. I'm gonna' say my little spire here at the beginning to introduce it. This interview is being conducted to collect data for a Master's of Landscape Architecture thesis. I'm interested in finding out what is important to you in your outdoor recreation experiences. Your responses will be anonymous, the tape recordings of this interview will be used solely for the purpose of this study, and the identities of the respondents will not be revealed at any time in this study. The results of the study will be made available to you, upon request. Do you have any questions about that part of it?

**Participant #3:** No.

**Interviewer:** O.K. Well, I guess I just want to start out by asking you do you enjoy outdoor recreation activities?

**Participant #3:** I haven't done anything outdoors, much, for many years, since I was a kid, in fact.

**Interviewer:** Well, what kind of activities did you enjoy as a kid?

**Participant #3:** Um, I took swimming lessons for, I think, four summers and, um, I rode a bike, well, various sizes of bike until I was about 12 or 13, and I, um, played ball. I liked those balls they used to have, I don't even think they make them any more, the great big balls and bright colors on it so that people could either see it or it had a bell in it...

**Interviewer:** ...Oh, great...

**Participant #3:** ...And now they get those horrible electronic beep things that beep...I hate those things...

**Interviewer:** ...Oh, no...

**Participant #3:**..Give me a bell any day. And, um, I used to do that. Went to camp a few years and they did things like they took us on hikes and took us out in a canoe and an itty-bitty boat, it was a boat, it wasn't...one year it was a canoe and another year it was a little-bitty boat.

**Interviewer:** And this was all at the camp?

**Participant #3:** Uh-huh.

**Interviewer:** Can you describe the camp to me, the place?

**Participant #3:** Well, there was three different...three different sites in the four years that I went. And, um, one of them was really neat - it was down here in Smyth County. And it was like, um, I think it was supposed to be a church camp and we borrowed it...the Department of the Visually Handicapped borrowed it...for a week.

**Interviewer:** Oh, great.

**Participant #3:** And it was a little kids' camp, I was 11. I was the oldest one there, I was going to be 12 next month and was anxious...everybody else was seven. We slept in a little building at the bottom of the hill, and the dining hall was at the top of the hill. And everything was pretty close together...it was a good setup because it was just right in there together. The only thing we had to travel any distance for was to go to the pool. They had to load us up and take us to the pool 'cause there was no pool.

**Interviewer:** Every place else you walked, right?

**Participant #3:** Every place else we walked...

**Interviewer:** Yeah...

**Participant #3:** ..And it was really, that was pretty neat. The next year was a big mistake. It was up near... I don't remember where it was near...in the middle part of the state, in central Virginia somewhere.

**Interviewer:** Yeah.

**Participant #3:** And it was a Boy Scout camp and we slept in two-man tents and, um, everything was way apart and the trails were confusing and, didn't like that. Didn't like it at all.

**Interviewer:** And what about the trails made it confusing?

**Participant #3:** There were too many of them and they went in every single direction and no direction at all. We went...one day, my tent-mate and I decided we were gonna' go back after lunch and lie down. And, by the time we finally got back to our campsite, it was time to go to the next activity. We walked up and down a trail going, "Where is it?"

**Interviewer:** Oh, no.

**Participant #3:** And it was terrible. And then the third and fourth years, and they may still be using this 'cause it's a pretty good deal, it's up near Charlottesville and it's real neat. They have cabins up and down the side of this road, and at one end of the road is the pool and the pavilion for, if it rains or something you could do things under there, and at the bottom of the hill was the place to eat. And that was pretty good.

**Interviewer:** And that was your favorite one of those camping experiences...or the camps?

**Participant #3:** Well, the first and the third kind of rivaled each other.

**Interviewer:** Yeah.

**Participant #3:** ..I just didn't like that second one...I was like, "We gotta' go home. Somebody's gonna' get killed up here...we gotta' go home."

**Interviewer:** Can you describe what you think was...confusing, I mean, or...I mean you said there were too many and they were going in different directions.

**Participant #3:** Uh-huh.

**Interviewer:** How did you perceive that or how did you feel about that?

**Participant #3:** There didn't seem to be any rhyme or reason and some of the ground was uneven, too, so we'd be, sort of tripping along as you were walking.

**Interviewer:** Right. Well, that's important.

**Participant #3:** It was not a good deal. Some of the kids really like it, but I was not one of them ...I was like, "Oh, man, we gotta' travel again. I don't wanna' go. Let's just stay here."

**Interviewer:** It wasn't enjoyable.

**Participant #3:** Not at all.

**Interviewer:** Well, the first and the third...what were, maybe just take one of them, maybe you could tell me what the best part about it or your favorite part about it was?

**Participant #3:** Well, the fact that it was...well, the third one wasn't too close together, there was some distance to cover, but you pretty much would get on this gravel path and just keep going and you were gonna' get to one end or the other, and you could count on it. There was gonna' be counselors at both ends....there was, like, the pool bunch and they hung out at the pool all the time and there would be the other bunch that hung around the dining hall all the time and you could keep...just stay on that road and you were gonna' be O.K. 'cause it didn't turn or anything. It was straight. And the same thing was true with the first one.

**Interviewer:** Right.

**Participant #3:** The road was pretty straight.

**Interviewer:** And what kind of activities did you do?

**Participant #3:** All kinds. We did crafts, we swam, we did a lot of hikes...a lot of nature hikes...and stuff like that and...

**Interviewer:** Well, can you tell me about one of your favorite experiences hiking on a nature trail?

**Participant #3:** One of my favorite things was to go out with this one guy who knew plants. This man knew plants. He could pick up a leaf and say, "This is from a whatever tree," big ole' Latin words, and tell you all about it and everything, and he was really cool to go on a hike with 'cause he knew all the things, like, "If you ever get lost out in the woods, you can eat this but you can't eat that," and he knew all this stuff and he was really neat to listen to him.

**Interviewer:** Uh-huh.

**Participant #3:** And, um, ...

**Interviewer:** And how did you, um, how did you perceive that information? How did you gather that information he was telling you? He was talking to you.

**Participant #3:** Uh-huh.

**Interviewer:** Were there any other ways that you experienced the surroundings?

**Participant #3:** He would pass everything around...he would pass it around so people could touch it or look at it real quick. He'd pull things off the trees and show them to us, raise our hands up to touch the stuff.

**Interviewer:** Uh-huh.

**Participant #3:** I remember one year, I don't remember if it was the first or second year, but, um, he and this other guy went for a walk to see what they could see before they took the rest of us up to show us the stuff. And they found this big poison ivy vine and they had to come back and get something and go up there and take that out...they said they were laughing, the blankets were up, and they were saying, "Well, I've always wanted to know what that looked like," and they had poison ivy all over their hands, you know. And for the whole weekend - total misery.

**Interviewer:** Oh, no.

**Participant #3:** But they went up and they took that thing out. Usually they left stuff alone, they didn't mess with the habitat that was going on.

**Interviewer:** So mostly it was information about plants? Were there other aspects of hiking along that you enjoyed?

**Participant #3:** Once in a while there'd be a bird singing and carrying on being a bird and somebody would start talking about feathers...

**Interviewer:** Yeah.

**Participant #3:** They'd try to figure out what kind of bird it was.

**Interviewer:** Uh-huh. And on the other trails you were talking about the surfacing and that experience had a real uneven ground and the path you liked was a pretty straight and clear gravel path. How do you feel about that kind of stuff and was the nature trail you were just talking about similar to one of those?

**Participant #3:** Mostly they were a little bit rough 'cause they were more natural and they were a little bit, a little bit hard but, you know, you kind of expect to have to do a little bit of work when you get off of the main trail, but...only one time...we didn't have very many falls or anything on those trails. I mean, I fell once. Scared me half to death. I almost went down in the lake. "I want outta' here," but, um, you know,

there were rocks and things in the path and you had to sort of step on them or step around them or whatever.

**Interviewer:** Yeah.

**Participant #3:** They would, better there, they tried to have, overall, one to five ratio, counselor to campers?

**Interviewer:** O.K.

**Participant #3:** And, on the hikes, they tried to have it even less than that. Especially if they had totally blind people on it...then, each one of them had to be holding onto somebody and, um, they tried usually to take only one if they had to guide somebody, they only wanted to take one.

**Interviewer:** Right.

**Participant #3:** A couple of times, that didn't work and they had to take two, but they preferred to have only one.

**Interviewer:** Yeah.

**Participant #3:** And so it was usually two counselors and seven or eight kids.

**Interviewer:** Yeah. You talked about boating. That's kind of a different activity than the hiking.

**Participant #3:** Uh-huh.

**Interviewer:** How did you feel about that? What was fun about that, or enjoyable?

**Participant #3:** That was just fun, just riding around in the wake and, um, riding in the little-bitty boats. That was fun, you just rode around in that and the counselor, he drove it and we all sat there and he told us, at one point...I thought it was kind of funny and kind of weird, that we were out in the middle of the lake. Way out in the middle of this lake. He said, "Water here's about a foot deep." We said, "Tom, you're crazy." He said, "water's only a foot deep." He turned the boat off. He said, "Put your hand down there-check it out." So we put our hands down there and, sure enough, it was about a foot deep, it was barely below the bottom of the boat. Good thing it was a little boat - we'd be stuck!

**Interviewer:** It wasn't very deep at all. How did you, um, how could you tell you were in the middle of the lake?

**Participant #3:** Well, he told us we were, that was one way.

**Interviewer:** O.K.

**Participant #3:** And there was no trees over us, no shadows and stuff there.

**Interviewer:** And how do you perceive shadows?

**Participant #3:** I can just see 'em, I see light, so...

**Interviewer:** By light. O.K.

**Participant #3:** And light on black. There was no trees right over us where if we were on the edge of the lake, there were trees all around the lake, so it would be darker.

**Interviewer:** Right. O.K. Um, can you tell...you walk back and forth to school?

**Participant #3:** Yeah.

**Interviewer:** Maybe you could tell me a little bit about that, just your experience between here and there, mostly how do you get around campus?

**Participant #3:** Um, a lot of memory, just practice. I've been doing it for seven years. But, um, the way that I go to school, I go up the street and there's a wall there and that wall goes all the way up around the corner. And then there's a pole...it's not too much of an indicator of anything, it's just, there it is. There's the pole. But there's...

**Interviewer:** And how do you know the pole's there?

**Participant #3:** I've had a couple of run-ins with it.

**Interviewer:** And you just know it's coming, or...

**Participant #3:** Yeah. "I've gone far enough, I'll be crashing into the pole soon." Bang. "Yep, there's the pole."

**Interviewer:** Oh, gosh.

**Participant #3:** And there's a fire hydrant on one of the corners, um, pretty good indication of, "Yep, this is really the sidewalk. It's not just a blip in the road." It's a wheelchair cut. they all are. There isn't a solid corner between here and there.

**Interviewer:** O.K.

**Participant #3:** Not, not on the street I go. I think on the other side, there are a couple of places where there's no wheelchair cuts but they're all down the other way.

**Interviewer:** Yeah. Well, do you feel any differently about traveling between here and school and traveling on the trails you were talking about earlier?

**Participant #3:** Not really 'cause there's certain dangers with both of them, but they're not really big dangers. Um, one street down right next to the school is a pretty busy street. And I had a hard time getting back across it today...I think everybody and their brother was down there, about 10:20, 10:25 this morning. And nobody was in the mood to stop.

**Interviewer:** Yeah. I walk across campus a lot at Tech and they don't want to stop for anybody. It's really scary. Well, let's see if there's something else I can ask you about that. Um, you talked about listening, you know, touching, as ways of...as things you use while you're outdoors. Um, can you talk any more about how you feel about those kind of things...using your other senses?

**Participant #3:** .There's always smell.

**Interviewer:** How do you think that affects your experience?

**Participant #3:** Kind of tell if you've got pine trees...different trees and different things smell different and that's kind of neat. It sort of gives you more of an idea. 'Cause people don't walk along with you and tell you everything that is going on. Probably drive you crazy if they did. "We're passing a tree now." "Yeah, right. So what?"

**Interviewer:** Yeah.

**Participant #3:** "Let's talk about something else besides the scenery." Vision, ah, you know, smelling things as you're walking along and you kind of breathe and, um, even...I can remember a couple times that the counselors would use that at the camp. They'd stop and they'd go, "What's that? Smell that? You know what that is?" And tell us about that one, too, because that was the first thing that you'd notice about it...was not the flowers on it or something like that but the fact that it had this strong smell to it. Just kind of hit you.

**Interviewer:** Yeah. Let's see. Are there any other...can you describe, maybe not even, um, talking about the camp or...do you have a favorite place that, not necessarily that you do any recreational activities but a favorite outdoor place now in your adult life?

**Participant #3:** Um, well, in the summer, in the evenings after the sun goes down and it's a little bit cooler, we sometimes sit out at my parents' place, out in the yard, either on the patio or out in the grass. Um, depends on where the chairs are.

**Interviewer:** Right.

**Participant #3:** Just sit out and sit around and talk and stuff.

**Interviewer:** And what do you think about that makes that your favorite place now?

**Participant #3:** It's peaceful and, um, it's just fun...we have a lot of fun out there. Sit around and carry on and have a good time.

**Interviewer:** Yeah. O.K. Well, I think this really helps, um, and if you can't think of anything else you'd like to tell me, I think that's probably all the specific questions I had for ya'. Can I ask you a few questions, like demographic questions, like just for the record?

**Participant #3:** O.K.

**Interviewer:** Your name is . Right?

**Participant #3:** Uh-huh.

**Interviewer:** And your age, please?

**Participant #3:** 27.

**Interviewer:** And, you're a student?

**Participant #3:** Uh-huh.

**Interviewer:** And your level of vision now?

**Participant #3:** Light projection and, if I've got it right up in my eyes, color. But it has to be right under a bag.

**Interviewer:** O.K. And how long have you had this current level of vision?

**Participant #3:** The current level, probably about, um, three years. Before that, there was more color but I had bad eye infections three years ago.

**Interviewer:** O.K. But, since birth, you've not had much vision at all?

**Participant #3:** No, it's never been measurable.

**Interviewer:** O.K., O.K. And do you have any other sensory disabilities?

**Participant #3:** No.

**Interviewer:** O.K. And do you use any travel assistive devices?

**Participant #3:** A cane.

**Interviewer:** And have you had any, um, official orientation of mobility training?

**Participant #3:** Yeah.

**Interviewer:** How many years of that?

**Participant #3:** About five years.

**Interviewer:** And could I contact you if I need any clarification on any of your responses? Can I give you a call?

**Participant #3:** Sure.

**Interviewer:** Great. O.K. Well, that wasn't too bad, was it?

**Participant #3:** Nope.

#### **Interview #4:**

**INTERVIEWER:** O.K. I want to tell you just a brief introductory statement of the study. This interview is being conducted to collect data for a Master's of Landscape

Architecture thesis. All of your responses are confidential. Your responses will be identified by a participant number instead of your name and the results of the study can be made available to you, upon request.

**Participant #4:** Yeah, I would like to have that.

**Interviewer:** O.K. Do you have any questions about the study?

**Participant #4:** No.

**Interviewer:** Well, I guess I'd like to start out by asking do you enjoy recreation activities?

**Participant #4:** Yes.

**Interviewer:** And what kind of activities do you enjoy?

**Participant #4:** Well, I enjoy walking. I do that a lot. I enjoy fishing, too, um, I don't get to do that very much anymore. Or, and I enjoy hiking, and I don't get to do that a lot in ... I did go this past Sunday to ... this guy at work that does it all the time, we went to McAfee's Knob, you know.

**INTERVIEWER:** I've never been up there. I've always wanted to.

**Participant #4:** Yeah, that was neat. But, you know, if I had somebody experienced, you know, that I can go with 'cause, obviously, not seeing, you know, you wouldn't want to go unless somebody is an experienced hiker, you know. But I enjoy that and I enjoy swimming...any kind of water sports.

**INTERVIEWER:** Well, do you have a favorite place that you like to hike?

**Participant #4:** No, not really. No, just mountains or anything.

**INTERVIEWER:** You talked about the last hike to McAfee's Knob. Maybe you could tell me a little bit about that experience.

**Participant #4:** O.K. I did that Sunday, as a matter of fact. It was 8 miles altogether. We climbed up a mountain, it was about 3000 feet above sea level at the top. And, um, it was on the Appalachian Trail and, of course, what we did, a friend that I went with made me a cane that I kind of used to feel things with but also for support, you know, 'cause it was rocky and everything,...if I needed it. What he did, 'cause I got just a little bit of vision, not much, we did sighted guide where we had to but, otherwise, he had a

cane that he made for himself, too, and kind of held it behind him and I just held onto the end of that so I could walk right behind him and stay on the path. And I could use my cane, you know, to, you know, to feel where I was going and not have to go sighted guide, but, you know...and that worked real well.

**INTERVIEWER:** And sighted guide is the...what are you talking about with that?

**Participant #4:** Sighted guide is when I'd actually have to take your arm right above the elbow.

**INTERVIEWER:** I see.

**Participant #4:** Which, we did that just in a couple of cases where the terrain was really, really difficult. But, otherwise, I did that other technique, which was kind of something we came up with...or he came up with and it worked.

**INTERVIEWER:** Well, you used the word "neat" to describe that experience. Can you sort of tell me what you mean by that? What contributed to that?

**Participant #4:** Well, just...no, just like it would be for you. Just to get away from your job pressure and, um, just being outside in the nice clear air and up at the top, it was like a rock area. We had a picnic lunch...and I'm allowed to say this on tape...had a beer before we came back down, you know. It was just, um, just, exercise, of course, makes ya', usually kind of makes ya' relax a little bit more. It does me, anyway. That's one reason I do walk a lot when I get a chance. And that's... 'cause that's the one thing I can do by myself in my neighborhood. And so I do that as much as I can.

**INTERVIEWER:** So you do walk in your neighborhood as a regular exercise?

**Participant #4:** Yes.

**INTERVIEWER:** And you can do that by yourself?

**Participant #4:** Oh, yeah.

**INTERVIEWER:** Maybe you could talk a little bit about some of the things you experienced on that hike at McAfee's Knob...I mean, were there particular aspects of it that you remember...or, you talked about clear air and things like that.

**Participant #4:** Well, but you, if you're looking for, like, things that were hard, because there's so many rocks and, you know, mud and loose gravel and obstacles, there were some things that, that were very difficult to negotiate by not seeing although most of it,

you know, I did fine with. You know, like he had to give me a few verbal clues, you know, to get around some of the rocks.

**INTERVIEWER:** What about something positive like the best part of it?

**Participant #4:** Well, the best part was just, um, like, say, the actual experience of it and the exercise. But really, I guess, just what would be positive to you if you go on a hike, you know? I'm trying to think. Um. PHONE INTERRUPTED

**INTERVIEWER:** Ah, so you were telling me about some of the specific things that...

**Participant #4:** Well, like I say, just helps you clear your mind, just the exercise of it and knowing that I could actually....I didn't know if I could, when I thought back about doing it, you know, just kind of neat to know that I could do it. Now on top of that mountain was about two inches of snow. It was kind of neat watching...you know, going from the elevation...that was positive, I mean that was kind of a neat experience, too, you know, just climbing the mountain and feeling the air get colder. You know, stuff like that.

**INTERVIEWER:** So, the temperature was something that helped you with the...

**Participant #4:** Right. It was just, it was just different, you know? Something new.

**INTERVIEWER:** O.K. Maybe we could talk just a few minutes about walking in your neighborhood...

**Participant #4:** O.K.

**INTERVIEWER:** Can you tell me a little bit about that? Is this a routine that you have?

**Participant #4:** Routine. I've worked out an area where I can get around and I know and I use my cane, you know, just to tap curves and stuff. But I just, basically, where I live, I just... you know, there's just...most of the area has sidewalks. There's a couple of places that doesn't that are...but mostly, you know, just along the streets that I've...you know, just got, um. Well, I've got two or three different routines. One's like, about, two miles. One's about two and a half. And one's about three, you know, depending on how much time I have, that I take.

**INTERVIEWER:** And you mentioned you could do that by yourself and that's a...that's a motivation for you.

**Participant #4:** Right, sure, because, um, obviously. Yeah. INTERRUPTED BY KNOCK ON DOOR

**INTERVIEWER:** O.K. You were telling me about walking in your neighborhood.

**Participant #4:** Uh-huh.

**INTERVIEWER:** Can you tell me how you, um, first determined that route? I'm trying to think of some of the components...

**Participant #4:** Well, O.K. You know, I guess I had a mobility instructor show me, first of all, the area so I'd know it. You know, and work with me a couple times when I moved. In other words, so I'd be familiar with where I was. And, of course, I've had orientation mobility training since I was little, so he didn't have to teach me how to use a cane - just basically, you know, familiarize me with the area. You know, and if you're visually impaired, if you move to a new area, you have to have somebody... you know, to show...unless you, of course you can ask people as you go, but, you know, if you've got to learn your route to work or whatever, you've got to have somebody to show, you know, familiarize you with it. You know what I'm saying?

**INTERVIEWER:** Yes. Are there instances where you're going to a new place that you don't have somebody showing you?

**Participant #4:** Oh, yeah. And then you have to figure out...you know, you either ask instructions or you have to work out specific...whatever your situation would be. Like, say if I were going out of town to a new location. If I took, you know, a bus or plane, then I'd have the address and get a cab where I had to go, of course. Or work out transportation. I'd have to do all that ahead of time, you know, as much as possible.

**INTERVIEWER:** But walking along...

**Participant #4:** But walking along unfamiliar areas, if I ever got lost, naturally, I'd just have to ask directions, know, like anybody else would have to do.

**INTERVIEWER:** I've had people describe to me, um, landmarks and things in the environment that help them.

**Participant #4:** Yeah, now, I have landmarks...you know, I told 'ya I have just a little bit better than light perception, but that's....so, since I can't see, like, lights and I can't see signs, or anything like that, I use landmarks as much as I can to travel. You know, I use that a whole lot. You know, if I see a wall or something like that...

**INTERVIEWER:** So you can detect those objects visually?

**Participant #4:** Yeah, if I get close enough to 'em. Especially once somebody...a lot of times I'd have somebody point out what I need to look for. You know, that's how a mobility person can help me, you know, 'cause they can tell me, in a route, what I need to kind of look for, you know. And then once I kind of get familiar with it, of course, that makes a big difference.

**INTERVIEWER:** Then just a couple of quick questions about your fishing experience. Maybe you can tell me what you enjoy about that. Do you have a favorite place for that?

**Participant #4:** Well, I like to do...my brother lives down in the Norfolk area. I don't get to do it much now 'cause my wife and I have a little baby girl, but I like to go deep sea fishing. Just go out on the boat with him and, you know, just be out in the middle of the water... and, you know, enjoy, again, the fresh air. Just relaxing kind of thing, you know. I've gone fishing at Smith Mountain Lake some or a trout stream. I just to do a lot more when I was, you know, small than I do now.

**INTERVIEWER:** How much do you depend on other senses to either inform you or add to your experience?

**Participant #4:** Oh, all the time. I think, you know, they're not better than yours but I think you do learn to use them a lot more. You know, your hearing, your smell. I know when my brother ... I have a brother that's 14 months younger than me, he's, of course, fully sighted, but when we were small, I know we were out in the woods playing one time. I'll always remember this. And he told me I heard something that he didn't hear and he couldn't believe...he thought I could hear a lot better than him. And, of course, I can't. But, you know, I just learned to pay attention more than he...'cause he could look around and see it. Does that make sense?

**INTERVIEWER:** Yeah.

**Participant #4:** Yeah.

**INTERVIEWER:** Well, I guess what I'm fishing for is how those senses might add to the quality of your experience. Um, for instance, on your fishing or if you're up at McAfee's Knob and, if you're not experiencing it primarily through vision.

**Participant #4:** Well, but you're...you know, for example, you can smell the fresh air or you can feel the changing of air or, if you're fishing, you know, just feeling that fish hit

the hook, you know. You know, winding it in, you know, or hear that rod sing. You know what I mean?

**INTERVIEWER:** Uh-huh.

**Participant #4:** Um, you know, just stuff like that. I guess I pay more attention to that than maybe you would, you know, if you were doing the same thing. But I really think all of us...I think, in other words, if you can see/experience things, it would be easy to say, "Well, I don't get the same experiences as somebody else so I'm not going to do it." But I think you just have to...there's other ways you can experience the same...I mean, you may not get the same quality as, like, you would do, you know, doing it but you still...it's much better than not doing anything at all. You know. So it's still worth doing the activity, you know. Like, um...I don't know. It's anything you do. And I think you do learn, like, say if I'm watching a basketball game on TV, "cause I can't see what's going on, you know, on the screen. And I use "watch" as a figure of speech. But I've learned by listening and things that are said that I can know a lot more than, say, if you all of a sudden couldn't see and was trying to watch the same game. I just think your senses, you know, make you... you learn to experience through the other senses more.

**INTERVIEWER:** I also remember what a basketball game looks like.

**Participant #4:** Right. And I don't have that experience, though. You know, I have in my own mind but, of course, if you've never seen it...it's like, you know, I think we talked about this the last time. You know. It's like if I see your...I mean, if somebody loses their sight and you describe a person to them, they can visualize it. But I can't really visualize, for example, what you would look like as compared to somebody else...you know, what your face, you know, the features...

**INTERVIEWER:** The details...

**Participant #4:** The details, right. Because, I mean, I can make up something in my mind but really there's no way of knowing 'cause I've never seen it. Does that make sense?

**INTERVIEWER:** Well, when you make that up in your mind, in my mind it's a picture. In your mind, is it a picture?

**Participant #4:** Well...

**INTERVIEWER:** Is that too hard of a question?

**Participant #4:** It is 'cause I really don't have a concept. I mean...in other words, I really can't know in my own mind, for example, just, for example, somebody's face. I really can't imagine what makes a face look beautiful as compared to somebody else's face. Or, you know, what distinguishes it, you know. I mean I know what a smile is like 'cause I can feel, you know, if a person, I mean if I smile. You know, I know...but even that, I don't know what it looks like. So there's just no way, there's just no way of really knowing. I mean, I, for example, you know, when I was smaller and single and was interested in girls, for example, use that. I would go a whole lot by their voice but, you know, that's the only way I had of determining in my own mind whether they were really nice looking or not. And sometimes that didn't have anything to do with it at all. So, so, you know. There's just things you can't know if you can't see.

**INTERVIEWER:** Well, taking that back a little bit to the outdoor environment. You talk about aesthetic things like beauty and things like that about people. How do you know whether a... I mean, how is the place beautiful to you?

**Participant #4:** Well, sometimes, you know, you can feel things like the different plants, you know, by touch. Um, and just the sound, I think, more than anything. You know. I keep coming back to the hearing but, you know, for me, hearing is just so...I depend on it so much. You know, it's just, you know, I really do depend on hearing to get a lot of things out of the environment. You know. Everything, you know, the...I just pay attention to everything, especially if I'm by myself, you know, I listen. I can hear, you know, cars. I can hear, just everything. I just pay attention to everything around me by listening 'cause that's the only way I know what's going on.

**INTERVIEWER:** Right. So is there, um, a beautiful sound?

**Participant #4:** Well, like birds singing, of course, to me is beautiful. Naturally you heard the lady just talking about singing. I'm musically inclined so I sing and stuff all the time. So any kind of music I hear is beautiful to me. But, you know, just sounds of animals, you know, to me, is kind of neat. You know. But I would think that's the same as it would be for you, isn't it? I mean, you know, as a seeing person. I don't know ...

**INTERVIEWER:** It is.

**Participant #4:**...If it's any different.

**INTERVIEWER:** Well, I think you talked about putting more emphasis on it or that you pay attention, um. Part of my work here is talking to people about, you know, do the same things matter to you that matter to me, basically, and...

**Participant #4:** ...Right.

**INTERVIEWER:** ..And how they're affected in the literature. It talks about, um, real nitty-gritty of structure and things like that and how people enjoy the environment may depend on specific things like how complex it is or, you know, very detailed things like that.

**Participant #4:** Uh-huh.

**INTERVIEWER:** And so when I ask you about what's beautiful to you, I'm wondering if your response is similar to that of the literature. You know? So...

**Participant #4:** O.K.

**INTERVIEWER:** And that's really hard to ask about and it's very hard to answer, I think.

**Participant #4:** Yeah, it is, it is.

**INTERVIEWER:** But...if there's anything else you can think of about, um, any experience you've had in the outdoor environment that might me with that, about details perhaps, um, that might be helpful.

**Participant #4:** O.K.

**INTERVIEWER:** But if you don't, then I guess I can stop the tape.

**Participant #4:** Oh, O.K.

**INTERVIEWER:** Can you think of anything else you'd like to say about a specific experience?

**Participant #4:** Um, no.

**INTERVIEWER:** O.K. Well, just let me ask you a few demographic questions for the study. Your name is \_\_\_\_\_ ?

**Participant #4:** Right.

**INTERVIEWER:** And your age?

**Participant #4:** 37, just turned 37.

**INTERVIEWER:** And your occupation?

**Participant #4:** Rehabilitation teacher.

**INTERVIEWER:** And your level of vision?

**Participant #4:** Um, it's slightly better than light perception but not any...you know, I can't read...think one doctor told me something like maybe three over five hundred or something in my right eye. A little bit better than light perception, maybe shadow vision?

**INTERVIEWER:** So it's measurable vision?

**Participant #4:** Yeah, yeah...

**INTERVIEWER:** Slightly?

**Participant #4:** Yeah, slightly.

**INTERVIEWER:** And how long have you had this current level?

**Participant #4:** Birth. It will always be the same.

**INTERVIEWER:** O.K. And you said you used travel assistive devices? You use a cane, right?

**Participant #4:** Cane, right.

**INTERVIEWER:** And you have had orientation of mobility training?

**Participant #4:** Oh, yeah.

**INTERVIEWER:** For, you said, years...since you were young?

**Participant #4:** Right, since I was young.

**INTERVIEWER:** O.K. And, can I contact you if I need any further clarification on some of your responses?

**Participant #4:** Sure, sure. You know, I've played other sports in my lifetime, too. Do you need to know that? I think I told you, the last time, like I've played beeper ball. I've wrestled before. Um, I've even played football, you know, um, touch football?

**INTERVIEWER:** Uh-huh.

**Participant #4:** You know...in other words, I, you know, especially when I was growing up, I tried to play sports, you know, as much as I could. Some things, like baseball, obviously, I couldn't play but, you know, I've always tried to play to the level I could. I played sports. You know, things like throwing and running obviously is, you know from research, if you've never seen, you don't do those as well as people that see and lose their sight. There are studies to prove that. And, and this recreation, of course, is a real interest to me, too, 'cause I think, you know, especially children that are congenitally blind or almost like I am? You know a lot of them, now, are going to public schools and I don't think they let 'em participate in, in phys. ed. like they should and they don't get the exercise, you know... in other words, I think because if you're congenitally blind, I think, um, I think physical activity is probably even more important than if you can see. But most people don't get the exercise they need. Does that make sense? Do you know what I'm trying to say?

**INTERVIEWER:** Sure, yes, yes.

**Participant #4:** It's a real...I think it's a real problem.

**INTERVIEWER:** Uh-huh. Well I hope that we can, that I can learn something from this study about, um, making contributions to the outdoor environment ....

## Appendix B

### *Similarities among the Literature Concepts*

---

distinctiveness, distinction

connectedness, continuity, fittingness, compatibility, dissonance

familiarity, predictability, redundancy, novelty

preference

mystery, deflected vista, surprisingness

content, node, landmark, path, edge

complexity, texture, visual order, focality, depth

spatial relationships, regions, districts

making sense, coherence, incongruity, legibility, imageability

associational, affect

meaning, ambiguity

exploration, discovery

optimal experience, flow

threat, tension, anxiety

restoration

social interaction, escape, need for solitude, privacy

need to be connected to whole, see/be seen

freedom of choice

attention, interest, arousal, boredom

cognitive

concentration

intrinsic motivation

pleasure, enjoyment

## Appendix C

### *Similarities among Key Words Found in the Interviews*

|                          |                        |                          |
|--------------------------|------------------------|--------------------------|
| (1,24) activity          | (10) feature-rocks     | (4) rain                 |
| (2) affecting change     | (10) feature-waterfall | (18) relaxation          |
| (3) aggression           | (16) freedom           | (3) release stress       |
| (4) air                  | (6) frustration        | (10) right angles        |
| (5) annual ritual        | (17) fun               | (13) role model          |
| (6) anxious              | (20) hearing           | (5) routine              |
| (7) attention            | (1) hiking             | (3) rule breaking        |
| (1) bird-watching        | (20) imaging           | (16) safety              |
| (1) boating              | (13) independence      | (6,16) scared            |
| (1) camping              | (21) information       | (5) seasonal interest    |
| (8) challenge            | (18,23) isolation      | (11,22) shadows          |
| (9) choice               | (22) landmarks         | (20) sight               |
| (3) competition          | (18,23) left out       | (24) similarity          |
| (4) clean air            | (14) legibility        | (20) smell               |
| (10) closed              | (11) light perception  | (4) snow                 |
| (11) colors              | (12,22) location       | (23) social              |
| (12) complexity          | (12,14) making sense   | (18,23) solitude         |
| (7) concentration        | (12,22) memory         | (20) sound               |
| (6) concerned            | (12,22) memory spatial | (20) sound-beautiful     |
| (13) confidence          | (12,22) memory visual  | (20) sound-negative      |
| (14) confusion           | (20) multisensory      | (20) sound-negative      |
| (12) contrast            | (24) natural-nature    | (20) sound-positive      |
| (8) convenient           | (6) nightmare          | (12) spatial relation.   |
| (22) cues                | (22) noise-people      | (19) speculation         |
| (15) curiosity           | (22) noise-traffic     | (1,23) sports            |
| (10,11) curves           | (12) novelty           | (10) straight-axial      |
| (13) dependence          | (10) open              | (6,7) stressful          |
| (10,11) diagonals        | (1) opportunity        | (10) structured-activity |
| (8) difficult            | (12) order             | (10) structured-setting  |
| (15) discovery           | (12) organized         | (8,13) success           |
| (10) distance            | (22) orientation       | (25) technique           |
| (7) distraction          | (6) painful            | (4) temperature          |
| (8) easy                 | (12) pattern           | (3) tension release      |
| (17) enjoy               | (17) peaceful          | (10) texture             |
| (18) escape              | (12,19) predictability | (22) time                |
| (1,23) exercise          | (17) preference        | (20) touch               |
| (19) expectation         | (17) pretty/beautiful  | (20) visual              |
| (13) failure             | (13) pride             | (6) worried              |
| (12) familiarity         | (12) proximity         | (4) wind                 |
| (10) featu-histor/cultur | (18) quiet             |                          |

## Appendix D

### *Categories & Themes Found in the Interviews*

|   |                          |   |                    |
|---|--------------------------|---|--------------------|
| 1-activity<br>1-exercise<br>1-sports<br>1-bird-watching<br>1-hiking<br>1-walking<br>1-boating<br>1-camping<br>1-fishing | <b>Activity</b>          | 6-nightmare<br>6-attention<br>6-concentration<br>6-distraction  |                    |
| 2-control<br>2-aggression<br>2-freedom<br>2-choice  | <b>Control</b>           | 7-obstacles<br>7-safety<br>7-challenge<br>7-difficult<br>7-easy<br>7-success<br>7-convenient  | <b>Challenge</b>   |
| 3-release stress<br>3-rule breaking<br>3-tension release<br>3-aggression  | <b>Release</b>           | 8-opportunity<br>8-closed<br>8-distance<br>8-feature-histor/culture<br>8-feature-rocks<br>8-feature-waterfall<br>8-open<br>8-right angles<br>8-straight-axial<br>8-structured-activity<br>8-structured-setting<br>8-texture<br>8-diagonal<br>8-curves<br>8-nature/natural | <b>Structure</b>   |
| 4-air<br>4-clean air<br>4-rain<br>4-snow<br>4-temperature<br>4-wind   | <b>Climatic Elements</b> |   |                    |
| 5-annual ritual<br>5-seasonal interest<br>5-routine   | <b>Ritual Patterns</b>   |   |                    |
| 6-anxious<br>6-concerned<br>6-frustration<br>6-scared<br>6-stressful<br>6-worried<br>6-painful                          | <b>Negative Affect</b>   | 9-colors<br>9-light perception<br>9-shadows   | <b>Visual Cues</b> |
|   |                          | 10-complexity<br>10-contrast<br>10-familiarity<br>10-location<br>10-making sense  |                    |

## Appendix D (continued)

### *Categories & Themes Found in the Interviews*

|  |                           |  |                   |
|--|---------------------------|--|-------------------|
| 10-memory<br>10-memory spatial<br>10-memory visual<br>10-novelty<br>10-order<br>10-organized<br>10-pattern<br>10-predictability<br>10-proximity<br>10-spatial relation.<br>10-confusion<br>10-legibility<br>10-making sense<br>10-expectation<br>10-predictability<br>10-speculation | <b>Making Sense</b>       | 14-relaxation<br>14-solitude   |                   |
| 11-confidence<br>11-dependence<br>11-failure<br>11-independence<br>11-pride<br>11-role model<br>11-success   | <b>Self-esteem</b>        | 15-hearing<br>15-imaging<br>15-multisensory<br>15-sight<br>15-sound<br>15-sound-beautiful<br>15-sound-negative<br>15-sound-negative<br>15-sound-positive<br>15-touch<br>15-visual<br>15-smell    | <b>Sensory</b>    |
| 12-curiosity<br>12-discovery   | <b>Exploration</b>        | 16-information<br>16-landmarks<br>16-cues<br>16-location<br>16-memory<br>16-memory spatial<br>16-memory visual<br>16-noise-people<br>16-noise-traffic<br>16-orientation<br>16-shadows<br>16-time | <b>Cues</b>       |
| 13-enjoy<br>13-peaceful<br>13-preference<br>13-pretty-beautiful<br>13-fun  | <b>Positive Affect</b>    | 17-techniques  | <b>Techniques</b> |
| 14-escape<br>14-isolation<br>14-left out<br>14-quiet   | <b>Social Interaction</b> | 18-difference  | <b>Contrast</b>   |

## **Bibliography: Environmental Cognition**

- Ackerman, D., 1990. A Natural History of the Senses. New York: Vintage Books.
- Alexander, C., 1979. The Timeless Way of Building. New York: Oxford University Press.
- Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I., & Angel, S., 1977. A Pattern Language, town, buildings, construction. New York: Oxford University Press.
- American Heritage Dictionary, 1982. Boston: Houghton Mifflin.
- Appleton, J., 1975. The Experience of Landscape. London: Wiley.
- Appleyard, D., 1969. Why Buildings are Known. In Environmental Behavior, Vol. 1.
- Beddall, G. (eds.), 1969. Wallace and Bates on the Tropics: An introduction to the theory of natural selection. London: Macmillan.
- Berlyne, D. E., 1963. Complexity and Incongruity variables as determinants of exploratory choice and evaluative ratings. (as cited in Ulrich, 1984)
- Berrill, N. J., 1955. Man's Emerging Mind. (as cited in Kaplan & Kaplan, 1982)
- Brosseau, G. E., 1967. Evolution. Dubuque, IA: Wm. C. Brown.
- Campbell, B. G. 1966. Human Evolution (as cited in Kaplan & Kaplan, 1982)
- Canter, D., 1977. The Psychology of Place. New York: St. Martins Press.
- Csikszentmihalyi, M., Toward a Psychology of Optimal Experience. In: L. Wheeler, 1982. Review of Personality and Social Psychology. Beverly Hills: Sage.
- Darwin, C., 1859. On the Origin of the Species by Means of Natural Selection. (5th edition) London: Watts & Co.
- Downs, R. & D. Stea. (eds.), 1973. Image and Environment. Chicago: Aldine.
- Dulbecco, R. (ed.), 1991. Encyclopedia of Human Biology Vol. 7. San Diego: Academic Press.

- Farbstein, J. & M. Kantrowitz, 1978. People in Places: Experiencing, Using, and Changing the Built Environment. New Jersey: Prentice-Hall.
- Gibson, J. 1958. Perception of distance & space in the open air. (as cited in Ulrich, 1984)
- Gibson, J. 1966. The Senses Considered as Perceptual Systems. Boston: Houghton Mifflin.
- Hiss, T., 1990. The Experience of Place. New York: Alfred A. Knopf.
- Ittleson, W., 1973. Environmental Perception and contemporary Perceptual Theory. In Environment and Cognition, New York: Seminar Press.
- James, W., 1892. Psychology: The briefer course. (as cited in Kaplan & Kaplan, 1982)
- Kaplan, S. & R. Kaplan, 1981. Cognition and Environment: Functioning in an Uncertain World. New York: Praeger.
- Kaplan, R., 1976. Wayfinding in the Environment. In G.T. Moore and R. G. Golledge (eds.), 1976. Environmental Knowing: Theory, Research, and Methods. Stroudsburg, PA: Dowden, Hutchinson, and Ross.
- Kaplan, R., & Kaplan, S., 1989. The Experience of Nature: a psychological perspective. Cambridge: Cambridge University Press.
- Kaplan, S., & Kaplan, R., 1982. Humanscapes: Environments for people. Ann Arbor: Ulrich's Books.
- Lamarck, J. B. M., 1809. Philosophie Zoologique.
- Lazarus, R. S., Kanner, A. D., & Folkman, S. 1980. Emotions: A cognitive-phenomenological analysis. (as cited in Ulrich, 1984)
- Lynch, K., 1960. The Image of the City. Cambridge: The M.I.T. Press.
- Marcus, C. & C. Francis, (eds.), 1990. People Places: Design Guidelines for Urban Open Spaces. New York: Van Nostrand Reinhold.
- Messervy, J., 1990. Contemplative Gardens. Charlottesville: Howell Press.
- Moore, G. T. & R. G. Golledge (eds.), 1976. Environmental Knowing: Theory, Research, and Methods. Stroudsburg, PA: Dowden, Hutchinson, and Ross.

- Posner, M. I., & Rothbart, M. K., 1980. The Development of Attentional Mechanisms. (as cited in Kaplan & Kaplan, 1981)
- Rapoport, A., 1988. Place, Image, and Placemaking. Unpublished manuscript, University of Wisconsin-Milwaukee.
- Relph, E., 1976. Place and Placelessness. London: Pion.
- Rock, I., & Harris, C. S., 1967. Vision and Touch. (as cited in Kaplan & Kaplan, 1981)
- Rossmann, B. B. & Ulehla, Z. J., 1977. Psychological reward values associated with wilderness use. (as cited in Ulrich, 1984)
- Shafer, E. L., Jr., & Mietx, J., 1969. Aesthetic and emotional experiences rate high with Northeast wilderness hikers. (as cited in Ulrich, 1984)
- Tinsley, E. A., & Tinsley, D. J., 1986. A Theory of the Attributes, Benefits, and Causes of Leisure Experience. In: Leisure Sciences, Vol. 8, No. 1.
- Tuan, Y., 1974. Topophilia: A study of environmental perception, attitudes, and values. New Jersey: Prentice-Hall.
- Tuan, Y., 1977. Space and Place: The Perspective of Experience. Minneapolis: University of Minnesota Press.
- Tuan, Y., 1982. Segmented Worlds and Self: Group life and individual consciousness. Minneapolis: University of Minnesota Press.
- Ulrich, R. S., 1977. Visual Landscape Preferences: A Model and Application. In: Man-Environment Systems, Vol. 7, pp. 279-293.
- Ulrich, R. S., 1984. Aesthetic and Affective Response to Natural Environment. In: Human Behavior & Environment, Vol. VI.
- Ulrich, R. S., 1985. Human Responses to Vegetation and Landscapes. In: Landscape and Urban Planning, Vol. 13, pp. 29-44.
- Wallace, A. R., 1859. On the Tendency of Varieties to Depart Indefinitely from the Original type. In, Journal of the Linnean Society of London. Vol. 3.
- Wohwill, J. F., 1976. Environmental Aesthetics: The Environment as a Source of Affect. In: Human Behavior & Environment, Vol. 1.

Zube, E. H., Pitt, D. G., & Anderson, T. W. 1984. Perception and Measurements of Scenic Resources in the Southern Connecticut River Valley. (as cited in Ulrich, 1984)

## **Bibliography: Visual Impairment and Blindness**

Aiello, J., 1978. A Shot in the Dark: Towards a Research Methodology for Analyzing Perceptions of the Visually Impaired Traveler. Department of Geography, Syracuse University, No. 50, July, 1978.

Armstrong, J. (ed.), 1969. A Combined Mobility System for the Blind. In, Nature, Vol. 222, June 28, 1969: 1301-1302.

Bailey, J., 1956. Meaning Maps for the Blind and Seeing. In, New Outlook for the Blind, Vol. 50, Mar. 1956: 77-83.

Bednar, M. (ed.), 1977. Barrier-Free Environments. Strousburg, PA: Dowden Hutchinson and Ross.

Beni, R. & C. Cornoldi, 1988. Imagery Limitations in Totally Congenitally Blind Subjects. In, Journal of Experimental Psychology: Learning, Memory, and Cognition, Vol. 14, No. 4, 650-655.

Blasch, B. & R. Welsh, and T. Davidson, 1973. Auditory Maps: Orientation Aid for Visually Handicapped Persons. In, New Outlook for the Blind, Vol. 67, Apr. 1973: 145-158.

Bliss, J., 1963. Tactual-Kinesthetic Perception of Information. In, Proceedings of the International Congress on Technology and Blindness. Edited by L. Clark. vol. 1, New York: American Foundation for the Blind, 1963. p. 309-323.

Brodey, W., 1965. Sound and Space. In, New Outlook for the Blind, Vol. 59, Jan. 1965: 1-4.

Cardwell, H. Gardens and Parks for Everyone. In, Journal of Visual Impairment and Blindness.

Carver, V. and M. Roda, 1978. Disability and the Environment. London: Paul Elek.

Craig, J. 1972. Difference Threshold for Intensity of Tactile Stimuli. In, Perception and Psychophysics, Vol. 11, Feb. 1972: 150-152.

- Garvey, J., 1969. Touch and See. In, Parks and Recreation, Nov., 1969.
- Geldard, F., 1972. The Human Senses. New York: Wiley.
- Gibson, J., 1979. The Ecological Approach to Visual Perception. Boston: Houghton Mifflin.
- Keller, H., 1938. Helen Keller's Journal. Bath: Cedric Chivers.
- Kennedy, J. 1983. What can we Learn About Pictures for the Blind. In, American Scientist, Vol. 71, Jan-Feb., 1983: 19-26.
- Kidwell, A. & P. Greer, 1973. Sites Perception and the Nonvisual Experience. New York: American Foundation for the Blind.
- Leach, M. 1992. Symphony for the Sense: A Garden for the Blind Takes Shape. In, Columbus Dispatch, 2/23/92.
- Lederman, S., 1979. Auditory Texture Perception. In, Perception, Vol. 8, No. 1, 1979: 93-103.
- McEachern, M., 1970. Beauty is not in the Eyes of These Beholders. In, Today's Health, Nov. 1970.
- Mueller, C., 1965. Sensory Psychology. Englewood Cliffs, New Jersey: Prentice-Hall.
- Nichols, D., 1990. Tactual Environmental Interpretation: A Multisensory Approach. In, Journal of Visual Impairment and Blindness, March, 1990.
- Ono, H. and A. Fay, and S Tarbell, 1986. A Visual Explanation of Facial Vision. In, Psychology Research, 48: 57-62.
- Pick, H., D. Warren, and J. Hay, 1969. Sensory Conflicts in Judgment of Spatial Direction. In, Perception and Psychophysics, Vol. 6, Oct. 1969: 203-205.
- Plourde, R., 1980. Recreation. In, Access Information Bulletin. National Center for Barrier Free Environment.
- Robinson, F. and S Skinner, 1985. A Holistic Perspective on the Disabled Child, Illinois: Charles C. Thomas Publisher.
- Schiffman, H., 1976. Sensation and Perception and Integrated Approach. New York: Wiley.

- Seven, S., 1980. Environmental Interpretation for the Visually Impaired. In, The Journal of Environmental Education, Vol. 11, No. 4.
- Stubbins, J. (ed.), 1977. Social and Psychological Aspects of Disability: A Handbook for Practitioners. Baltimore: University Park Press.
- U.S. Bureau of Census, 1994. Statistical Abstract of the U.S. 1994. Washington, DC: Government Printing Office.
- Welch, R. and B. Blasch, (eds.), 1980. Foundations of Orientation and Mobility. New York: American Foundation for The Blind.
- White, B., and others, 1970. Seeing with the Skin. In, Perception and Psychophysics, Vol. 7, Jan. 1970: 23-27.

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